Supplementary

Trends in, projections of, and inequalities in non-communicable diseases management indicators in Vietnam 2010–2030 and progress toward universal health coverage: A Bayesian analysis at national and sub-national levels

Authors:
Phuong The Nguyen[1,2]*, Stuart Gilmour[1], Phuong Mai Le[1], Hoa L. Nguyen[3], Thi Minh An Dao[4,5], Bao Quoc Tran[6], Minh Van Hoang[7], Huy Van Nguyen[1,8,9]

Affiliations:
[1] Graduate School of Public Health, St. Luke's International University, Tokyo, Japan
[2] Division of Surveillance and Policy Evaluation, National Cancer Center Institute for Cancer Control, Tokyo, Japan
[3] Department of Population and Quantitative Health Sciences, University of Massachusetts Chan Medical School, Massachusetts, USA
[4] School of Public Health, The University of Queensland, Queensland, Australia
[5] Institution for Preventive Medicine and Public Health, Hanoi Medical University, Hanoi, Vietnam
[6] General Department of Preventive Medicine, Ministry of Health, Hanoi, Vietnam
[7] Hanoi University of Public Health, Hanoi, Vietnam
[8] Health Innovation and Transformation Centre, Federation University, Victoria, Australia
[9] School of Medicine and Dentistry, Griffith University, Queensland, Australia

Table of Contents

Table S1: Description of the Included Surveys

Sources of data	Survey year	Sampling design	Sample households	Response Rate
Vietnam STEPwise Approach to NCD Risk Factor Surveillance (STEPS)	2009-2010	Two-stage stratified sampling	14706	64.1%
Vietnam STEPwise Approach to NCD Risk Factor Surveillance (STEPS)	2015	Two-stage stratified sampling	3758	79.8%
Vietnam Global Adults Tobacco Survey (VGATS)	2010	Two-stage stratified sampling	9925	92.7%
Vietnam Global Adults Tobacco Survey (VGATS)	2015	Two-stage stratified sampling	9206	95.8%
Total			**37595**	

Table S2: List of non-communicable disease (NCD) health service indicators and data sources

Indicator	Definition	Numerator	Denominator	Data source (questions used)
Promotion and Prevention Indicators				
Non-use of tobacco	The proportion of adults aged 18 years or older who currently do not smoke tobacco	Number of adults age 18 years or older who currently do not smoke tobacco either in a daily or less than daily basis	Total number of respondents age 18 years or older	VGATS 2010 (b01) VGATS 2015 (B01)
Non-harmful use of alcohol	The proportion of adults aged 18 years or older who do not having harmful use of alcohol (i.e., binge drinking and heavy drinking)	Number of adults age 18 years or older who are not having harmful use of alcohol (i.e., binge drinking and heavy drinking)	Total number of respondents age 18 years or older	VSTEPS 2010 (xa0, a1, a2, a3, a5a, a5b, a5c, a5d, a5e, a5f, a5g) VSTEPS 2015 (a1, a2, a4, a7, a10a, a10b, a10c, a10d, a10e, a10f, a10g)
Binge drinking	The proportion of adults aged 18 years or older who report having at least 5 drinks (for men) or 4 drinks (for women) on at least 1 occasion during the previous 30 days	Number of adults aged 18 years or older who report having at least 5 drinks (for men) or 4 drinks (for women) on at least 1 occasion during the previous 30 days	Total number of respondents age 18 years or older	VSTEPS 2010 (xa0, a1, a5a, a5b, a5c, a5d, a5e, a5f, a5g) VSTEPS 2015 (a1, a2, a10a, a10b, a10c, a10d, a10e, a10f, a10g)
Heavy drinking	The proportion of adults aged 18 years or older who report having weekly alcohol consumption of at least 15 drinks (for men) or 8 drinks (for women).	Number of adults aged 18 years or older who report having weekly alcohol consumption of at least 15 drinks (for men) or 8 drinks (for women).	Total number of respondents age 18 years or older	VSTEPS 2010 (xa0, a1, a2, a3, a5a, a5b, a5c, a5d, a5e, a5f, a5g) VSTEPS 2015 (a1, a2, a4, a7, a10a, a10b, a10c, a10d, a10e, a10f, a10g)
Sufficient physical activity	The proportion of adults with sufficient physical activity (defined as 150 minutes of moderate-intensity physical activity per week; or 75 minutes of vigorous-intensity physical activity per week; or an equivalent combination of moderate- and vigorous-intensity physical activity accumulating at least 600 metabolic equivalent minutes per week)	Number of adults with sufficient physical activity (defined as 150 minutes of moderate-intensity physical activity per week; or 75 minutes of vigorous-intensity physical activity per week; or an equivalent combination of moderate- and vigorous-intensity physical activity accumulating at least 600 metabolic equivalent minutes per week)	Total number of respondents age 18 years or older	VSTEPS 2010 (p1, p2, p3a, p3b, p4, p5, p6a, p6b, p7, p8, p9a, p9b, p10, p11, p12a, p12b, p13, p14, p15a, p15b, p16a, p16b, xp1, xp2, xp3a, xp3b, xp4, xp5, xp6a, xp6b) VSTEPS 2015 (p1, p2, p3a, p3b, p4, p5, p6a, p6b, p7, p8, p9a, p9b, p10, p11, p12a, p12b, p13, p14, p15a, p15b, p16a, p16b)
Sufficient use of fruit and vegetables	The proportion of adults aged 18 years or older who eat five or more servings of fruit and/or vegetables (400 grams) on average per day	Number of adults aged 18 years or older who eat five or more servings of fruit and/or vegetables (400 grams) on average per day	Total number of respondents age 18 years or older	VSTEPS 2010 (d1, d2, d3, d4) VSTEPS 2015 (d1, d2, d3, d4)
Management and Treatment Indicators				
Non-overweight	The proportion of adults aged 18 years or older who are not overweight (i.e., body-mass index <25.0 kg/m²)	Number of adults aged 18 years or older who are not overweight (i.e., body-mass index <25.0 kg/m²)	Total number of respondents age 18 years or older	VSTEPS 2010 (m3, m4, m5) VSTEPS 2015 (m8, m11, m12)
Screening for cervical cancer	The proportion of women aged 18 years or older who have ever had a screening test for cervical cancer using any of the following methods: visual inspection with acetic acid/vinegar (VIA), pap smear, human papillomavirus (HPV) test.	Number of women aged 18 years or older who have ever had a screening test for cervical cancer using any of the following methods: visual inspection with acetic acid/vinegar (VIA), pap smear, human papillomavirus (HPV) test.	Total number of female respondents age 18 years or older	VSTEPS 2015 (cx1)
Treatment of diabetes	The proportion of respondents who use medication for treating/ controlling diabetes or raised blood glucose among those either have raised blood glucose (plasma venous value>=7mmol) OR were diagnosed with diabetes by a doctor OR are on medication for diabetes	Number of respondents who use medication (exluding traditional medicine) for treating/controlling diabetes or raised blood glucose	Number of respondents aged 18 years or older who either have raised blood glucose (plasma venous value>=7mmol) OR were diagnosed with diabetes by a doctor	VSTEPS 2010 (h7, xh8, b1, b5) VSTEPS 2015 (h7a, h8, b5, b6)

			OR are on medication (exluding traditional medicine) for diabetes	
Treatment of hypertension	The proportion of respondents who use medication for treating/ controlling hypertension or raised blood pressure among those either have raised blood pressure (SBP>=140 and/or DBP>=90mmHg) OR were diagnosed with hypertension by a doctor OR are on medication for hypertension	Number of respondents who use medication (excluding traditional medicine) for treating/controlling hypertension or raised blood pressure	Number of respondents aged 18 years or older who either have raised blood pressure (SBP>=140 and/or DBP>=90 mmHg) OR were diagnosed with hypertension by a doctor OR are on medication (exluding traditional medicine) for hypertension	VSTEPS 2010 (m11a, m11b, m12a, m12b, m13a, m13b, m14, h2, h3a) VSTEPS 2015 (m4a, m4b, m5a, m5b, m6a, m6b, m7, h2a, h3)
Treatment of high cholesterol	The proportion of respondents who use medication for treating/ controlling high cholesterol among those either have high total blood cholesterol (total cholesterol ≥ 6.2 mmol/L or ≥ 240 mg/dl) OR were diagnosed with high cholesterol by a doctor OR are on medication for high cholesterol	Number of respondents who use medication (excluding traditional medicine) for treating/controlling high cholesterol	Number of respondents aged 18 years or older who either have high total blood cholesterol (total cholesterol ≥ 6.2 mmol/L or ≥ 240 mg/dl) OR were diagnosed with high cholesterol by a doctor OR are on medication (exluding traditional medicine) for high cholesterol	VSTEPS 2015 (b1, xb1, b4, b8, b9, h13a, h14)

Note: VSTEPS=Vietnam STEPwise Approach to NCD Risk Factor Surveillance; VGATS=Vietnam Global Adult Tobacco Survey;

Bayesian models

We developed the Bayesian regression model step by step from a standard Frequentist linear regression model. First, we considered a standard linear regression model of y_i, which is the logistic transformation of outcomes (coverage of NCD indicators). That is,

$$y_i = ln\left(\frac{p_i}{1-p_i}\right)$$

Where here p_i is the proportion measured of the i-th indicator. The *i* subscript measures the indicator number, i.e. $j \in (1, \dots, 16)$. The linear regression model can also be written as

$$y_i \sim \text{Normal}(\mu_i, \sigma^2)$$

$$\mu_i = \alpha + \beta X'_i$$

Where, X' is a vector of predictors including continuous variable of time, dummy variables of gender, ethnic groups, living area, wealth quintile, or educational level, and the interaction terms between time and those dummy variables. The prior for model parameters were specified as:

$$\alpha \sim Student_3(median(y_i), 10)$$
$$\beta \sim 1 \ (flat)$$

and

$$\sigma \sim Student_3(0, 10)$$

For regional level, we extended this model to a classical mixed effects model. To allow each region j to have a unique intercept for different means with others, we added $\boldsymbol{\alpha_j}$ to the model. Similarly, we used a varying slope to indicate that each region is allowed to have a different trend line with others (random effect intercepts and random effect slopes). We evaluated this correlation by α region and β region as specified on the following model:

$$\mu_{ij} = \alpha + \alpha_j + (\beta + \beta_j)x_{ij}$$
$$\begin{bmatrix}\alpha_j \\ \beta_j\end{bmatrix} \sim \text{MVNormal}\left(\begin{bmatrix}0 \\ 0\end{bmatrix}, S\right)$$
$$S = \begin{pmatrix}\sigma^2_{\alpha_i} & \sigma_{\alpha_j}\sigma_{\beta_j}\rho \\ \sigma_{\alpha_j}\sigma_{\beta_j}\rho & \sigma^2_{\beta_j}\end{pmatrix}$$

To ensure the prior was non-informative, we gave α and β the Normal(0, 4) prior, which allows α and β to mostly lie in a large range between -10 and 10. The residual variation σ was given a Half-Cauchy before restricting the distribution to positive values. **M** is the correlation matrix, and ρ is the correlation between intercepts and slopes. This matrix was set to an LKJ-Correlation prior.

Table S3: Model comparison using leave-one-out cross-validation for wealth index

Model	Model without interaction			Model with interaction			Difference		Interaction term used
	ELPD_o	P_LOO_o	LOOIC_o	ELPD_i	P_LOO_i	LOOIC_i	ELPD	LOOIC	
Non-use of tobacco	-56.0	10.8	112.0	-57.4	13.1	114.8	-1.4	2.8	No
Non-harmful use of alcohol	-70.3	26.8	140.5	-72.8	31.7	145.7	-2.6	5.2	No
Sufficient physical activity	-80.3	34.2	160.6	-83.2	41.3	166.5	-2.9	5.8	No
Sufficient use of fruit and vegetable	-69.4	25.8	138.8	-77.9	36.5	155.7	-8.5	16.9	No
Non-overweight	-66.3	26.0	132.5	-73.8	34.4	147.6	-7.5	15.1	No
Treatment of diabetes	-58.0	21.9	115.9	-66.5	32.0	133.0	-8.6	17.1	No
Treatment of hypertension	-39.3	13.2	78.6	-48.7	23.1	97.3	-9.4	18.8	No
Composite Prevention (meta)	-49.3	8.1	98.7	-57.5	15.7	115.1	-8.2	16.4	No
Composite Treatment (meta)	-57.2	31.3	114.4	-105.2	78.6	210.5	-48.1	96.1	No
Composite health coverage (meta)	-116.0	90.2	231.9	-201.9	175.0	403.8	-85.9	171.9	No
Composite Prevention (a.mean)	-50.5	8.7	100.9	-55.2	13.4	110.3	-4.7	9.4	No
Composite Treatment (a.mean)	-55.5	29.5	111.1	-106.0	79.4	212.0	-50.5	100.9	No
Composite health coverage (a.mean)	-107.2	81.3	214.3	-223.7	196.9	447.4	-116.6	233.1	No
Composite Prevention (geo.mean)	-52.0	10.6	104.1	-62.1	19.9	124.2	-10.1	20.2	No
Composite Treatment (geo.mean)	-59.4	33.5	118.9	-103.0	76.4	205.9	-43.5	87.0	No
Composite health coverage (geo.mean)	-121.8	95.8	243.7	-221.2	194.2	442.3	-99.3	198.6	No

Note: LOOIC=Leave one out Criteria Information; ELPD=Expected Log Predictive Density; P_LOO=Effective number of parameters; meta=Meta-analysis random effects; a.mean=Arithmetic Means; geo.mean=Geometric Means

Table S4: Model comparison using leave-one-out cross-validation for regional levels

Model	Model without interaction			Model with interaction			Difference		Random slope used
	ELPD_o	P_LOO_o	LOOIC_o	ELPD_i	P_LOO_i	LOOIC_i	ELPD	LOOIC	
Non-use of tobacco	-59.8	9.1	119.5	0.0	-85.8	24.9	171.6	-52.1	Yes
Non-harmful use of alcohol	-55.1	8.8	110.2	0.0	-68.9	16.8	137.9	-27.7	Yes
Sufficient physical activity	-55.8	9.5	111.6	0.0	-708.4	303.2	1416.7	-1305.2	Yes
Sufficient use of fruit and vegetable	-56.0	9.4	111.9	0.0	-117.3	43.4	234.5	-122.6	Yes
Non-overweight	-53.1	10.0	106.1	0.0	-196.3	92.9	392.6	-286.5	Yes
Treatment of diabetes	-47.8	9.2	95.6	0.0	-124.0	55.4	248.1	-152.5	Yes
Treatment of hypertension	-34.3	7.3	68.5	0.0	-67.3	27.5	134.7	-66.1	Yes
Composite Prevention (meta)	-55.7	7.9	111.5	0.0	-91.2	28.9	182.4	-71.0	Yes
Composite Treatment (meta)	-37.3	4.7	74.6	0.0	-38.2	4.1	76.5	-1.9	Yes
Composite health coverage (meta)	-35.4	2.7	70.7	-0.1	-35.2	2.3	70.5	0.2	No
Composite Prevention (a.mean)	-55.9	8.0	111.8	0.0	-78.7	21.4	157.5	-45.7	Yes
Composite Treatment (a.mean)	-38.4	5.6	76.7	0.0	-39.9	4.8	79.7	-3.0	Yes
Composite health coverage (a.mean)	-35.3	2.6	70.5	-0.2	-35.1	2.2	70.1	0.4	No
Composite Prevention (geo.mean)	-55.6	7.6	111.3	0.0	-89.0	26.7	177.9	-66.7	Yes
Composite Treatment (geo.mean)	-39.6	7.2	79.2	0.0	-53.5	12.8	107.0	-27.8	Yes
Composite health coverage (geo.mean)	-38.9	5.1	77.7	0.0	-42.2	6.9	84.4	-6.7	Yes

Note: LOOIC=Leave one out Criteria Information; ELPD=Expected Log Predictive Density; P_LOO=Effective number of parameters; meta=Meta-analysis random effects; a.mean=Arithmetic Means; geo.mean=Geometric Means

Table S5: Model comparison using leave-one-out cross-validation for educational levels

Model	Model without interaction			Model with interaction			Difference		Interaction term used
	ELPD_o	P_LOO_o	LOOIC_o	ELPD_i	P_LOO_i	LOOIC_i	ELPD	LOOIC	
Non-use of tobacco	-52.0	8.2	104.0	0.0	-55.5	9.2	111.1	-7.1	Yes
Non-harmful use of alcohol	-48.0	8.0	96.0	0.0	-55.8	11.5	111.7	-15.6	Yes
Sufficient physical activity	-49.0	8.0	98.1	0.0	-51.3	8.3	102.5	-4.5	Yes
Sufficient use of fruit and vegetable	-48.7	8.2	97.4	-0.3	-48.4	7.1	96.8	0.6	No
Non-overweight	-46.8	9.1	93.7	0.0	-70.2	22.5	140.4	-46.8	Yes
Treatment of diabetes	-41.8	8.0	83.5	0.0	-58.4	17.5	116.8	-33.3	Yes
Treatment of hypertension	-32.8	7.7	65.5	-4.3	-28.5	3.9	57.0	8.5	No
Composite Prevention (meta)	-49.4	8.0	98.9	-3.4	-46.1	4.7	92.2	6.7	No
Composite Treatment (meta)	-32.8	7.6	65.5	-4.5	-28.3	3.8	56.5	9.0	No
Composite health coverage (meta)	-32.9	7.9	65.9	-6.1	-26.9	2.8	53.7	12.2	No
Composite Prevention (a.mean)	-49.4	7.8	98.7	-1.9	-47.5	5.5	94.9	3.8	No
Composite Treatment (a.mean)	-33.7	8.5	67.4	-6.6	-27.1	2.9	54.3	13.2	No
Composite health coverage (a.mean)	-33.3	8.3	66.7	-6.5	-26.9	2.7	53.7	13.0	No
Composite Prevention (geo.mean)	-49.6	8.0	99.2	-4.9	-44.6	3.8	89.3	9.9	No
Composite Treatment (geo.mean)	-33.1	7.9	66.1	-4.2	-28.8	4.2	57.7	8.4	No
Composite health coverage (geo.mean)	-33.9	8.7	67.9	-7.2	-26.8	2.6	53.6	14.3	No

Note: LOOIC=Leave one out Criteria Information; ELPD=Expected Log Predictive Density; P_LOO=Effective number of parameters; meta=Meta-analysis random effects; a.mean=Arithmetic Means; geo.mean=Geometric Means

Table S6: Model comparison using leave-one-out cross-validation for living area

Model	Model without interaction			Model with interaction			Difference		Interaction term used
	ELPD_o	P_LOO_o	LOOIC_o	ELPD_i	P_LOO_i	LOOIC_i	ELPD	LOOIC	
Non-use of tobacco	-22.9	3.3	45.7	-22.8	3.3	45.6	0.0	-0.2	Yes
Non-harmful use of alcohol	-19.2	1.6	38.4	-21.0	3.1	42.0	-1.8	3.6	No
Sufficient physical activity	-20.3	2.1	40.5	-21.9	3.5	43.7	-1.6	3.2	No
Sufficient use of fruit and vegetable	-20.9	2.7	41.8	-21.2	3.1	42.4	-0.3	0.7	No
Non-overweight	-18.4	1.6	36.7	-20.1	3.1	40.3	-1.8	3.6	No
Treatment of diabetes	-18.6	3.0	37.2	-19.2	3.8	38.4	-0.6	1.2	No
Treatment of hypertension	-16.2	4.0	32.4	-15.0	3.2	29.9	0.0	-2.5	Yes
Composite Prevention (meta)	-19.8	1.6	39.6	-21.5	3.1	43.1	-1.7	3.5	No
Composite Treatment (meta)	-13.6	1.9	27.1	-15.5	3.5	30.9	-1.9	3.8	No
Composite health coverage (meta)	-13.1	1.5	26.2	-15.4	3.6	30.9	-2.3	4.6	No
Composite Prevention (a.mean)	-20.0	1.8	39.9	-22.0	3.5	43.9	-2.0	4.0	No
Composite Treatment (a.mean)	-13.4	1.8	26.8	-15.5	3.6	30.9	-2.0	4.1	No
Composite health coverage (a.mean)	-13.2	1.6	26.4	-15.1	3.3	30.2	-1.9	3.8	No
Composite Prevention (geo.mean)	-20.6	2.2	41.3	-21.6	3.1	43.2	-1.0	1.9	No
Composite Treatment (geo.mean)	-13.2	1.6	26.4	-15.5	3.7	31.1	-2.3	4.6	No
Composite health coverage (geo.mean)	-13.0	1.4	26.0	-15.1	3.2	30.3	-2.1	4.2	No

Note: LOOIC=Leave one out Criteria Information; ELPD=Expected Log Predictive Density; P_LOO=Effective number of parameters; meta=Meta-analysis random effects; a.mean=Arithmetic Means; geo.mean=Geometric Means

Table S7: Model comparison using leave-one-out cross-validation for ethnic groups

Model	Model without interaction			Model with interaction			Difference		Interaction term used
	ELPD_o	P_LOO_o	LOOIC_o	ELPD_i	P_LOO_i	LOOIC_i	ELPD	LOOIC	
Non-use of tobacco	-20.9	2.2	41.8	-22.0	3.1	44.0	-1.1	2.3	No
Non-harmful use of alcohol	-26.7	7.2	53.4	-20.9	3.4	41.7	0.0	-11.7	Yes
Sufficient physical activity	-20.5	3.1	41.0	-20.3	3.3	40.6	0.0	-0.4	Yes
Sufficient use of fruit and vegetable	-56.9	27.0	113.8	-21.3	3.7	42.7	0.0	-71.1	Yes
Non-overweight	-17.5	1.7	35.0	-19.5	3.3	38.9	-2.0	3.9	No
Treatment of diabetes	-16.5	2.3	33.1	-17.6	3.1	35.1	-1.0	2.1	No
Treatment of hypertension	-12.5	2.0	24.9	-14.2	3.6	28.4	-1.7	3.5	No
Composite Prevention (meta)	-23.6	4.8	47.2	-21.0	3.1	42.0	0.0	-5.2	Yes
Composite Treatment (meta)	-13.8	1.9	27.6	-15.3	3.1	30.6	-1.5	3.0	No
Composite health coverage (meta)	-14.2	1.9	28.4	-15.7	3.2	31.5	-1.5	3.1	No
Composite Prevention (a.mean)	-23.6	4.8	47.3	-21.4	3.5	42.9	0.0	-4.4	Yes
Composite Treatment (a.mean)	-13.8	1.9	27.6	-15.4	3.2	30.8	-1.6	3.3	No
Composite health coverage (a.mean)	-14.3	2.0	28.6	-15.5	2.9	31.0	-1.2	2.4	No
Composite Prevention (geo.mean)	-29.1	8.6	58.3	-20.9	2.9	41.8	0.0	-16.5	Yes
Composite Treatment (geo.mean)	-13.6	1.9	27.3	-15.2	3.2	30.5	-1.6	3.2	No
Composite health coverage (geo.mean)	-14.0	1.7	28.0	-15.6	3.0	31.2	-1.6	3.2	No

Note: LOOIC=Leave one out Criteria Information; ELPD=Expected Log Predictive Density; P_LOO=Effective number of parameters; meta=Meta-analysis random effects; a.mean=Arithmetic Means; geo.mean=Geometric Means

Table S8: Model comparison using leave-one-out cross-validation for genders

Model	Model without interaction			Model with interaction			Difference		Interaction term used
	ELPD_o	P_LOO_o	LOOIC_o	ELPD_i	P_LOO_i	LOOIC_i	ELPD	LOOIC	
Non-use of tobacco	-19.9	2.8	39.9	-0.5	-19.4	2.3	38.8	1.1	No
Non-harmful use of alcohol	-20.4	4.5	40.8	-2.8	-17.6	1.8	35.2	5.6	No
Sufficient physical activity	-21.4	3.1	42.7	0.0	-62.7	31.9	125.5	-82.8	Yes
Sufficient use of fruit and vegetable	-21.6	3.4	43.2	0.0	-57.9	29.0	115.8	-72.6	Yes
Non-overweight	-20.6	3.6	41.2	0.0	-24.2	6.0	48.4	-7.2	Yes
Treatment of diabetes	-18.7	3.3	37.4	0.0	-27.0	9.4	53.9	-16.5	Yes
Treatment of hypertension	-14.7	2.8	29.4	0.0	-16.8	4.4	33.5	-4.1	Yes
Composite Prevention (meta)	-21.4	3.2	42.9	-0.5	-20.9	2.7	41.8	1.1	No
Composite Treatment (meta)	-14.9	3.0	29.8	-0.4	-14.5	2.5	29.0	0.8	No
Composite health coverage (meta)	-14.8	3.1	29.6	-1.5	-13.3	1.8	26.6	3.0	No
Composite Prevention (a.mean)	-21.7	3.3	43.4	0.0	-21.9	3.2	43.7	-0.3	Yes
Composite Treatment (a.mean)	-15.0	3.1	30.0	-0.0	-15.0	3.0	29.9	0.1	No
Composite health coverage (a.mean)	-15.0	3.2	30.0	-1.7	-13.3	1.7	26.7	3.4	No
Composite Prevention (geo.mean)	-21.9	3.4	43.8	0.0	-37.8	14.9	75.7	-31.9	Yes
Composite Treatment (geo.mean)	-14.7	2.8	29.5	0.0	-15.0	3.0	30.0	-0.5	Yes
Composite health coverage (geo.mean)	-15.5	3.6	31.1	-2.0	-13.5	1.9	27.0	4.0	No

Note: LOOIC=Leave one out Criteria Information; ELPD=Expected Log Predictive Density; P_LOO=Effective number of parameters; meta=Meta-analysis random effects; a.mean=Arithmetic Means; geo.mean=Geometric Means

Table S9: Average annual percent of change in NCD management indicators in different periods

Indicators	Average Annual Percentage of Change (95% CrI)			
	Period 2010-2030	Period 2010-2015	Period 2015-2020	Period 2020-2030
Non-use of tobacco	0.6 (0.4 to 0.7)	0.7 (0.5 to 0.9)	0.6 (0.4 to 0.8)	0.5 (0.4 to 0.6)
Non-harmful use of alcohol	-0.9 (-1.3 to -0.5)	-0.8 (-1.1 to -0.5)	-0.9 (-1.3 to -0.5)	-1.0 (-1.5 to -0.6)
Sufficient physical activity	0.4 (0.0 to 0.6)	0.4 (0.0 to 0.7)	0.4 (0.0 to 0.7)	0.4 (0.0 to 0.6)
Sufficient use of fruit and vegetable	3.9 (3.8 to 4.0)	4.9 (4.6 to 5.3)	5.7 (5.4 to 6.0)	2.5 (2.3 to 2.7)
Non-overweight	-1.0 (-1.5 to -0.5)	-0.7 (-1.0 to -0.4)	-0.9 (-1.3 to -0.5)	-1.1 (-1.8 to -0.6)
Treatment of diabetes	-1.9 (-2.6 to -0.6)	-2.4 (-4.2 to -0.7)	-2.2 (-3.2 to -0.6)	-1.5 (-1.7 to -0.6)
Treatment of hypertension	0.8 (0.1 to 1.6)	0.7 (0.1 to 1.4)	0.8 (0.1 to 1.5)	0.8 (0.1 to 1.7)
Composite Prevention	1.1 (0.9 to 1.3)	1.4 (1.0 to 1.7)	1.2 (0.9 to 1.5)	1.0 (0.8 to 1.1)
Composite Treatment	-0.9 (-2.2 to 0.8)	-0.9 (-2.7 to 0.8)	-0.9 (-2.6 to 0.8)	-0.9 (-1.9 to 0.7)
Composite Coverage	0.5 (-1.3 to 1.7)	0.5 (-1.3 to 2.2)	0.5 (-1.3 to 1.9)	0.4 (-1.3 to 1.3)

Table S10: Observed, predicted coverage and probability of reaching targets of NCD management in Vietnam by genders, 2010–2030

Indicators	Gender	Estimated coverage in percent (95% CI)		Predicted coverage in percent (95% CrI)		Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Non-use of tobacco	Women	98.4 (98.1 to 98.8)	98.9 (98.4 to 99.3)	99.1 (98.9 to 99.2)	99.4 (99.2 to 99.6)	100.0
	Men	48.7 (47.3 to 50.1)	54.7 (52.5 to 56.9)	60.7 (57.8 to 63.8)	71.6 (66.2 to 76.9)	0.1
Non-harmful use of alcohol	Women	98.7 (98.2 to 99.0)	98.0 (97.2 to 98.7)	97.6 (96.9 to 98.1)	95.7 (93.6 to 97.1)	100.0
	Men	60.8 (58.8 to 62.7)	53.8 (50.6 to 57.0)	46.3 (41.6 to 50.7)	32.3 (24.4 to 41.1)	0.0
Sufficient physical activity	Women	66.8 (65.3 to 68.3)	63.6 (60.5 to 66.6)	60.2 (55.6 to 64.3)	53.0 (43.5 to 62.1)	0.0
	Men	71.7 (69.8 to 73.5)	78.9 (76.4 to 81.2)	84.8 (81.3 to 87.7)	92.4 (88.1 to 95.3)	100.0
Sufficient use of fruit and vegetable	Women	18.3 (16.8 to 19.9)	48.6 (45.3 to 51.9)	80.0 (77.0 to 82.8)	98.6 (98.0 to 99.1)	100.0
	Men	18.4 (16.8 to 20.1)	37.0 (33.8 to 40.2)	60.3 (55.3 to 65.3)	91.1 (86.9 to 94.2)	100.0
Non-overweight	Women	88.6 (87.5 to 89.6)	83.5 (81.1 to 85.7)	76.9 (71.8 to 81.5)	58.7 (45.2 to 72.1)	0.0
	Men	87.5 (86.1 to 88.8)	85.5 (82.9 to 87.7)	83.1 (78.4 to 87.3)	77.7 (64.7 to 87.3)	34.4
Screening for cervical cancer	Women	NA	23.8 (21.5 to 26.2)	NA	NA	NA
Treatment of diabetes	Women	57.1 (50.0 to 63.9)	38.6 (29.7 to 48.4)	22.7 (10.8 to 41.2)	6.1 (1.0 to 29.5)	0.0
	Men	42.4 (34.5 to 50.8)	39.1 (29.5 to 49.6)	35.9 (17.4 to 58.2)	29.9 (5.0 to 74.7)	1.1
Treatment of hypertension	Women	34.1 (31.9 to 36.5)	32.7 (28.6 to 37.2)	31.4 (23.4 to 40.5)	28.7 (14.8 to 48.4)	0.0
	Men	18.7 (17.0 to 20.5)	25.6 (21.9 to 29.7)	33.9 (25.1 to 44.2)	53.4 (31.4 to 73.8)	0.3
Treatment of high cholesterol	Women	NA	23.2 (18.6 to 28.6)	NA	NA	NA
	Men	NA	26.1 (19.5 to 33.8)	NA	NA	NA

Table S11: Observed, predicted coverage and probability of reaching targets of NCD management in Vietnam by ethnic groups, 2010–2030

Indicators	Ethnic group	Estimated coverage in percent (95% CI)		Predicted coverage in percent (95% CrI)		Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Non-use of tobacco	Minorities (Others)	71.0 (67.8 to 73.9)	73.9 (70.2 to 77.4)	77.9 (75.7 to 79.9)	83.6 (80.3 to 86.6)	98.3
	Majority (Kinh)	74.6 (73.8 to 75.4)	78.1 (76.7 to 79.5)	81.1 (79.5 to 82.6)	86.2 (83.4 to 88.5)	100.0
Non-harmful use of alcohol	Minorities (Others)	79.9 (76.8 to 82.7)	71.2 (66.2 to 75.9)	60.8 (52.1 to 69.1)	37.6 (22.5 to 56.8)	0.0
	Majority (Kinh)	80.1 (79.0 to 81.1)	77.3 (75.1 to 79.3)	74.2 (70.8 to 77.3)	67.3 (59.1 to 74.6)	0.0
Sufficient physical activity	Minorities (Others)	88.3 (84.1 to 91.5)	89.9 (86.0 to 92.8)	91.3 (86.3 to 94.8)	93.5 (83.2 to 97.8)	99.1
	Majority (Kinh)	68.0 (66.7 to 69.2)	67.0 (64.6 to 69.2)	65.9 (62.4 to 69.4)	63.7 (56.2 to 70.9)	0.0
Sufficient use of fruit and vegetable	Minorities (Others)	20.0 (15.9 to 24.8)	32.1 (26.7 to 38.0)	47.1 (38.4 to 55.9)	75.9 (60.0 to 87.0)	26.9
	Majority (Kinh)	18.3 (17.1 to 19.5)	45.3 (42.4 to 48.2)	75.4 (72.6 to 78.0)	97.7 (96.9 to 98.3)	100.0
Non-overweight	Minorities (Others)	92.3 (88.4 to 95.0)	89.4 (85.8 to 92.2)	85.1 (81.8 to 87.9)	72.9 (63.4 to 80.6)	3.9
	Majority (Kinh)	87.9 (86.9 to 88.8)	83.2 (81.1 to 85.2)	77.3 (73.6 to 80.7)	61.7 (51.4 to 70.8)	0.0
Screening for cervical cancer	Minorities (Others)	NA	9.5 (6.6 to 13.5)	NA	NA	NA
	Majority (Kinh)	NA	26.6 (24.1 to 29.3)	NA	NA	NA
Treatment of diabetes	Minorities (Others)	20.0 (10.0 to 35.9)	20.0 (8.9 to 39.1)	11.0 (4.6 to 22.4)	5.1 (1.1 to 18.5)	0.0
	Majority (Kinh)	53.6 (47.9 to 59.3)	42.3 (35.0 to 50.0)	33.0 (20.2 to 47.7)	17.6 (4.8 to 43.9)	0.0
Treatment of hypertension	Minorities (Others)	15.0 (12.5 to 18.0)	16.7 (11.4 to 23.8)	20.1 (14.8 to 26.2)	26.5 (15.7 to 41.0)	0.0
	Majority (Kinh)	27.3 (25.7 to 29.0)	31.2 (28.1 to 34.5)	35.1 (28.6 to 42.3)	43.7 (29.6 to 59.4)	0.0
Treatment of high cholesterol	Minorities (Others)	NA	22.7 (12.8 to 37.0)	NA	NA	NA
	Majority (Kinh)	NA	24.4 (20.3 to 29.0)	NA	NA	NA

Table S12: Observed, predicted coverage and probability of reaching targets of NCD management in Vietnam by living areas, 2010–2030

Indicators	Living Area	Estimated coverage in percent (95% CI)		Predicted coverage in percent (95% CrI)		Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Non-use of tobacco	Rural	73.6 (72.5 to 74.7)	76.5 (74.7 to 78.2)	79.1 (76.7 to 81.3)	83.7 (79.3 to 87.3)	95.7
	Urban	75.5 (74.4 to 76.5)	79.4 (77.7 to 80.9)	82.8 (80.5 to 84.9)	88.3 (84.6 to 91.2)	100.0
Non-harmful use of alcohol	Rural	79.0 (77.8 to 80.3)	75.0 (72.1 to 77.7)	69.9 (66.3 to 73.2)	58.8 (50.5 to 66.5)	0.0
	Urban	82.5 (80.9 to 83.9)	78.3 (75.5 to 80.8)	74.2 (71.1 to 77.2)	63.8 (56.1 to 71.0)	0.0
Sufficient physical activity	Rural	73.1 (71.6 to 74.6)	76.0 (73.0 to 78.8)	77.7 (74.9 to 80.2)	81.6 (76.5 to 85.7)	75.3
	Urban	60.0 (58.2 to 61.7)	62.1 (59.1 to 65.1)	65.4 (62.0 to 68.7)	70.7 (64.1 to 76.5)	0.1
Sufficient use of fruit and vegetable	Rural	16.3 (14.9 to 17.8)	39.9 (36.4 to 43.5)	68.0 (64.7 to 71.1)	95.8 (94.4 to 96.9)	100.0
	Urban	22.9 (21.5 to 24.5)	48.4 (44.6 to 52.2)	76.0 (73.3 to 78.5)	97.2 (96.2 to 97.9)	100.0
Non-overweight	Rural	90.3 (89.1 to 91.3)	87.1 (84.9 to 89.1)	83.5 (80.5 to 86.1)	73.4 (64.8 to 80.5)	3.8
	Urban	82.9 (81.5 to 84.1)	78.4 (75.1 to 81.3)	72.6 (68.6 to 76.3)	59.1 (49.3 to 68.3)	0.0
Screening for cervical cancer	Rural	NA	21.4 (18.4 to 24.6)	NA	NA	NA
	Urban	NA	28.1 (24.7 to 31.6)	NA	NA	NA
Treatment of diabetes	Rural	45.0 (37.3 to 53.0)	26.0 (17.3 to 37.1)	13.2 (4.6 to 29.5)	2.7 (0.3 to 19.5)	0.0
	Urban	54.2 (46.9 to 61.3)	47.8 (38.9 to 56.9)	41.3 (24.2 to 60.5)	29.7 (7.2 to 68.9)	0.4
Treatment of hypertension	Rural	20.9 (19.3 to 22.7)	25.2 (21.5 to 29.3)	26.5 (20.9 to 32.7)	32.4 (20.4 to 46.8)	0.0
	Urban	33.7 (31.3 to 36.3)	34.8 (30.6 to 39.3)	39.8 (33.0 to 46.9)	46.8 (32.4 to 61.5)	0.0
Treatment of high cholesterol	Rural	NA	16.0 (11.5 to 22.0)	NA	NA	NA
	Urban	NA	31.5 (25.8 to 37.9)	NA	NA	NA

Table S13: Observed, predicted coverage and probability of reaching targets of NCD management in Vietnam by regional levels, 2010–2030

Indicators	Regional Levels	Estimated coverage in percent (95% CI)		Predicted coverage in percent (95% CrI)		Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Non-use of tobacco	Northern Midlands and Mountains	75.4 (74.0 to 76.8)	80.1 (78.0 to 82.1)	83.7 (80.9 to 86.3)	89.6 (85.3 to 92.9)	100.0
	Red River Delta	74.9 (73.2 to 76.6)	76.7 (73.3 to 79.8)	79.3 (73.9 to 83.4)	83.2 (72.6 to 89.8)	74.3
	North Central and Central Coast	68.0 (66.7 to 69.3)	78.5 (75.0 to 81.6)	85.2 (80.7 to 89.0)	93.9 (89.0 to 96.9)	100.0
	Central Highlands	78.6 (75.4 to 81.5)	80.6 (75.0 to 85.1)	81.4 (73.0 to 88.3)	84.1 (66.3 to 94.2)	71.0
	Southeast	76.3 (74.7 to 77.9)	76.0 (73.5 to 78.3)	76.4 (72.7 to 79.8)	76.6 (68.3 to 83.5)	17.3
	Mekong River Delta	70.8 (68.7 to 72.8)	76.8 (74.0 to 79.3)	81.3 (73.8 to 86.9)	86.9 (72.5 to 94.3)	90.4
Non-harmful use of alcohol	Northern Midlands and Mountains	80.6 (78.5 to 82.5)	78.6 (75.1 to 81.8)	75.4 (70.0 to 80.5)	69.5 (56.1 to 80.8)	3.6
	Red River Delta	78.0 (75.2 to 80.6)	77.5 (71.9 to 82.2)	75.8 (67.9 to 82.6)	73.2 (54.5 to 86.6)	18.2
	North Central and Central Coast	78.5 (76.7 to 80.1)	77.2 (71.2 to 82.3)	75.0 (66.4 to 82.1)	70.9 (51.4 to 85.4)	12.8
	Central Highlands	76.2 (73.4 to 78.8)	78.2 (66.4 to 86.6)	77.7 (65.9 to 87.1)	78.6 (52.5 to 93.3)	44.4
	Southeast	84.3 (82.0 to 86.4)	75.6 (71.6 to 79.2)	65.8 (58.9 to 72.5)	41.9 (27.3 to 59.1)	0.0
	Mekong River Delta	80.4 (77.6 to 82.8)	73.2 (68.5 to 77.5)	72.9 (63.2 to 81.6)	64.6 (41.3 to 84.9)	6.3
Sufficient physical activity	Northern Midlands and Mountains	93.3 (91.8 to 94.6)	60.0 (56.2 to 63.7)	14.0 (11.0 to 17.6)	0.2 (0.1 to 0.3)	0.0
	Red River Delta	68.1 (64.5 to 71.5)	60.9 (54.0 to 67.4)	53.7 (43.5 to 63.6)	38.5 (20.9 to 59.4)	0.0
	North Central and Central Coast	73.1 (71.3 to 74.9)	79.7 (72.9 to 85.2)	84.8 (77.2 to 90.4)	91.9 (80.5 to 97.1)	97.7
	Central Highlands	90.6 (88.0 to 92.6)	71.6 (56.9 to 82.8)	39.7 (24.3 to 58.9)	4.3 (1.1 to 18.4)	0.0
	Southeast	49.1 (45.9 to 52.3)	70.5 (66.5 to 74.2)	85.5 (81.8 to 88.6)	97.3 (95.2 to 98.5)	100.0
	Mekong River Delta	62.9 (60.1 to 65.7)	86.9 (81.9 to 90.6)	67.7 (17.4 to 95.7)	58.0 (0.8 to 99.6)	31.1
Sufficient use of fruit and vegetable	Northern Midlands and Mountains	23.3 (20.6 to 26.2)	50.3 (45.5 to 55.0)	76.7 (72.1 to 80.7)	97.3 (95.5 to 98.3)	100.0
	Red River Delta	25.9 (22.9 to 29.2)	42.7 (34.8 to 51.1)	62.5 (53.0 to 71.1)	88.9 (78.2 to 94.8)	95.5
	North Central and Central Coast	11.8 (10.3 to 13.4)	44.7 (37.3 to 52.3)	82.2 (75.1 to 87.7)	99.4 (98.5 to 99.7)	100.0
	Central Highlands	6.9 (4.4 to 10.5)	40.7 (25.9 to 57.3)	85.1 (74.6 to 91.8)	99.8 (99.1 to 99.9)	100.0
	Southeast	22.0 (19.3 to 24.9)	41.3 (36.6 to 46.2)	64.6 (58.2 to 70.4)	92.2 (86.8 to 95.5)	100.0
	Mekong River Delta	12.4 (10.1 to 15.0)	37.2 (31.9 to 42.8)	74.6 (56.3 to 87.3)	97.9 (85.5 to 99.7)	98.5
Non-overweight	Northern Midlands and Mountains	93.8 (92.7 to 94.8)	77.4 (73.0 to 81.2)	44.2 (35.6 to 53.4)	4.0 (1.9 to 8.3)	0.0
	Red River Delta	86.9 (84.8 to 88.8)	79.1 (72.3 to 84.6)	69.0 (56.4 to 79.9)	42.7 (19.2 to 71.1)	0.2
	North Central and Central Coast	92.5 (91.5 to 93.4)	83.1 (77.3 to 87.7)	66.1 (51.2 to 78.5)	23.7 (8.0 to 52.2)	0.0
	Central Highlands	93.3 (91.5 to 94.8)	86.2 (76.7 to 92.2)	72.4 (50.0 to 88.6)	33.2 (6.5 to 81.6)	3.0
	Southeast	82.0 (79.0 to 84.6)	84.7 (81.3 to 87.6)	87.2 (82.4 to 91.0)	91.0 (81.8 to 95.9)	99.0
	Mekong River Delta	85.4 (83.1 to 87.3)	91.4 (88.8 to 93.5)	76.1 (39.4 to 93.2)	54.0 (3.7 to 96.9)	17.8
Screening for cervical cancer	Northern Midlands and Mountains	NA	30.4 (26.3 to 34.9)	NA	NA	NA
	Red River Delta	NA	21.8 (15.7 to 29.4)	NA	NA	NA
	North Central and Central Coast	NA	21.5 (14.6 to 30.5)	NA	NA	NA
	Central Highlands	NA	16.4 (10.2 to 25.3)	NA	NA	NA
	Southeast	NA	25.5 (21.2 to 30.3)	NA	NA	NA
	Mekong River Delta	NA	14.4 (11.0 to 18.6)	NA	NA	NA
Treatment of diabetes	Northern Midlands and Mountains	28.6 (18.4 to 41.5)	52.8 (41.4 to 63.9)	71.9 (47.5 to 88.4)	93.8 (57.3 to 99.5)	84.8
	Red River Delta	66.7 (52.1 to 78.6)	21.7 (9.7 to 41.9)	4.6 (0.6 to 21.3)	0.1 (0.0 to 5.3)	0.0
	North Central and Central Coast	33.3 (22.9 to 45.6)	45.0 (25.8 to 65.8)	52.8 (17.8 to 85.6)	69.9 (6.1 to 98.8)	37.5
	Central Highlands	39.5 (25.6 to 55.3)	50.0 (15.0 to 85.0)	42.8 (4.9 to 93.0)	44.5 (0.3 to 99.7)	27.9
	Southeast	52.3 (40.4 to 64.0)	23.5 (14.0 to 36.8)	9.4 (2.5 to 26.3)	0.9 (0.0 to 13.1)	0.0
	Mekong River Delta	73.0 (61.0 to 82.4)	22.2 (9.0 to 45.2)	20.4 (2.1 to 73.1)	6.3 (0.0 to 93.1)	5.5
Treatment of hypertension	Northern Midlands and Mountains	14.5 (12.4 to 17.0)	35.7 (30.1 to 41.7)	63.3 (50.3 to 74.8)	94.6 (84.5 to 98.2)	99.2
	Red River Delta	19.9 (16.1 to 24.4)	31.8 (23.7 to 41.1)	45.4 (27.7 to 64.5)	73.4 (34.4 to 93.6)	32.8
	North Central and Central Coast	26.0 (23.1 to 29.2)	32.6 (23.6 to 43.0)	36.1 (19.9 to 57.3)	47.6 (14.5 to 84.5)	5.0
	Central Highlands	16.4 (13.5 to 19.8)	27.3 (15.1 to 44.2)	47.7 (18.4 to 73.4)	80.3 (19.4 to 97.7)	50.6
	Southeast	34.4 (30.3 to 38.7)	28.9 (23.9 to 34.4)	23.0 (14.8 to 33.9)	14.8 (5.2 to 35.3)	0.0

Indicators	Regional Levels	Estimated coverage in percent (95% CI)		Predicted coverage in percent (95% CrI)		Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Treatment of high cholesterol	Mekong River Delta	40.0 (35.9 to 44.2)	16.8 (11.9 to 23.2)	33.9 (9.9 to 68.9)	45.6 (2.3 to 95.7)	13.8
	Northern Midlands and Mountains	NA	35.1 (27.9 to 43.1)	NA	NA	NA
	Red River Delta	NA	15.6 (7.7 to 28.8)	NA	NA	NA
	North Central and Central Coast	NA	27.6 (14.7 to 45.7)	NA	NA	NA
	Central Highlands	NA	0.0 (0.0 to 29.9)	NA	NA	NA
	Southeast	NA	18.0 (12.2 to 25.8)	NA	NA	NA
	Mekong River Delta	NA	14.3 (7.4 to 25.7)	NA	NA	NA

Table S14: Observed, predicted coverage and probability of reaching targets of NCD management in Vietnam by completed wealth quintiles (before imputation), 2010–2030

Indicators	Wealth Quintiles	Estimated coverage in percent (95% CI)		Predicted coverage in percent (95% CrI)		Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Non-use of tobacco	Poorest	71.5 (69.1 to 73.7)	72.7 (69.6 to 75.5)	77.3 (75.3 to 79.2)	82.6 (79.2 to 85.6)	93.8
	Poorer	73.2 (71.2 to 75.1)	75.7 (72.9 to 78.3)	79.0 (77.0 to 80.9)	84.0 (80.8 to 86.8)	99.2
	Middle	72.6 (70.8 to 74.3)	76.4 (73.6 to 78.9)	78.7 (76.7 to 80.6)	83.8 (80.5 to 86.6)	98.8
	Richer	76.3 (74.4 to 78.2)	80.4 (78.0 to 82.7)	81.9 (80.1 to 83.5)	86.3 (83.5 to 88.7)	100.0
	Richest	79.7 (77.9 to 81.4)	82.2 (79.7 to 84.5)	84.4 (82.7 to 85.9)	88.3 (85.8 to 90.4)	100.0
Non-harmful use of alcohol	Poorest	79.6 (76.5 to 82.4)	73.2 (68.6 to 77.4)	71.0 (67.1 to 74.7)	60.6 (52.2 to 68.6)	0.0
	Poorer	81.2 (78.9 to 83.3)	76.0 (72.3 to 79.5)	72.9 (69.3 to 76.3)	62.8 (54.6 to 70.5)	0.0
	Middle	79.3 (77.2 to 81.3)	76.4 (71.6 to 80.6)	71.5 (67.6 to 75.1)	61.1 (52.6 to 69.2)	0.0
	Richer	79.9 (76.6 to 82.8)	76.9 (72.8 to 80.4)	72.0 (68.1 to 75.5)	61.7 (53.4 to 69.6)	0.0
	Richest	75.8 (71.2 to 79.9)	78.3 (74.5 to 81.6)	70.7 (66.8 to 74.4)	60.3 (52.2 to 68.0)	0.0
Sufficient physical activity	Poorest	78.3 (75.4 to 81.0)	82.0 (77.2 to 86.0)	79.8 (76.7 to 82.5)	83.3 (78.2 to 87.4)	90.7
	Poorer	77.3 (74.8 to 79.6)	72.8 (68.9 to 76.4)	77.3 (74.3 to 80.1)	81.2 (75.8 to 85.7)	68.0
	Middle	72.9 (70.4 to 75.4)	68.8 (63.5 to 73.7)	73.5 (69.9 to 77.1)	77.9 (71.5 to 83.2)	23.0
	Richer	68.7 (65.9 to 71.4)	67.6 (63.3 to 71.7)	70.0 (66.3 to 73.5)	74.7 (68.1 to 80.4)	3.6
	Richest	62.9 (57.5 to 68.0)	63.6 (59.0 to 67.9)	65.8 (61.9 to 69.5)	70.9 (64.1 to 76.9)	0.1
Sufficient use of fruit and vegetable	Poorest	10.0 (8.2 to 12.1)	25.4 (21.0 to 30.2)	54.1 (49.6 to 58.6)	93.1 (90.7 to 94.9)	100.0
	Poorer	13.8 (11.9 to 15.9)	37.2 (32.8 to 41.8)	64.5 (60.6 to 68.1)	95.4 (93.8 to 96.6)	100.0
	Middle	18.3 (16.4 to 20.2)	42.3 (37.6 to 47.2)	70.9 (67.2 to 74.5)	96.5 (95.2 to 97.5)	100.0
	Richer	25.5 (23.2 to 27.9)	53.7 (48.6 to 58.8)	78.8 (75.9 to 81.5)	97.7 (96.8 to 98.3)	100.0
	Richest	37.8 (33.1 to 42.8)	57.2 (52.5 to 61.7)	84.0 (81.7 to 86.1)	98.4 (97.8 to 98.8)	100.0
Non-overweight	Poorest	91.0 (88.5 to 93.0)	89.5 (86.5 to 91.8)	85.3 (82.2 to 88.1)	76.7 (67.9 to 83.8)	19.9
	Poorer	90.4 (88.7 to 91.8)	84.8 (81.3 to 87.7)	83.4 (80.0 to 86.3)	73.9 (64.7 to 81.6)	6.7
	Middle	87.4 (85.3 to 89.2)	85.1 (80.7 to 88.6)	80.0 (76.0 to 83.6)	69.3 (59.0 to 78.2)	0.8
	Richer	87.5 (85.5 to 89.2)	84.3 (80.3 to 87.6)	79.4 (75.2 to 83.0)	68.5 (58.2 to 77.5)	0.5
	Richest	80.6 (76.0 to 84.6)	77.4 (72.7 to 81.5)	71.2 (66.4 to 75.7)	58.3 (47.7 to 68.4)	0.0
Screening for cervical cancer	Poorest	NA	11.3 (7.8 to 16.1)	NA	NA	NA
	Poorer	NA	18.1 (14.5 to 22.5)	NA	NA	NA
	Middle	NA	24.6 (19.1 to 31.1)	NA	NA	NA
	Richer	NA	29.7 (24.4 to 35.6)	NA	NA	NA
	Richest	NA	36.5 (31.2 to 42.2)	NA	NA	NA
Treatment of diabetes	Poorest	33.9 (22.9 to 47.0)	22.6 (11.4 to 39.8)	17.0 (8.2 to 31.4)	6.8 (1.5 to 24.7)	0.0
	Poorer	50.8 (38.8 to 62.7)	35.0 (22.1 to 50.5)	26.5 (14.5 to 43.2)	11.3 (2.8 to 35.6)	0.0
	Middle	42.9 (30.8 to 55.9)	48.4 (32.0 to 65.2)	27.2 (14.1 to 45.2)	11.7 (2.7 to 37.2)	0.0
	Richer	54.5 (41.5 to 67.0)	57.1 (40.9 to 72.0)	36.1 (20.6 to 54.8)	16.7 (4.3 to 46.5)	0.0
	Richest	75.0 (53.1 to 88.8)	37.3 (25.3 to 51.0)	32.5 (19.2 to 49.0)	14.5 (4.1 to 39.7)	0.0
Treatment of hypertension	Poorest	24.5 (21.4 to 27.8)	25.0 (19.7 to 31.2)	30.0 (23.5 to 37.3)	36.4 (23.1 to 51.9)	0.0
	Poorer	25.9 (22.9 to 29.1)	23.9 (18.9 to 29.6)	31.0 (24.4 to 38.5)	37.4 (23.9 to 53.1)	0.0
	Middle	24.3 (21.5 to 27.4)	29.7 (23.0 to 37.5)	31.3 (24.2 to 39.2)	37.7 (23.7 to 53.9)	0.0
	Richer	24.0 (20.4 to 28.0)	34.5 (27.3 to 42.4)	32.0 (25.0 to 39.7)	38.5 (24.6 to 54.3)	0.0
	Richest	27.6 (21.3 to 34.9)	36.5 (29.8 to 43.7)	37.3 (29.8 to 45.3)	44.1 (29.8 to 59.3)	0.0
Treatment of high cholesterol	Poorest	NA	13.0 (6.4 to 24.4)	NA	NA	NA
	Poorer	NA	17.8 (11.2 to 26.9)	NA	NA	NA
	Middle	NA	15.2 (8.4 to 25.7)	NA	NA	NA
	Richer	NA	27.7 (19.2 to 38.2)	NA	NA	NA
	Richest	NA	37.1 (28.8 to 46.1)	NA	NA	NA

Table S15: Observed, predicted coverage and probability of reaching targets of NCD management in Vietnam by imputed wealth quintiles (after imputation), 2010–2030

Indicators	Wealth Quintiles	Estimated coverage in percent (95% CI)		Predicted coverage in percent (95% CrI)		Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Non-use of tobacco	Poorest	71.5 (70.2 to 72.8)	72.7 (70.7 to 74.7)	77.3 (75.3 to 79.2)	82.6 (79.2 to 85.6)	93.8
	Poorer	73.0 (71.7 to 74.3)	75.7 (73.6 to 77.8)	79.0 (77.0 to 80.9)	84.0 (80.8 to 86.8)	99.2
	Middle	72.4 (71.2 to 73.6)	76.3 (74.4 to 78.3)	78.7 (76.7 to 80.6)	83.8 (80.5 to 86.6)	98.8
	Richer	75.9 (74.6 to 77.2)	80.4 (78.6 to 82.3)	81.9 (80.1 to 83.5)	86.3 (83.5 to 88.7)	100.0
	Richest	79.3 (77.9 to 80.8)	82.2 (80.5 to 84.0)	84.4 (82.7 to 85.9)	88.3 (85.8 to 90.4)	100.0
Non-harmful use of alcohol	Poorest	80.1 (78.1 to 82.1)	73.2 (70.1 to 76.4)	71.0 (67.1 to 74.7)	60.6 (52.2 to 68.6)	0.0
	Poorer	81.4 (79.9 to 82.8)	76.1 (73.3 to 78.8)	72.9 (69.3 to 76.3)	62.8 (54.6 to 70.5)	0.0
	Middle	79.9 (78.4 to 81.3)	76.4 (72.9 to 79.8)	71.5 (67.6 to 75.1)	61.1 (52.6 to 69.2)	0.0
	Richer	80.2 (78.4 to 82.0)	76.8 (73.7 to 80.0)	72.0 (68.1 to 75.5)	61.7 (53.4 to 69.6)	0.0
	Richest	76.8 (73.5 to 80.2)	78.3 (75.3 to 81.2)	70.7 (66.8 to 74.4)	60.3 (52.2 to 68.0)	0.0
Sufficient physical activity	Poorest	74.7 (72.4 to 76.9)	82.0 (79.3 to 84.7)	79.8 (76.7 to 82.5)	83.3 (78.2 to 87.4)	90.7
	Poorer	73.5 (71.7 to 75.3)	72.9 (70.0 to 75.7)	77.3 (74.3 to 80.1)	81.2 (75.8 to 85.7)	68.0
	Middle	69.0 (66.9 to 71.1)	68.8 (65.0 to 72.6)	73.5 (69.9 to 77.1)	77.9 (71.5 to 83.2)	23.0
	Richer	64.8 (62.4 to 67.2)	67.6 (64.1 to 71.0)	70.0 (66.3 to 73.5)	74.7 (68.1 to 80.4)	3.6
	Richest	60.0 (55.7 to 64.3)	63.5 (60.1 to 66.9)	65.8 (61.9 to 69.5)	70.9 (64.1 to 76.9)	0.1
Sufficient use of fruit and vegetable	Poorest	9.5 (8.0 to 11.0)	25.4 (22.3 to 28.5)	54.1 (49.6 to 58.6)	93.1 (90.7 to 94.9)	100.0
	Poorer	13.2 (11.7 to 14.7)	37.2 (34.1 to 40.3)	64.5 (60.6 to 68.1)	95.4 (93.8 to 96.6)	100.0
	Middle	17.6 (16.0 to 19.1)	42.4 (38.4 to 46.4)	70.9 (67.2 to 74.5)	96.5 (95.2 to 97.5)	100.0
	Richer	24.3 (22.3 to 26.3)	53.7 (50.0 to 57.4)	78.8 (75.9 to 81.5)	97.7 (96.8 to 98.3)	100.0
	Richest	34.7 (31.2 to 38.1)	57.1 (53.6 to 60.6)	84.0 (81.7 to 86.1)	98.4 (97.8 to 98.8)	100.0
Non-overweight	Poorest	90.9 (89.7 to 92.2)	89.4 (87.1 to 91.8)	85.3 (82.2 to 88.1)	76.7 (67.9 to 83.8)	19.9
	Poorer	90.3 (89.1 to 91.5)	84.8 (82.3 to 87.3)	83.4 (80.0 to 86.3)	73.9 (64.7 to 81.6)	6.7
	Middle	87.5 (86.4 to 88.6)	85.0 (81.8 to 88.2)	80.0 (76.0 to 83.6)	69.3 (59.0 to 78.2)	0.8
	Richer	87.0 (85.5 to 88.5)	84.2 (81.2 to 87.3)	79.4 (75.2 to 83.0)	68.5 (58.2 to 77.5)	0.5
	Richest	80.9 (78.0 to 83.8)	77.4 (73.8 to 81.0)	71.2 (66.4 to 75.7)	58.3 (47.7 to 68.4)	0.0
Screening for cervical cancer	Poorest	NA	11.2 (8.3 to 14.1)	NA	NA	NA
	Poorer	NA	18.2 (15.0 to 21.5)	NA	NA	NA
	Middle	NA	24.5 (19.7 to 29.3)	NA	NA	NA
	Richer	NA	29.7 (25.1 to 34.3)	NA	NA	NA
	Richest	NA	36.4 (31.8 to 41.1)	NA	NA	NA
Treatment of diabetes	Poorest	38.2 (25.6 to 50.8)	22.6 (7.9 to 37.3)	17.0 (8.2 to 31.4)	6.8 (1.5 to 24.7)	0.0
	Poorer	51.8 (40.5 to 63.2)	35.0 (20.2 to 49.8)	26.5 (14.5 to 43.2)	11.3 (2.8 to 35.6)	0.0
	Middle	47.5 (34.7 to 60.3)	48.4 (30.8 to 66.0)	27.2 (14.1 to 45.2)	11.7 (2.7 to 37.2)	0.0
	Richer	57.1 (44.2 to 70.1)	57.1 (40.7 to 73.5)	36.1 (20.6 to 54.8)	16.7 (4.3 to 46.5)	0.0
	Richest	72.3 (52.4 to 92.2)	37.3 (24.0 to 50.5)	32.5 (19.2 to 49.0)	14.5 (4.1 to 39.7)	0.0
Treatment of hypertension	Poorest	24.9 (21.5 to 28.3)	25.0 (19.2 to 30.8)	30.0 (23.5 to 37.3)	36.4 (23.1 to 51.9)	0.0
	Poorer	26.3 (22.8 to 29.9)	23.9 (18.5 to 29.2)	31.0 (24.4 to 38.5)	37.4 (23.9 to 53.1)	0.0
	Middle	25.3 (21.9 to 28.7)	29.7 (22.4 to 37.1)	31.3 (24.2 to 39.2)	37.7 (23.7 to 53.9)	0.0
	Richer	24.8 (20.9 to 28.6)	34.5 (26.8 to 42.1)	32.0 (25.0 to 39.7)	38.5 (24.6 to 54.3)	0.0
	Richest	28.7 (21.4 to 35.9)	36.5 (29.5 to 43.5)	37.3 (29.8 to 45.3)	44.1 (29.8 to 59.3)	0.0
Treatment of high cholesterol	Poorest	NA	13.0 (4.0 to 21.9)	NA	NA	NA
	Poorer	NA	17.8 (9.9 to 25.7)	NA	NA	NA
	Middle	NA	15.2 (6.5 to 23.8)	NA	NA	NA
	Richer	NA	27.7 (18.1 to 37.3)	NA	NA	NA
	Richest	NA	37.1 (28.3 to 45.9)	NA	NA	NA

Table S16: Observed, predicted coverage and probability of reaching targets of NCD management in Vietnam by educational levels, 2010–2030

Indicators	Education Levels	Estimated coverage in percent (95% CI)		Predicted coverage in percent (95% CrI)		Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Non-use of tobacco	Lower than primary	74.7 (72.9 to 76.5)	75.1 (72.0 to 77.9)	75.4 (70.9 to 79.5)	76.0 (66.3 to 83.8)	17.0
	Primary school	76.0 (73.9 to 78.0)	79.4 (76.4 to 82.1)	82.3 (78.1 to 85.9)	87.3 (79.7 to 92.3)	96.9
	Secondary school	70.8 (69.2 to 72.4)	73.2 (70.2 to 76.0)	75.4 (71.3 to 79.2)	79.6 (71.3 to 85.9)	44.9
	Highschool	74.8 (73.3 to 76.3)	78.0 (75.9 to 79.9)	80.8 (77.8 to 83.6)	85.7 (80.2 to 89.9)	98.0
	University and higher	77.3 (75.2 to 79.4)	82.7 (80.1 to 85.1)	87.1 (83.6 to 90.0)	93.1 (88.2 to 96.1)	100.0
Non-harmful use of alcohol	Lower than primary	85.1 (82.8 to 87.1)	75.7 (71.6 to 79.5)	63.2 (54.5 to 71.3)	34.1 (19.7 to 52.3)	0.0
	Primary school	80.2 (77.1 to 83.0)	78.6 (73.9 to 82.6)	76.7 (69.1 to 83.4)	72.6 (54.0 to 86.5)	17.9
	Secondary school	79.3 (77.4 to 81.0)	76.9 (72.9 to 80.5)	74.3 (67.2 to 80.2)	68.6 (51.8 to 81.4)	4.3
	Highschool	77.5 (75.3 to 79.5)	74.3 (70.6 to 77.7)	70.8 (64.7 to 76.5)	63.2 (49.1 to 75.9)	0.3
	University and higher	79.6 (76.7 to 82.3)	75.9 (71.4 to 79.9)	71.7 (63.6 to 78.8)	62.2 (42.9 to 78.7)	1.7
Sufficient physical activity	Lower than primary	69.6 (67.0 to 72.2)	74.2 (69.2 to 78.6)	78.4 (71.7 to 83.9)	85.1 (73.1 to 92.3)	82.4
	Primary school	62.5 (58.9 to 66.0)	68.1 (62.9 to 72.8)	73.0 (65.6 to 79.4)	81.4 (67.9 to 90.3)	60.3
	Secondary school	73.1 (70.7 to 75.4)	71.9 (67.8 to 75.7)	70.7 (63.8 to 76.7)	68.1 (52.4 to 80.2)	2.8
	Highschool	73.9 (71.6 to 76.1)	76.0 (72.7 to 79.1)	78.1 (72.7 to 82.7)	81.8 (71.1 to 89.1)	65.1
	University and higher	56.9 (53.3 to 60.4)	63.1 (58.2 to 67.8)	68.9 (61.6 to 75.7)	78.8 (65.0 to 88.3)	41.3
Sufficient use of fruit and vegetable	Lower than primary	9.8 (8.1 to 11.7)	27.3 (23.1 to 31.9)	53.7 (49.7 to 57.9)	92.4 (90.0 to 94.3)	100.0
	Primary school	23.8 (20.6 to 27.2)	46.8 (41.4 to 52.2)	75.7 (72.8 to 78.6)	97.0 (96.1 to 97.8)	100.0
	Secondary school	15.0 (12.9 to 17.3)	36.5 (32.5 to 40.6)	64.9 (61.4 to 68.4)	95.1 (93.5 to 96.4)	100.0
	Highschool	17.8 (15.7 to 20.0)	44.0 (39.7 to 48.5)	70.1 (66.9 to 73.3)	96.1 (94.8 to 97.1)	100.0
	University and higher	33.5 (30.3 to 36.9)	59.6 (54.0 to 64.9)	83.7 (81.5 to 85.8)	98.2 (97.6 to 98.7)	100.0
Non-overweight	Lower than primary	88.1 (86.0 to 89.9)	84.1 (79.9 to 87.6)	79.0 (70.7 to 86.0)	65.4 (42.5 to 84.2)	7.2
	Primary school	85.0 (82.4 to 87.4)	86.6 (82.3 to 90.0)	88.0 (81.3 to 92.8)	90.4 (76.0 to 96.8)	93.8
	Secondary school	88.8 (87.1 to 90.3)	78.4 (74.5 to 81.8)	62.2 (52.7 to 70.8)	25.5 (13.2 to 43.2)	0.0
	Highschool	90.8 (89.3 to 92.1)	89.1 (86.4 to 91.4)	87.4 (81.8 to 91.6)	83.0 (66.7 to 92.6)	66.2
	University and higher	83.6 (80.7 to 86.2)	82.9 (78.4 to 86.7)	82.1 (73.8 to 88.4)	80.5 (60.2 to 92.5)	52.2
Screening for cervical cancer	Lower than primary	NA	18.5 (14.3 to 23.6)	NA	NA	NA
	Primary school	NA	22.8 (17.6 to 28.9)	NA	NA	NA
	Secondary school	NA	23.7 (19.0 to 29.1)	NA	NA	NA
	Highschool	NA	21.3 (17.6 to 25.6)	NA	NA	NA
	University and higher	NA	34.2 (28.5 to 40.3)	NA	NA	NA
Treatment of diabetes	Lower than primary	57.1 (46.5 to 67.2)	36.4 (23.8 to 51.1)	32.2 (19.3 to 49.1)	16.3 (4.6 to 44.0)	0.0
	Primary school	41.0 (27.1 to 56.6)	30.6 (18.0 to 46.9)	22.0 (11.8 to 37.0)	10.4 (2.8 to 31.3)	0.0
	Secondary school	52.2 (40.6 to 63.5)	43.8 (28.2 to 60.7)	31.7 (17.9 to 48.5)	16.0 (4.3 to 42.9)	0.0
	Highschool	47.5 (36.9 to 58.3)	38.1 (25.0 to 53.2)	27.5 (15.8 to 43.2)	13.5 (3.7 to 37.6)	0.0
	University and higher	50.9 (38.3 to 63.4)	50.0 (34.1 to 65.9)	33.2 (18.9 to 50.2)	17.1 (4.6 to 45.0)	0.0
Treatment of hypertension	Lower than primary	34.7 (31.7 to 37.9)	26.4 (21.0 to 32.6)	19.3 (11.1 to 30.4)	9.8 (2.8 to 26.9)	0.0
	Primary school	27.4 (23.3 to 32.0)	28.6 (21.6 to 36.8)	29.1 (15.8 to 47.6)	31.2 (7.9 to 69.9)	0.4
	Secondary school	22.1 (19.5 to 24.9)	31.0 (25.0 to 37.7)	41.7 (27.4 to 56.5)	64.6 (32.5 to 86.4)	10.7
	Highschool	17.9 (15.6 to 20.5)	30.1 (24.7 to 36.2)	46.1 (32.3 to 59.8)	77.1 (49.8 to 91.6)	38.6
	University and higher	27.1 (23.1 to 31.5)	28.6 (21.7 to 36.5)	29.9 (16.1 to 46.8)	32.8 (8.7 to 69.3)	0.5
Treatment of high cholesterol	Lower than primary	NA	13.3 (7.4 to 22.8)	NA	NA	NA
	Primary school	NA	27.9 (18.7 to 39.6)	NA	NA	NA
	Secondary school	NA	19.2 (12.0 to 29.3)	NA	NA	NA
	Highschool	NA	25.2 (17.8 to 34.4)	NA	NA	NA
	University and higher	NA	32.9 (23.9 to 43.5)	NA	NA	NA

Table S17: Sensitivity analysis of composite methods in observed, predicted coverage and probability of reaching targets by genders, 2010–2030

Indicators	Genders	Estimated coverage in percent (95% CI)		Predicted coverage in percent (95% CrI)		Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Composite Prevention (mega)	Women	77.4 (76.4 to 78.3)	83.1 (81.4 to 84.7)	86.7 (84.7 to 88.5)	92.5 (89.9 to 94.5)	100.0
	Men	49.4 (48.2 to 50.6)	56.5 (54.1 to 58.9)	64.8 (61.2 to 68.3)	77.6 (71.6 to 82.7)	18.1
Composite Treatment (mega)	Women	61.8 (54.7 to 68.4)	52.5 (42.8 to 61.9)	50.1 (34.8 to 65.9)	40.0 (14.8 to 72.3)	0.4
	Men	50.4 (42.2 to 58.5)	50.6 (40.3 to 60.8)	42.2 (27.9 to 57.7)	32.6 (11.4 to 64.8)	0.1
Composite Coverage (mega)	Women	70.7 (63.9 to 76.7)	71.3 (61.8 to 79.2)	74.1 (58.9 to 85.7)	77.9 (45.3 to 94.0)	43.2
	Men	49.6 (41.5 to 57.8)	54.0 (43.6 to 64.1)	55.4 (38.4 to 71.6)	60.2 (26.5 to 86.9)	9.5
Composite Prevention (a.mean)	Women	70.6 (69.5 to 71.6)	77.3 (75.4 to 79.0)	82.9 (79.7 to 85.9)	90.7 (86.2 to 94.0)	100.0
	Men	49.9 (48.7 to 51.1)	56.1 (53.7 to 58.5)	62.1 (57.3 to 66.6)	73.0 (64.1 to 80.2)	2.7
Composite Treatment (a.mean)	Women	59.7 (52.6 to 66.4)	51.5 (41.9 to 61.0)	49.7 (34.2 to 65.3)	41.4 (15.4 to 72.7)	0.7
	Men	49.6 (41.5 to 57.8)	50.6 (40.3 to 60.8)	43.1 (28.3 to 59.0)	35.2 (12.2 to 67.7)	0.1
Composite Coverage (a.mean)	Women	66.0 (59.0 to 72.3)	66.3 (56.7 to 74.8)	69.3 (54.1 to 81.4)	72.9 (40.6 to 91.6)	29.0
	Men	49.6 (41.5 to 57.8)	54.0 (43.6 to 64.1)	54.7 (38.6 to 70.2)	59.1 (26.6 to 85.2)	7.6
Composite Prevention (geo.mean)	Women	58.7 (57.6 to 59.8)	74.0 (72.1 to 75.8)	85.1 (82.3 to 87.4)	95.8 (93.7 to 97.2)	100.0
	Men	44.4 (43.2 to 45.6)	54.1 (51.7 to 56.5)	63.5 (58.8 to 68.0)	79.1 (71.4 to 85.1)	39.9
Composite Treatment (geo.mean)	Women	55.5 (48.4 to 62.4)	47.5 (38.1 to 57.2)	39.7 (21.6 to 60.5)	25.9 (5.2 to 67.8)	0.4
	Men	41.0 (33.2 to 49.3)	43.7 (33.7 to 54.1)	46.6 (26.3 to 68.5)	52.4 (13.8 to 88.9)	10.1
Composite Coverage (geo.mean)	Women	57.6 (50.5 to 64.4)	61.4 (51.6 to 70.3)	66.9 (51.1 to 79.9)	75.1 (43.2 to 92.5)	34.6
	Men	43.2 (35.2 to 51.5)	49.4 (39.2 to 59.7)	53.7 (37.6 to 69.2)	63.7 (31.2 to 87.3)	11.7

Note: meta=Meta-analysis random effects; a.mean=Arithmetic Means; geo.mean=Geometric Means

Table S18: Sensitivity analysis of composite methods in observed, predicted coverage and probability of reaching targets by ethnic groups, 2010–2030

Indicators	Ethnic Levels	Estimated coverage in percent (95% CI)		Predicted coverage in percent (95% CrI)		Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Composite Prevention (mega)	Minorities (Others)	66.0 (64.1 to 67.9)	68.3 (64.5 to 71.8)	70.5 (63.2 to 76.9)	74.7 (59.8 to 85.4)	19.5
	Majority (Kinh)	60.4 (59.6 to 61.3)	67.4 (65.7 to 69.0)	73.6 (70.5 to 76.6)	83.7 (78.8 to 87.6)	93.2
Composite Treatment (mega)	Minorities (Others)	42.9 (28.0 to 59.1)	43.1 (37.0 to 49.4)	39.3 (29.1 to 50.6)	33.1 (14.3 to 59.1)	0.0
	Majority (Kinh)	57.7 (52.0 to 63.3)	53.4 (45.7 to 60.9)	50.9 (36.2 to 64.7)	44.2 (18.3 to 72.8)	0.5
Composite Coverage (mega)	Minorities (Others)	57.1 (40.9 to 72.0)	58.4 (54.2 to 62.4)	60.3 (50.5 to 69.4)	64.2 (38.1 to 83.8)	6.2
	Majority (Kinh)	59.1 (53.4 to 64.6)	61.3 (53.7 to 68.5)	63.0 (48.7 to 75.8)	66.7 (36.5 to 87.9)	13.3
Composite Prevention (a.mean)	Minorities (Others)	64.8 (62.8 to 66.7)	66.8 (63.1 to 70.4)	68.7 (61.4 to 75.4)	72.5 (57.1 to 83.8)	11.7
	Majority (Kinh)	60.2 (59.4 to 61.1)	66.9 (65.2 to 68.5)	73.0 (69.8 to 75.9)	82.8 (77.7 to 86.9)	87.2
Composite Treatment (a.mean)	Minorities (Others)	42.9 (28.0 to 59.1)	41.8 (35.8 to 48.2)	38.2 (28.5 to 49.2)	31.7 (13.9 to 58.1)	0.0
	Majority (Kinh)	56.4 (50.6 to 61.9)	52.1 (44.5 to 59.7)	49.1 (35.2 to 63.5)	42.2 (17.7 to 71.7)	0.4
Composite Coverage (a.mean)	Minorities (Others)	54.3 (38.2 to 69.5)	56.2 (52.1 to 60.3)	58.5 (48.8 to 67.7)	62.8 (38.1 to 83.0)	5.3
	Majority (Kinh)	58.4 (52.7 to 63.9)	60.7 (53.1 to 67.9)	62.8 (48.5 to 75.7)	66.8 (37.3 to 87.9)	13.8
Composite Prevention (geo.mean)	Minorities (Others)	56.2 (54.2 to 58.2)	62.4 (58.5 to 66.1)	68.3 (61.0 to 74.9)	78.2 (65.2 to 87.7)	37.8
	Majority (Kinh)	52.2 (51.3 to 53.1)	65.4 (63.7 to 67.0)	76.6 (73.8 to 79.2)	90.8 (87.7 to 93.1)	100.0
Composite Treatment (geo.mean)	Minorities (Others)	31.4 (18.6 to 48.0)	31.0 (25.4 to 37.1)	28.9 (20.3 to 38.9)	25.1 (10.2 to 49.9)	0.0
	Majority (Kinh)	50.5 (44.8 to 56.2)	47.9 (40.3 to 55.5)	45.9 (32.0 to 60.5)	41.6 (16.9 to 71.0)	0.4
Composite Coverage (geo.mean)	Minorities (Others)	42.9 (28.0 to 59.1)	46.3 (42.2 to 50.5)	51.5 (41.7 to 61.3)	61.6 (35.1 to 82.2)	4.3
	Majority (Kinh)	51.5 (45.8 to 57.2)	57.1 (49.4 to 64.4)	61.7 (47.0 to 74.4)	70.9 (40.0 to 89.6)	21.8

Note: meta=Meta-analysis random effects; a.mean=Arithmetic Means; geo.mean=Geometric Means

Table S19: Sensitivity analysis of composite methods in observed, predicted coverage and probability of reaching targets by living areas, 2010–2030

Indicators	Living Area	Estimated coverage in percent (95% CI)		Predicted coverage in percent (95% CrI)		Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Composite Prevention (mega)	Rural	60.6 (59.6 to 61.6)	67.5 (65.3 to 69.5)	73.7 (70.8 to 76.3)	83.6 (79.2 to 87.1)	94.8
	Urban	60.8 (59.4 to 62.1)	67.7 (65.5 to 69.8)	73.8 (71.1 to 76.5)	83.7 (79.4 to 87.2)	95.8
Composite Treatment (mega)	Rural	53.6 (45.7 to 61.4)	46.6 (35.6 to 57.9)	42.4 (27.9 to 58.7)	32.7 (11.1 to 64.7)	0.1
	Urban	58.1 (50.8 to 65.1)	53.9 (44.8 to 62.7)	47.9 (33.0 to 63.4)	37.6 (13.7 to 69.0)	0.4
Composite Coverage (mega)	Rural	57.6 (49.6 to 65.2)	58.9 (47.4 to 69.5)	62.0 (45.8 to 76.1)	66.8 (33.7 to 88.8)	16.3
	Urban	59.8 (52.5 to 66.7)	62.6 (53.5 to 70.9)	64.7 (49.7 to 77.7)	69.1 (37.3 to 89.6)	18.9
Composite Prevention (a.mean)	Rural	60.5 (59.5 to 61.5)	66.8 (64.7 to 68.9)	73.1 (70.1 to 75.8)	82.8 (78.1 to 86.6)	88.9
	Urban	60.2 (58.8 to 61.6)	67.1 (64.9 to 69.2)	72.9 (70.0 to 75.6)	82.7 (78.0 to 86.4)	88.1
Composite Treatment (a.mean)	Rural	52.3 (44.4 to 60.1)	46.6 (35.6 to 57.9)	43.4 (28.7 to 60.2)	35.5 (12.7 to 68.3)	0.3
	Urban	57.0 (49.7 to 64.0)	53.9 (44.8 to 62.7)	49.1 (34.4 to 64.4)	40.8 (15.8 to 72.9)	0.7
Composite Coverage (a.mean)	Rural	57.0 (49.0 to 64.6)	57.5 (46.1 to 68.2)	60.6 (44.1 to 75.3)	64.8 (32.1 to 87.7)	13.7
	Urban	58.7 (51.3 to 65.6)	61.7 (52.6 to 70.1)	63.2 (47.9 to 76.5)	67.0 (35.3 to 88.8)	16.8
Composite Prevention (geo.mean)	Rural	51.3 (50.3 to 52.3)	64.6 (62.4 to 66.7)	75.0 (72.3 to 77.5)	89.5 (86.4 to 91.9)	100.0
	Urban	54.1 (52.7 to 55.5)	65.7 (63.5 to 67.9)	76.8 (74.3 to 79.2)	90.4 (87.6 to 92.6)	100.0
Composite Treatment (geo.mean)	Rural	43.7 (36.1 to 51.7)	38.4 (28.1 to 49.8)	35.9 (22.7 to 51.9)	29.3 (9.6 to 61.8)	0.1
	Urban	53.1 (45.8 to 60.2)	50.4 (41.4 to 59.4)	46.0 (31.6 to 61.7)	38.4 (14.5 to 70.7)	0.4
Composite Coverage (geo.mean)	Rural	48.3 (40.5 to 56.3)	52.1 (40.8 to 63.1)	57.5 (41.9 to 72.6)	66.6 (35.0 to 88.8)	16.5
	Urban	53.6 (46.3 to 60.8)	59.1 (50.0 to 67.7)	63.3 (47.8 to 76.8)	71.7 (40.5 to 91.0)	25.9

Note: meta=Meta-analysis random effects; a.mean=Arithmetic Means; geo.mean=Geometric Means

Table S20: Sensitivity analysis of composite methods in observed, predicted coverage and probability of reaching targets by regional levels, 2010–2030

Indicators	Regional Levels	Estimated coverage in percent (95% CI)	Predicted coverage in percent (95% CrI)			Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Composite Prevention (mega)	Northern Midlands and Mountains	70.4 (68.9 to 71.8)	67.9 (65.1 to 70.6)	65.7 (59.7 to 71.4)	60.9 (47.7 to 72.8)	0.0
	Red River Delta	62.2 (59.7 to 64.7)	64.9 (60.1 to 69.4)	70.2 (61.2 to 76.7)	77.0 (59.4 to 87.2)	32.2
	North Central and Central Coast	57.3 (55.7 to 58.9)	70.6 (65.6 to 75.2)	79.0 (72.5 to 85.2)	91.3 (83.8 to 96.1)	99.6
	Central Highlands	63.2 (61.0 to 65.5)	68.4 (60.1 to 75.7)	72.7 (62.1 to 81.8)	80.6 (60.8 to 92.2)	53.1
	Southeast	58.7 (56.3 to 61.0)	66.4 (63.4 to 69.3)	73.9 (68.4 to 78.5)	84.9 (76.3 to 90.7)	88.4
	Mekong River Delta	56.2 (53.7 to 58.6)	69.6 (66.3 to 72.7)	73.7 (64.1 to 81.9)	83.2 (62.7 to 93.5)	68.5
Composite Treatment (mega)	Northern Midlands and Mountains	48.2 (35.7 to 61.0)	55.6 (44.1 to 66.5)	49.0 (32.8 to 72.5)	43.2 (14.4 to 88.4)	6.4
	Red River Delta	57.8 (43.3 to 71.0)	45.0 (37.3 to 53.0)	38.0 (23.3 to 51.9)	22.4 (5.4 to 52.4)	0.0
	North Central and Central Coast	54.0 (41.8 to 65.7)	55.1 (46.4 to 63.5)	49.1 (34.4 to 68.3)	42.5 (15.1 to 81.7)	3.4
	Central Highlands	52.6 (37.3 to 67.5)	57.1 (43.3 to 70.0)	48.5 (30.7 to 73.4)	40.9 (12.1 to 88.3)	6.9
	Southeast	56.9 (44.8 to 68.2)	47.1 (34.1 to 60.5)	41.4 (22.4 to 61.2)	28.1 (5.2 to 68.9)	0.6
	Mekong River Delta	66.7 (54.4 to 77.1)	45.2 (39.6 to 51.0)	43.3 (28.0 to 62.9)	31.3 (9.2 to 72.2)	1.2
Composite Coverage (mega)	Northern Midlands and Mountains	60.7 (47.6 to 72.4)	62.5 (51.0 to 72.8)	64.1 (55.6 to 72.6)	69.0 (50.0 to 83.8)	8.3
	Red River Delta	60.0 (45.5 to 73.0)	57.8 (52.7 to 62.8)	62.7 (54.9 to 69.9)	67.5 (49.1 to 82.1)	5.4
	North Central and Central Coast	55.6 (43.3 to 67.2)	65.1 (59.7 to 70.1)	64.7 (56.9 to 72.4)	69.5 (51.1 to 83.8)	8.6
	Central Highlands	57.9 (42.2 to 72.1)	65.5 (56.3 to 73.6)	64.5 (56.1 to 72.7)	69.3 (50.6 to 83.8)	8.2
	Southeast	58.5 (46.3 to 69.6)	58.8 (45.2 to 71.2)	63.6 (54.9 to 71.8)	68.3 (49.2 to 83.3)	7.5
	Mekong River Delta	60.3 (48.0 to 71.5)	60.5 (56.8 to 64.0)	63.8 (56.1 to 71.5)	68.7 (50.4 to 83.3)	7.4
Composite Prevention (a.mean)	Northern Midlands and Mountains	68.1 (66.7 to 69.6)	67.3 (64.4 to 70.0)	66.8 (60.9 to 72.4)	65.8 (52.9 to 76.8)	0.5
	Red River Delta	61.8 (59.3 to 64.2)	64.4 (59.6 to 69.0)	69.9 (61.1 to 76.2)	76.9 (59.6 to 86.7)	30.1
	North Central and Central Coast	57.9 (56.3 to 59.4)	70.1 (65.0 to 74.7)	77.2 (70.8 to 83.9)	89.2 (80.8 to 95.2)	98.1
	Central Highlands	63.1 (60.8 to 65.3)	67.7 (59.3 to 75.0)	71.5 (61.7 to 80.9)	79.0 (59.8 to 91.5)	43.6
	Southeast	58.0 (55.6 to 60.3)	65.9 (62.9 to 68.8)	73.6 (68.4 to 78.2)	84.8 (76.5 to 90.6)	88.9
	Mekong River Delta	56.6 (54.2 to 59.0)	68.6 (65.2 to 71.7)	72.8 (64.7 to 80.1)	82.3 (66.2 to 91.9)	66.4
Composite Treatment (a.mean)	Northern Midlands and Mountains	46.4 (34.0 to 59.3)	55.6 (44.1 to 66.5)	50.2 (32.1 to 74.1)	47.2 (14.6 to 90.4)	10.4
	Red River Delta	57.8 (43.3 to 71.0)	44.4 (36.7 to 52.3)	36.5 (22.1 to 51.2)	21.0 (4.6 to 51.6)	0.1
	North Central and Central Coast	50.8 (38.8 to 62.7)	53.5 (44.9 to 62.0)	48.6 (33.4 to 68.1)	43.1 (15.3 to 83.0)	4.0
	Central Highlands	50.0 (34.8 to 65.2)	55.1 (41.3 to 68.1)	47.8 (28.9 to 73.7)	41.7 (10.4 to 89.0)	7.2
	Southeast	56.9 (44.8 to 68.2)	45.1 (32.3 to 58.6)	38.8 (20.7 to 60.1)	24.6 (4.3 to 67.3)	0.4
	Mekong River Delta	66.7 (54.4 to 77.1)	43.5 (38.0 to 49.3)	42.2 (25.6 to 61.8)	30.4 (7.6 to 70.6)	1.1
Composite Coverage (a.mean)	Northern Midlands and Mountains	58.9 (45.9 to 70.8)	62.5 (51.0 to 72.8)	60.2 (51.8 to 69.2)	61.8 (41.7 to 79.3)	2.0
	Red River Delta	60.0 (45.5 to 73.0)	55.9 (50.8 to 60.9)	58.9 (50.7 to 66.2)	60.4 (41.3 to 77.5)	1.1
	North Central and Central Coast	55.6 (43.3 to 67.2)	62.9 (57.4 to 68.0)	60.7 (52.7 to 68.7)	62.3 (42.6 to 79.3)	2.1
	Central Highlands	57.9 (42.2 to 72.1)	61.9 (52.7 to 70.4)	60.2 (51.8 to 68.6)	61.9 (41.8 to 78.9)	1.9
	Southeast	56.9 (44.8 to 68.2)	56.9 (43.3 to 69.5)	59.5 (50.6 to 68.3)	61.2 (40.9 to 78.6)	1.8
	Mekong River Delta	60.3 (48.0 to 71.5)	57.8 (54.1 to 61.4)	59.9 (51.8 to 67.8)	61.4 (41.6 to 78.4)	1.7
Composite Prevention (geo.mean)	Northern Midlands and Mountains	60.3 (58.7 to 61.8)	66.0 (63.2 to 68.8)	71.2 (65.9 to 76.1)	80.1 (70.9 to 87.1)	51.0
	Red River Delta	56.7 (54.2 to 59.2)	62.7 (57.8 to 67.3)	71.0 (62.2 to 77.2)	82.2 (67.0 to 90.2)	63.2
	North Central and Central Coast	46.3 (44.7 to 47.9)	68.0 (62.9 to 72.7)	81.8 (76.4 to 87.5)	95.9 (92.2 to 98.3)	100.0
	Central Highlands	43.9 (41.6 to 46.3)	65.4 (57.0 to 73.0)	81.6 (72.5 to 88.2)	96.1 (89.6 to 98.6)	100.0
	Southeast	51.3 (48.9 to 53.7)	63.9 (60.9 to 66.8)	75.6 (70.6 to 79.8)	90.0 (84.0 to 93.9)	99.9
	Mekong River Delta	45.9 (43.5 to 48.3)	65.3 (61.9 to 68.6)	77.1 (68.3 to 84.4)	91.6 (78.8 to 97.2)	96.9
Composite Treatment (geo.mean)	Northern Midlands and Mountains	33.9 (22.9 to 47.0)	52.8 (41.4 to 63.9)	62.2 (37.7 to 83.5)	80.7 (30.4 to 98.3)	51.5
	Red River Delta	48.9 (35.0 to 63.0)	37.7 (30.4 to 45.7)	29.2 (15.3 to 47.1)	15.2 (2.4 to 52.4)	0.1
	North Central and Central Coast	42.9 (31.4 to 55.1)	49.6 (41.1 to 58.2)	52.6 (34.2 to 72.2)	60.9 (21.2 to 91.8)	17.5
	Central Highlands	39.5 (25.6 to 55.3)	49.0 (35.6 to 62.5)	51.3 (25.9 to 78.0)	59.0 (10.8 to 95.9)	23.5
	Southeast	52.3 (40.4 to 64.0)	39.2 (27.0 to 52.9)	29.9 (12.7 to 54.4)	15.2 (1.6 to 63.9)	0.4

Indicators	Regional Levels	Estimated coverage in percent (95% CI)		Predicted coverage in percent (95% CrI)		Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Composite Coverage (geo.mean)	Mekong River Delta	63.5 (51.1 to 74.3)	32.3 (27.2 to 37.9)	38.1 (15.7 to 69.1)	30.0 (2.9 to 88.6)	5.2
	Northern Midlands and Mountains	46.4 (34.0 to 59.3)	59.7 (48.2 to 70.3)	64.1 (47.2 to 81.2)	77.2 (42.9 to 95.7)	42.3
	Red River Delta	53.3 (39.1 to 67.1)	50.7 (45.6 to 55.8)	54.0 (40.5 to 64.9)	58.8 (27.2 to 81.0)	3.4
	North Central and Central Coast	44.4 (32.8 to 56.7)	59.4 (53.9 to 64.6)	66.7 (54.4 to 78.4)	80.9 (55.6 to 94.7)	53.4
	Central Highlands	42.1 (27.9 to 57.8)	57.5 (48.3 to 66.2)	63.0 (48.1 to 78.8)	75.7 (43.9 to 95.1)	38.2
	Southeast	52.3 (40.4 to 64.0)	51.0 (37.7 to 64.1)	56.5 (34.4 to 74.1)	63.5 (20.2 to 90.2)	14.2
	Mekong River Delta	52.4 (40.3 to 64.2)	48.4 (44.7 to 52.1)	59.0 (43.3 to 74.1)	68.4 (34.5 to 90.6)	17.6

Note: meta=Meta-analysis random effects; a.mean=Arithmetic Means; geo.mean=Geometric Means

Table S21: Sensitivity analysis of composite methods in observed, predicted coverage and probability of reaching targets by wealth quintiles, 2010–2030

Indicators	Wealth Quintiles	Estimated coverage in percent (95% CI)		Predicted coverage in percent (95% CrI)		Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Composite Prevention (mega)	Poorest	58.2 (56.4 to 60.1)	64.0 (60.6 to 67.4)	71.2 (67.9 to 74.3)	81.6 (76.6 to 85.7)	74.4
	Poorer	60.2 (58.5 to 61.9)	66.0 (63.0 to 69.1)	72.8 (69.7 to 75.8)	82.8 (78.0 to 86.7)	88.3
	Middle	59.8 (58.2 to 61.5)	66.4 (62.6 to 70.3)	72.7 (69.4 to 75.8)	82.6 (77.8 to 86.7)	86.7
	Richer	61.8 (59.8 to 63.8)	70.1 (66.8 to 73.5)	74.6 (71.5 to 77.5)	84.0 (79.5 to 87.8)	96.0
	Richest	63.4 (60.2 to 66.7)	70.8 (67.6 to 74.0)	76.0 (72.9 to 78.8)	85.0 (80.8 to 88.4)	98.9
Composite Treatment (mega)	Poorest	53.3 (41.5 to 65.2)	48.4 (30.8 to 66.0)	43.1 (27.3 to 60.5)	33.3 (11.8 to 65.5)	0.1
	Poorer	58.0 (47.3 to 68.8)	50.0 (34.5 to 65.5)	46.8 (31.1 to 63.4)	36.8 (13.7 to 68.2)	0.2
	Middle	54.6 (43.5 to 65.8)	54.8 (37.3 to 72.4)	45.8 (29.5 to 63.1)	35.8 (12.9 to 67.9)	0.2
	Richer	57.5 (45.8 to 69.3)	60.0 (43.8 to 76.2)	49.9 (33.4 to 66.5)	39.6 (15.2 to 71.0)	0.4
	Richest	61.0 (54.0 to 68.0)	51.0 (37.3 to 64.7)	50.1 (34.1 to 66.1)	39.9 (15.1 to 71.4)	0.4
Composite Coverage (mega)	Poorest	56.4 (44.8 to 68.0)	58.1 (40.7 to 75.4)	60.5 (43.3 to 75.7)	64.5 (33.0 to 87.4)	12.1
	Poorer	59.3 (48.6 to 70.0)	60.0 (44.8 to 75.2)	62.9 (46.3 to 77.2)	66.8 (35.5 to 88.4)	15.1
	Middle	57.9 (47.0 to 68.8)	61.3 (44.1 to 78.4)	62.4 (45.2 to 77.2)	66.3 (34.4 to 88.4)	14.6
	Richer	60.1 (48.6 to 71.6)	65.7 (50.0 to 81.4)	65.3 (48.6 to 79.2)	69.0 (37.8 to 89.5)	19.1
	Richest	62.3 (57.3 to 67.3)	62.7 (49.5 to 76.0)	66.1 (50.0 to 79.5)	69.8 (37.8 to 90.0)	21.2
Composite Prevention (a.mean)	Poorest	58.9 (57.1 to 60.8)	63.4 (59.9 to 66.8)	70.7 (67.4 to 73.8)	80.5 (75.2 to 84.8)	57.2
	Poorer	60.3 (58.6 to 61.9)	65.4 (62.3 to 68.4)	71.9 (68.8 to 74.9)	81.4 (76.4 to 85.6)	71.8
	Middle	59.7 (58.1 to 61.3)	65.9 (62.1 to 69.8)	71.7 (68.3 to 74.8)	81.2 (76.0 to 85.5)	68.4
	Richer	61.3 (59.3 to 63.3)	69.7 (66.3 to 73.1)	73.4 (70.2 to 76.4)	82.5 (77.6 to 86.5)	85.1
	Richest	62.7 (59.5 to 66.0)	70.3 (67.0 to 73.5)	74.8 (71.6 to 77.7)	83.5 (79.0 to 87.2)	93.9
Composite Treatment (a.mean)	Poorest	51.4 (39.6 to 63.2)	45.2 (27.6 to 62.7)	41.3 (25.8 to 58.6)	32.1 (11.2 to 64.0)	0.1
	Poorer	56.2 (45.4 to 67.0)	47.5 (32.0 to 63.0)	45.2 (29.6 to 61.8)	35.7 (13.1 to 67.2)	0.2
	Middle	53.3 (42.1 to 64.5)	54.8 (37.3 to 72.4)	45.3 (29.2 to 62.6)	35.8 (12.8 to 68.0)	0.2
	Richer	56.3 (44.5 to 68.1)	60.0 (43.8 to 76.2)	49.4 (32.9 to 66.0)	39.7 (15.1 to 70.9)	0.4
	Richest	60.6 (53.6 to 67.6)	51.0 (37.3 to 64.7)	50.2 (34.1 to 66.2)	40.4 (15.2 to 71.8)	0.4
Composite Coverage (a.mean)	Poorest	55.5 (43.9 to 67.2)	54.8 (37.3 to 72.4)	58.6 (41.3 to 74.1)	62.1 (30.8 to 86.2)	9.4
	Poorer	58.6 (47.9 to 69.2)	57.5 (42.2 to 72.8)	61.4 (44.9 to 75.9)	64.9 (33.6 to 87.3)	12.2
	Middle	57.1 (46.2 to 67.9)	61.3 (44.1 to 78.4)	61.5 (44.4 to 76.4)	65.0 (33.3 to 87.6)	12.9
	Richer	59.0 (47.5 to 70.6)	65.7 (50.0 to 81.4)	64.4 (47.6 to 78.4)	67.8 (36.4 to 88.8)	16.9
	Richest	61.8 (56.8 to 66.8)	62.7 (49.5 to 76.0)	65.2 (49.1 to 78.8)	68.6 (36.6 to 89.5)	19.0
Composite Prevention (geo.mean)	Poorest	44.9 (42.7 to 47.1)	57.7 (54.1 to 61.2)	70.1 (66.8 to 73.2)	87.1 (83.4 to 90.1)	100.0
	Poorer	49.0 (47.1 to 50.9)	62.8 (59.7 to 65.9)	73.6 (70.5 to 76.4)	88.9 (85.7 to 91.5)	100.0
	Middle	51.5 (49.7 to 53.2)	64.2 (60.3 to 68.1)	75.3 (72.3 to 78.2)	89.8 (86.7 to 92.3)	100.0
	Richer	55.6 (53.5 to 57.7)	68.9 (65.4 to 72.3)	78.4 (75.7 to 81.0)	91.3 (88.6 to 93.4)	100.0
	Richest	59.7 (56.4 to 63.0)	69.6 (66.3 to 72.9)	80.4 (77.8 to 82.8)	92.2 (89.8 to 94.1)	100.0
Composite Treatment (geo.mean)	Poorest	44.2 (32.4 to 56.1)	35.5 (18.6 to 52.3)	34.4 (20.4 to 51.6)	26.9 (8.9 to 58.2)	0.0
	Poorer	49.8 (38.9 to 60.7)	42.5 (27.2 to 57.8)	40.0 (25.4 to 56.8)	31.9 (11.3 to 63.3)	0.1
	Middle	47.2 (36.1 to 58.4)	48.4 (30.8 to 66.0)	40.1 (25.0 to 57.2)	31.9 (11.1 to 63.7)	0.1
	Richer	49.8 (37.9 to 61.6)	54.3 (37.8 to 70.8)	43.9 (28.4 to 60.8)	35.5 (13.1 to 66.8)	0.2
	Richest	55.0 (48.0 to 62.1)	47.1 (33.4 to 60.8)	45.7 (30.2 to 61.9)	37.1 (13.6 to 68.7)	0.2
Composite Coverage (geo.mean)	Poorest	44.5 (32.8 to 56.2)	48.4 (30.8 to 66.0)	53.6 (36.7 to 69.9)	62.6 (31.5 to 86.3)	9.6
	Poorer	49.3 (38.4 to 60.1)	52.5 (37.0 to 68.0)	58.1 (41.6 to 73.1)	66.8 (35.9 to 88.1)	14.6
	Middle	49.7 (38.7 to 60.7)	58.1 (40.7 to 75.4)	60.0 (42.9 to 75.1)	68.5 (37.1 to 89.1)	18.0
	Richer	53.0 (41.2 to 64.7)	62.9 (46.8 to 78.9)	63.8 (47.1 to 77.9)	71.9 (41.3 to 90.5)	25.0
	Richest	57.7 (52.6 to 62.7)	58.8 (45.3 to 72.3)	66.2 (50.3 to 79.3)	74.0 (43.2 to 91.5)	30.8

Note: meta=Meta-analysis random effects; a.mean=Arithmetic Means; geo.mean=Geometric Means

Table S22: Sensitivity analysis of composite methods in observed, predicted coverage and probability of reaching targets by educational levels, 2010–2030

Indicators	Education Levels	Estimated coverage in percent (95% CI)		Predicted coverage in percent (95% CrI)		Probability reach target (%)
		Year 2010	Year 2015	Year 2020	Year 2030	
Composite Prevention (mega)	Lower than primary	59.5 (57.8 to 61.2)	63.7 (59.9 to 67.2)	71.9 (68.7 to 74.9)	82.0 (77.2 to 86.1)	80.6
	Primary school	61.1 (58.8 to 63.4)	68.8 (65.0 to 72.3)	73.9 (70.7 to 76.7)	83.4 (78.8 to 87.1)	92.9
	Secondary school	59.4 (57.9 to 61.0)	65.1 (61.7 to 68.3)	72.1 (68.9 to 75.1)	82.1 (77.3 to 86.1)	81.7
	Highschool	61.2 (59.6 to 62.7)	68.7 (65.8 to 71.5)	73.8 (70.8 to 76.6)	83.4 (78.9 to 87.1)	93.1
	University and higher	62.6 (60.2 to 64.9)	70.8 (67.2 to 74.2)	75.2 (72.2 to 78.1)	84.4 (80.1 to 87.9)	97.7
Composite Treatment (mega)	Lower than primary	61.9 (51.2 to 71.6)	50.0 (35.8 to 64.2)	52.7 (36.3 to 69.3)	46.7 (18.5 to 77.6)	1.8
	Primary school	51.3 (36.2 to 66.1)	50.0 (34.5 to 65.5)	46.0 (29.5 to 63.4)	39.8 (14.7 to 72.7)	0.7
	Secondary school	55.1 (43.4 to 66.2)	53.1 (36.4 to 69.1)	49.5 (32.4 to 67.0)	43.5 (16.4 to 75.8)	1.1
	Highschool	53.8 (42.9 to 64.3)	54.8 (39.9 to 68.8)	49.0 (32.7 to 66.3)	43.2 (16.5 to 75.4)	1.0
	University and higher	54.4 (41.6 to 66.6)	55.9 (39.5 to 71.1)	50.5 (33.3 to 67.9)	44.2 (17.0 to 76.3)	1.3
Composite Coverage (mega)	Lower than primary	60.7 (50.0 to 70.5)	59.1 (44.4 to 72.3)	65.3 (48.3 to 79.0)	70.8 (37.3 to 90.6)	24.6
	Primary school	56.4 (41.0 to 70.7)	61.1 (44.9 to 75.2)	63.3 (45.8 to 78.4)	69.0 (35.9 to 89.7)	20.2
	Secondary school	58.0 (46.2 to 68.9)	59.4 (42.3 to 74.5)	63.3 (45.8 to 78.5)	69.0 (35.3 to 90.2)	21.6
	Highschool	57.5 (46.6 to 67.7)	64.3 (49.2 to 77.0)	64.8 (47.0 to 78.9)	70.4 (36.5 to 90.5)	23.6
	University and higher	59.6 (46.7 to 71.4)	64.7 (47.9 to 78.5)	66.3 (47.9 to 80.3)	72.0 (37.5 to 90.9)	25.9
Composite Prevention (a.mean)	Lower than primary	59.8 (58.1 to 61.5)	63.0 (59.3 to 66.6)	71.4 (68.2 to 74.5)	81.0 (76.0 to 85.3)	65.6
	Primary school	60.6 (58.3 to 62.9)	68.1 (64.4 to 71.6)	72.8 (69.6 to 75.8)	82.0 (77.3 to 86.1)	80.7
	Secondary school	59.5 (58.0 to 61.1)	64.6 (61.2 to 67.8)	71.4 (68.3 to 74.4)	81.0 (76.1 to 85.2)	66.0
	Highschool	61.0 (59.5 to 62.5)	68.1 (65.1 to 70.9)	73.0 (70.0 to 75.8)	82.2 (77.5 to 86.2)	82.8
	University and higher	61.8 (59.4 to 64.2)	70.3 (66.7 to 73.7)	74.0 (71.0 to 76.9)	82.9 (78.5 to 86.8)	90.9
Composite Treatment (a.mean)	Lower than primary	59.5 (48.8 to 69.4)	50.0 (35.8 to 64.2)	49.3 (32.9 to 66.2)	41.0 (14.5 to 73.1)	0.8
	Primary school	51.3 (36.2 to 66.1)	47.2 (32.0 to 63.0)	43.0 (26.0 to 60.8)	35.3 (11.5 to 68.2)	0.3
	Secondary school	55.1 (43.4 to 66.2)	50.0 (33.6 to 66.4)	46.6 (29.2 to 64.0)	38.5 (12.7 to 71.3)	0.5
	Highschool	52.5 (41.7 to 63.1)	52.4 (37.7 to 66.6)	45.6 (29.3 to 62.9)	37.8 (12.7 to 70.5)	0.4
	University and higher	54.4 (41.6 to 66.6)	52.9 (36.7 to 68.5)	47.3 (30.1 to 64.9)	39.3 (13.5 to 71.9)	0.5
Composite Coverage (a.mean)	Lower than primary	59.5 (48.8 to 69.4)	56.8 (42.2 to 70.3)	63.0 (45.4 to 77.7)	67.9 (34.0 to 89.8)	19.7
	Primary school	56.4 (41.0 to 70.7)	61.1 (44.9 to 75.2)	62.9 (44.5 to 77.7)	67.7 (34.5 to 89.5)	19.4
	Secondary school	58.0 (46.2 to 68.9)	59.4 (42.3 to 74.5)	63.0 (44.6 to 77.8)	67.7 (33.8 to 89.8)	20.0
	Highschool	57.5 (46.6 to 67.7)	61.9 (46.8 to 75.0)	63.3 (45.7 to 78.2)	68.2 (34.5 to 89.9)	20.3
	University and higher	57.9 (45.0 to 69.8)	64.7 (47.9 to 78.5)	64.8 (46.5 to 79.6)	69.6 (35.8 to 90.5)	22.9
Composite Prevention (geo.mean)	Lower than primary	45.6 (43.9 to 47.4)	58.2 (54.4 to 61.9)	70.4 (67.0 to 73.3)	87.1 (83.3 to 90.0)	99.9
	Primary school	54.8 (52.5 to 57.2)	66.7 (62.9 to 70.3)	77.4 (74.5 to 80.0)	90.6 (87.7 to 92.8)	100.0
	Secondary school	49.8 (48.2 to 51.4)	62.0 (58.5 to 65.3)	73.7 (70.6 to 76.4)	88.8 (85.4 to 91.4)	100.0
	Highschool	52.5 (51.0 to 54.1)	66.4 (63.4 to 69.3)	76.0 (73.2 to 78.6)	90.0 (87.0 to 92.3)	100.0
	University and higher	58.6 (56.1 to 60.9)	69.7 (66.1 to 73.1)	79.9 (77.2 to 82.3)	91.9 (89.2 to 93.7)	100.0
Composite Treatment (geo.mean)	Lower than primary	56.0 (45.3 to 66.1)	43.2 (29.7 to 57.8)	47.7 (31.3 to 64.9)	42.8 (16.0 to 75.1)	1.0
	Primary school	46.2 (31.6 to 61.4)	41.7 (27.1 to 57.8)	40.3 (25.3 to 58.1)	35.7 (13.0 to 68.8)	0.3
	Secondary school	46.4 (35.1 to 58.0)	46.9 (30.9 to 63.6)	42.2 (26.4 to 60.7)	37.2 (13.3 to 71.7)	0.5
	Highschool	42.5 (32.3 to 53.4)	47.6 (33.4 to 62.3)	40.3 (25.1 to 57.6)	35.5 (12.2 to 68.6)	0.3
	University and higher	49.1 (36.6 to 61.7)	50.0 (34.1 to 65.9)	45.6 (29.2 to 63.9)	40.6 (15.0 to 74.0)	0.8
Composite Coverage (geo.mean)	Lower than primary	50.0 (39.5 to 60.5)	52.3 (37.9 to 66.2)	60.5 (43.0 to 75.5)	71.2 (37.9 to 90.6)	24.7
	Primary school	51.3 (36.2 to 66.1)	55.6 (39.6 to 70.5)	62.2 (44.9 to 77.4)	72.9 (40.2 to 91.4)	28.1
	Secondary school	47.8 (36.5 to 59.4)	56.2 (39.3 to 71.8)	60.4 (42.0 to 75.9)	71.0 (36.9 to 90.8)	25.2
	Highschool	47.5 (36.9 to 58.3)	57.1 (42.2 to 70.9)	60.5 (42.6 to 76.1)	71.1 (37.6 to 90.9)	24.1
	University and higher	54.4 (41.6 to 66.6)	58.8 (42.2 to 73.6)	65.4 (47.7 to 79.9)	75.3 (42.7 to 92.6)	35.1

Note: meta=Meta-analysis random effects; a.mean=Arithmetic Means; geo.mean=Geometric Means

Table S23: Inequality analyses of all NCD management indicators for year 2010

Indicators	Index	Gender inequality	Ethnic inequality	Urban-Rural Inequality	Regional Inequality	Wealth inequality	Educational Inequality
Non-use of tobacco	RII	0.234 (0.232 to 0.236)**	1.102 (1.092 to 1.113)**	1.090 (1.083 to 1.097)**	1.130 (1.124 to 1.136)**	1.110 (1.081 to 1.140)**	1.042 (1.036 to 1.048)**
	SII	-100.850 (-101.269 to -100.430)**	7.168 (6.492 to 7.844)**	6.441 (5.964 to 6.918)**	9.207 (8.790 to 9.624)**	7.731 (5.752 to 9.710)**	2.976 (2.554 to 3.397)**
	CnI	-0.167 (-0.168 to -0.167)**	0.006 (0.006 to 0.007)**	0.010 (0.010 to 0.011)**	0.020 (0.019 to 0.021)**	0.016 (0.012 to 0.020)**	0.006 (0.005 to 0.007)**
Non-harmful use of alcohol	RII	0.395 (0.392 to 0.398)**	1.065 (1.055 to 1.075)**	1.057 (1.049 to 1.064)**	1.080 (1.073 to 1.086)**	0.955 (0.927 to 0.983)**	0.883 (0.877 to 0.888)**
	SII	-73.127 (-73.645 to -72.609)**	5.076 (4.312 to 5.840)**	4.502 (3.936 to 5.067)**	6.184 (5.701 to 6.667)**	-3.794 (-6.183 to -1.405)**	-9.968 (-10.454 to -9.482)**
	CnI	-0.112 (-0.112 to -0.111)**	0.004 (0.004 to 0.005)**	0.006 (0.006 to 0.007)**	0.012 (0.011 to 0.013)**	-0.007 (-0.012 to -0.003)**	-0.018 (-0.019 to -0.017)**
Sufficient physical activity	RII	1.062 (1.054 to 1.071)**	0.625 (0.621 to 0.629)**	0.620 (0.614 to 0.626)**	1.809 (1.797 to 1.821)**	0.802 (0.774 to 0.831)**	0.895 (0.889 to 0.901)**
	SII	4.629 (4.030 to 5.229)**	-38.817 (-39.384 to -38.249)**	-35.116 (-35.773 to -34.459)**	46.801 (46.340 to 47.262)**	-17.042 (-19.760 to -14.324)**	-8.838 (-9.371 to -8.305)**
	CnI	0.008 (0.007 to 0.009)**	-0.035 (-0.036 to -0.034)**	-0.052 (-0.053 to -0.052)**	0.102 (0.101 to 0.103)**	-0.036 (-0.042 to -0.030)**	-0.020 (-0.021 to -0.019)**
Sufficient use of fruit and vegetables	RII	0.848 (0.822 to 0.875)**	0.818 (0.786 to 0.851)**	2.260 (2.192 to 2.330)**	5.124 (4.978 to 5.274)**	3.073 (2.690 to 3.512)**	4.131 (4.016 to 4.250)**
	SII	-2.862 (-3.397 to -2.327)**	-3.628 (-4.369 to -2.887)**	14.881 (14.297 to 15.464)**	27.949 (27.528 to 28.371)**	17.508 (15.325 to 19.691)**	22.508 (22.055 to 22.961)**
	CnI	-0.020 (-0.024 to -0.017)**	-0.014 (-0.017 to -0.012)**	0.098 (0.094 to 0.101)**	0.253 (0.249 to 0.257)**	0.171 (0.151 to 0.191)**	0.216 (0.212 to 0.220)**
Non-overweight	RII	1.016 (1.011 to 1.021)**	0.875 (0.870 to 0.879)**	0.793 (0.788 to 0.798)**	1.192 (1.187 to 1.197)**	0.877 (0.859 to 0.896)**	0.935 (0.930 to 0.939)**
	SII	1.410 (0.966 to 1.853)**	-12.179 (-12.663 to -11.695)**	-20.245 (-20.753 to -19.737)**	15.888 (15.516 to 16.261)**	-11.753 (-13.629 to -9.877)**	-6.119 (-6.512 to -5.726)**
	CnI	0.002 (0.001 to 0.003)**	-0.009 (-0.010 to -0.009)**	-0.026 (-0.027 to -0.025)**	0.031 (0.031 to 0.032)**	-0.022 (-0.025 to -0.018)**	-0.012 (-0.013 to -0.012)**
Treatment of diabetes	RII	0.309 (0.295 to 0.324)**	3.776 (3.476 to 4.101)**	3.035 (2.899 to 3.178)**	3.443 (3.301 to 3.590)**	1.273 (1.032 to 1.569)*	0.797 (0.765 to 0.831)**
	SII	-32.291 (-33.576 to -31.006)**	29.149 (27.729 to 30.570)**	31.804 (30.458 to 33.150)**	32.102 (31.039 to 33.165)**	6.740 (0.988 to 12.491)*	-5.351 (-6.488 to -4.214)**
	CnI	-0.145 (-0.151 to -0.140)**	0.079 (0.074 to 0.083)**	0.136 (0.131 to 0.142)**	0.195 (0.189 to 0.201)**	0.038 (0.005 to 0.071)*	-0.034 (-0.040 to -0.027)**
Treatment of hypertension	RII	0.659 (0.600 to 0.724)**	4.739 (3.697 to 6.073)**	1.941 (1.767 to 2.133)**	2.645 (2.449 to 2.857)**	1.790 (1.218 to 2.630)**	0.853 (0.788 to 0.923)**
	SII	-21.658 (-26.397 to -16.919)**	60.831 (54.046 to 67.616)**	34.370 (29.717 to 39.024)**	52.312 (48.513 to 56.111)**	30.678 (10.816 to 50.540)**	-7.679 (-11.867 to -3.490)**
	CnI	-0.050 (-0.061 to -0.039)**	0.055 (0.048 to 0.062)**	0.080 (0.070 to 0.091)**	0.160 (0.148 to 0.172)**	0.091 (0.031 to 0.150)**	-0.023 (-0.035 to -0.010)**

Note: ***, **, * Statistically significant results with P<0.001, P<0.01, and P<0.05, respectively; RII=Relative Index of Inequality; SII=Slope Index of Inequality; CnI=Concentrate Index of Inequality; CI=Confidence Interval;

Table S24: Wealth inequality in NCD management for all survey years stratifying by genders

Indicators	Year	Wealth inequality among Women			Wealth inequality among Men		
		RII_Women	SII_Women	CnI_Women	RII_Men	SII_Men	CnI_Men
Non-use of tobacco	2010	1.05 (1.04 to 1.05)**	4.41 (3.62 to 5.20)**	0.01 (0.01 to 0.01)**	1.41 (1.31 to 1.52)**	15.79 (12.37 to 19.21)**	0.05 (0.04 to 0.07)**
	2015	1.03 (1.02 to 1.04)**	2.56 (1.56 to 3.56)**	0.01 (0.00 to 0.01)**	1.74 (1.56 to 1.93)**	28.90 (23.54 to 34.26)**	0.09 (0.07 to 0.11)**
Non-harmful use of alcohol	2010	0.99 (0.98 to 1.00)	-0.60 (-1.63 to 0.43)	-0.00 (-0.00 to 0.00)	0.93 (0.87 to 1.00)	-4.21 (-8.61 to 0.19)	-0.01 (-0.02 to 0.00)
	2015	1.00 (0.98 to 1.02)	-0.39 (-2.45 to 1.67)	-0.00 (-0.00 to 0.00)	1.21 (1.03 to 1.42)*	10.08 (1.64 to 18.51)*	0.03 (0.00 to 0.06)*
Sufficient physical activity	2010	0.78 (0.74 to 0.82)**	-19.10 (-22.73 to -15.48)**	-0.04 (-0.05 to -0.03)**	0.83 (0.79 to 0.87)**	-14.89 (-18.76 to -11.01)**	-0.03 (-0.04 to -0.02)**
	2015	0.74 (0.67 to 0.82)**	-19.81 (-26.88 to -12.74)**	-0.05 (-0.06 to -0.03)**	0.77 (0.71 to 0.85)**	-20.04 (-26.97 to -13.11)**	-0.04 (-0.06 to -0.03)**
Sufficient use of fruit and vegetables	2010	3.14 (2.63 to 3.75)**	18.15 (15.13 to 21.18)**	0.17 (0.15 to 0.20)**	3.02 (2.47 to 3.68)**	16.87 (13.74 to 20.01)**	0.17 (0.14 to 0.20)**
	2015	2.99 (2.55 to 3.51)**	53.77 (46.78 to 60.76)**	0.18 (0.15 to 0.20)**	2.31 (1.85 to 2.89)**	31.36 (23.40 to 39.32)**	0.13 (0.10 to 0.17)**
Non-overweight	2010	0.91 (0.88 to 0.94)**	-8.27 (-10.95 to -5.59)**	-0.01 (-0.02 to -0.01)**	0.84 (0.82 to 0.87)**	-15.45 (-18.02 to -12.88)**	-0.03 (-0.03 to -0.03)**
	2015	0.90 (0.83 to 0.97)*	-8.55 (-15.10 to -2.00)*	-0.02 (-0.03 to -0.00)*	0.80 (0.74 to 0.87)**	-19.16 (-25.97 to -12.35)**	-0.04 (-0.05 to -0.02)**
Treatment of diabetes	2010	1.27 (0.98 to 1.63)	8.96 (-0.26 to 18.18)	0.04 (-0.00 to 0.08)	1.49 (1.05 to 2.13)*	7.99 (0.86 to 15.13)*	0.06 (0.01 to 0.12)*
	2015	1.28 (0.82 to 1.98)	8.25 (-7.33 to 23.83)	0.04 (-0.03 to 0.11)	3.17 (1.86 to 5.41)**	31.55 (18.11 to 44.99)**	0.19 (0.10 to 0.27)**
Treatment of hypertension	2010	1.49 (0.96 to 2.32)	24.29 (-1.18 to 49.75)	0.07 (-0.00 to 0.14)	3.06 (1.55 to 6.03)**	48.11 (18.55 to 77.66)**	0.16 (0.06 to 0.27)**
	2015	1.11 (0.50 to 2.45)	4.67 (-29.69 to 39.03)	0.02 (-0.11 to 0.14)	3.01 (1.04 to 8.74)*	53.08 (22.63 to 83.53)**	0.20 (0.04 to 0.36)*
Treatment of high cholesterol	2015	2.80 (1.28 to 6.11)*	22.15 (4.61 to 39.70)*	0.16 (0.04 to 0.28)*	4.65 (1.63 to 13.28)**	39.79 (16.21 to 63.38)**	0.23 (0.08 to 0.38)**

Note: ***, **, * Statistically significant results with P<0.001, P<0.01, and P<0.05, respectively; RII=Relative Index of Inequality; SII=Slope Index of Inequality; CnI=Concentrate Index of Inequality; CI=Confidence Interval;

Table S25: Wealth inequality in NCD management for all survey years stratifying by ethnic groups

Indicators	Year	Wealth inequality among Ethnic Minorities			Wealth inequality among Ethnic Majority (Kinh)		
		RII_Other	SII_Other	CnI_Other	RII_Kinh	SII_Kinh	CnI_Kinh
Non-use of tobacco	2010	1.18 (1.09 to 1.27)**	11.64 (6.35 to 16.93)**	0.02 (0.01 to 0.03)**	1.09 (1.06 to 1.12)**	6.18 (4.03 to 8.33)**	0.01 (0.01 to 0.02)**
	2015	1.29 (1.15 to 1.45)**	18.87 (10.02 to 27.72)**	0.04 (0.02 to 0.05)**	1.12 (1.07 to 1.16)**	8.71 (5.50 to 11.92)**	0.02 (0.01 to 0.02)**
Non-harmful use of alcohol	2010	0.91 (0.83 to 0.98)*	-7.86 (-14.21 to -1.51)*	-0.01 (-0.03 to -0.00)*	0.95 (0.92 to 0.98)**	-4.56 (-7.16 to -1.96)**	-0.01 (-0.01 to -0.00)**
	2015	1.07 (0.90 to 1.27)	5.12 (-7.68 to 17.91)	0.01 (-0.01 to 0.03)	0.99 (0.92 to 1.05)	-1.15 (-6.27 to 3.97)	-0.00 (-0.01 to 0.01)
Sufficient physical activity	2010	0.92 (0.88 to 0.97)**	-7.36 (-11.63 to -3.09)**	-0.01 (-0.02 to -0.01)**	0.86 (0.83 to 0.90)**	-10.92 (-14.04 to -7.81)**	-0.02 (-0.03 to -0.02)**
	2015	0.75 (0.66 to 0.86)**	-24.27 (-35.17 to -13.38)**	-0.04 (-0.06 to -0.02)**	0.88 (0.81 to 0.96)**	-8.84 (-14.61 to -3.07)**	-0.02 (-0.03 to -0.01)**
Sufficient use of fruit and vegetables	2010	1.59 (1.16 to 2.17)**	8.63 (2.60 to 14.67)**	0.07 (0.02 to 0.11)**	3.97 (3.42 to 4.61)**	21.26 (18.93 to 23.59)**	0.21 (0.19 to 0.23)**
	2015	2.21 (1.45 to 3.35)**	25.02 (10.90 to 39.14)**	0.11 (0.05 to 0.17)**	2.44 (2.12 to 2.80)**	41.75 (35.85 to 47.65)**	0.14 (0.12 to 0.17)**
Non-overweight	2010	0.89 (0.86 to 0.93)**	-10.78 (-14.49 to -7.06)**	-0.02 (-0.02 to -0.01)**	0.90 (0.87 to 0.92)**	-9.71 (-11.88 to -7.54)**	-0.02 (-0.02 to -0.01)**
	2015	0.86 (0.76 to 0.98)*	-12.84 (-24.04 to -1.65)*	-0.02 (-0.04 to -0.00)*	0.88 (0.83 to 0.94)**	-10.22 (-15.64 to -4.79)**	-0.02 (-0.03 to -0.01)**
Screening for cervical cancer	2015	3.30 (1.12 to 9.77)*	14.18 (0.55 to 27.81)*	0.17 (0.02 to 0.32)*	3.47 (2.62 to 4.59)**	33.81 (26.82 to 40.80)**	0.20 (0.15 to 0.24)**
Treatment of diabetes	2010	1.78 (0.87 to 3.61)	10.00 (-1.45 to 21.44)	0.09 (-0.02 to 0.19)	1.01 (0.81 to 1.26)	0.37 (-6.24 to 6.97)	0.00 (-0.03 to 0.04)
	2015	3.22 (0.91 to 11.39)	21.39 (-5.05 to 47.83)	0.16 (-0.02 to 0.34)	1.51 (1.06 to 2.14)*	13.25 (1.70 to 24.80)*	0.06 (0.01 to 0.12)*
Treatment of hypertension	2010	NA	NA	NA	1.61 (1.09 to 2.36)*	25.95 (4.78 to 47.12)*	0.07 (0.01 to 0.13)*
	2015	5.30 (0.30 to 92.84)	28.68 (-31.94 to 89.29)	0.24 (-0.20 to 0.68)	1.21 (0.64 to 2.30)	8.66 (-18.23 to 35.55)	0.03 (-0.07 to 0.13)
Treatment of high cholesterol	2015	2.40 (0.30 to 19.52)	15.04 (-26.86 to 56.94)	0.13 (-0.21 to 0.47)	3.47 (1.80 to 6.67)**	29.24 (14.19 to 44.30)**	0.19 (0.09 to 0.28)**

Note: ***, **, * Statistically significant results with P<0.001, P<0.01, and P<0.05, respectively; RII=Relative Index of Inequality; SII=Slope Index of Inequality; CnI=Concentrate Index of Inequality; CI=Confidence Interval;

Table S26: Wealth inequality in NCD management for all survey years stratifying by living areas

Indicators	Year	Wealth inequality in Rural Areas			Wealth inequality in Urban Areas		
		RII_Rural	SII_Rural	CnI_Rural	RII_Urban	SII_Urban	CnI_Urban
Non-use of tobacco	2010	1.07 (1.04 to 1.11)**	5.20 (2.58 to 7.82)**	0.01 (0.01 to 0.02)**	1.10 (1.05 to 1.14)**	6.96 (3.90 to 10.03)**	0.01 (0.01 to 0.02)**
	2015	1.13 (1.06 to 1.19)**	9.01 (4.66 to 13.37)**	0.02 (0.01 to 0.03)**	1.14 (1.08 to 1.20)**	10.31 (6.06 to 14.56)**	0.02 (0.01 to 0.03)**
Non-harmful use of alcohol	2010	0.95 (0.91 to 0.98)**	-4.49 (-7.48 to -1.50)**	-0.01 (-0.01 to -0.00)**	0.91 (0.87 to 0.96)**	-7.65 (-11.63 to -3.67)**	-0.01 (-0.02 to -0.01)**
	2015	1.02 (0.93 to 1.11)	1.31 (-5.52 to 8.14)	0.00 (-0.01 to 0.02)	0.95 (0.88 to 1.03)	-4.01 (-10.56 to 2.55)	-0.01 (-0.02 to 0.01)
Sufficient physical activity	2010	0.89 (0.86 to 0.93)**	-9.44 (-12.42 to -6.45)**	-0.02 (-0.02 to -0.01)**	0.92 (0.85 to 1.00)	-5.29 (-10.56 to -0.02)	-0.01 (-0.03 to -0.00)*
	2015	0.79 (0.73 to 0.86)**	-17.57 (-24.21 to -10.93)**	-0.03 (-0.05 to -0.02)**	0.86 (0.77 to 0.97)*	-10.00 (-17.74 to -2.26)*	-0.02 (-0.04 to -0.01)*
Sufficient use of fruit and vegetables	2010	1.78 (1.48 to 2.14)**	8.20 (5.54 to 10.87)**	0.09 (0.06 to 0.12)**	3.92 (3.22 to 4.77)**	28.59 (24.68 to 32.50)**	0.21 (0.18 to 0.24)**
	2015	2.66 (2.18 to 3.24)**	39.39 (31.88 to 46.89)**	0.16 (0.13 to 0.19)**	2.48 (2.07 to 2.98)**	43.38 (35.62 to 51.14)**	0.14 (0.12 to 0.17)**
Non-overweight	2010	0.93 (0.91 to 0.95)**	-6.80 (-8.77 to -4.82)**	-0.01 (-0.01 to -0.01)**	0.92 (0.87 to 0.96)**	-7.13 (-11.21 to -3.04)**	-0.01 (-0.02 to -0.01)**
	2015	0.91 (0.85 to 0.98)**	-7.98 (-13.88 to -2.08)**	-0.01 (-0.02 to -0.00)*	0.89 (0.81 to 0.99)*	-8.88 (-16.74 to -1.03)*	-0.02 (-0.03 to -0.00)*
Screening for cervical cancer	2015	4.53 (2.94 to 6.99)**	29.73 (21.28 to 38.18)**	0.23 (0.17 to 0.29)**	3.36 (2.34 to 4.82)**	36.15 (27.03 to 45.28)**	0.19 (0.14 to 0.24)**
Treatment of diabetes	2010	1.07 (0.79 to 1.44)	1.39 (-5.10 to 7.87)	0.01 (-0.04 to 0.06)	0.75 (0.57 to 0.98)*	-11.00 (-21.15 to -0.84)*	-0.05 (-0.09 to -0.00)*
	2015	1.03 (0.59 to 1.78)	0.65 (-13.40 to 14.71)	0.00 (-0.08 to 0.09)	1.75 (1.13 to 2.71)*	22.82 (7.19 to 38.45)**	0.09 (0.03 to 0.16)**
Treatment of hypertension	2010	1.96 (0.99 to 3.90)	30.22 (0.34 to 60.09)	0.11 (-0.00 to 0.21)	1.37 (0.86 to 2.19)	19.05 (-8.86 to 46.96)	0.05 (-0.02 to 0.12)
	2015	1.82 (0.46 to 7.19)	13.70 (-22.11 to 49.51)	0.09 (-0.13 to 0.31)	0.92 (0.46 to 1.83)	-4.45 (-37.32 to 28.42)	-0.01 (-0.12 to 0.09)
Treatment of high cholesterol	2015	1.45 (0.48 to 4.36)	5.82 (-13.59 to 25.24)	0.06 (-0.12 to 0.23)	3.13 (1.46 to 6.71)**	35.01 (14.30 to 55.71)**	0.17 (0.06 to 0.27)**

Note: ***, **, * Statistically significant results with P<0.001, P<0.01, and P<0.05, respectively; RII=Relative Index of Inequality; SII=Slope Index of Inequality; CnI=Concentrate Index of Inequality; CI=Confidence Interval;

Table S27: Changes in inequality of NCD management coverage in Vietnam (2010–2015)

Indicators	Index	Gender inequality	Ethnic inequality	Urban-Rural Inequality	Regional Inequality	Wealth inequality	Educational Inequality
Non-use of tobacco	RII	0.047 (0.031 to 0.062)***	0.046 (0.028 to 0.064)***	-0.006 (-0.018 to 0.005)	-0.036 (-0.046 to -0.026)***	0.042 (-0.004 to 0.089)	0.072 (0.062 to 0.082)***
	SII	8.046 (7.238 to 8.855)***	3.353 (2.034 to 4.671)***	-0.203 (-1.088 to 0.682)	-2.241 (-3.026 to -1.456)***	3.336 (-0.255 to 6.928)	5.282 (4.500 to 6.063)***
	CnI	0.021 (0.019 to 0.022)***	0.002 (0.001 to 0.003)***	-0.000 (-0.002 to 0.001)	-0.006 (-0.008 to -0.005)***	0.006 (-0.001 to 0.014)	0.010 (0.008 to 0.012)***
Non-harmful use of alcohol	RII	-0.107 (-0.128 to -0.085)***	0.026 (0.003 to 0.049)	0.041 (0.025 to 0.057)***	0.027 (0.013 to 0.042)***	0.063 (-0.004 to 0.130)	0.098 (0.084 to 0.113)***
	SII	-17.757 (-18.949 to -16.564)***	1.627 (-0.142 to 3.395)	2.748 (1.461 to 4.036)***	1.746 (0.609 to 2.883)**	5.173 (-0.099 to 10.445)	8.448 (7.312 to 9.584)***
	CnI	-0.033 (-0.034 to -0.031)***	0.002 (0.000 to 0.003)*	0.005 (0.003 to 0.007)***	0.004 (0.002 to 0.007)***	0.010 (-0.001 to 0.021)	0.015 (0.013 to 0.017)***
Sufficient physical activity	RII	0.274 (0.255 to 0.293)***	0.004 (-0.014 to 0.022)	0.096 (0.075 to 0.116)***	-0.227 (-0.243 to -0.211)***	-0.039 (-0.118 to 0.040)	-0.036 (-0.053 to -0.019)***
	SII	16.208 (14.826 to 17.590)***	3.104 (1.624 to 4.585)***	11.305 (9.888 to 12.721)***	-14.419 (-15.576 to -13.261)***	-2.196 (-7.919 to 3.528)	-2.282 (-3.515 to -1.050)***
	CnI	0.028 (0.026 to 0.031)***	0.000 (-0.002 to 0.002)	0.011 (0.008 to 0.013)***	-0.034 (-0.036 to -0.031)***	-0.007 (-0.019 to 0.006)	-0.006 (-0.008 to -0.003)***
Sufficient use of fruit and vegetables	RII	-0.248 (-0.294 to -0.203)***	1.246 (1.180 to 1.312)***	-0.792 (-0.836 to -0.747)***	-3.618 (-3.658 to -3.577)***	-0.398 (-0.585 to -0.210)	-1.844 (-1.884 to -1.804)***
	SII	-18.748 (-20.230 to -17.266)***	31.204 (29.295 to 33.113)***	1.649 (0.148 to 3.150)	-10.631 (-11.926 to -9.336)***	25.635 (19.886 to 31.385)***	12.868 (11.603 to 14.134)***
	CnI	-0.042 (-0.047 to -0.036)***	0.059 (0.055 to 0.063)***	-0.050 (-0.055 to -0.044)***	-0.189 (-0.195 to -0.183)***	-0.012 (-0.041 to 0.016)	-0.085 (-0.092 to -0.079)***
Non-overweight	RII	0.051 (0.036 to 0.066)***	-0.007 (-0.024 to 0.009)	0.038 (0.022 to 0.054)***	0.031 (0.018 to 0.044)***	-0.025 (-0.087 to 0.036)	0.115 (0.102 to 0.128)***
	SII	3.999 (2.751 to 5.247)***	0.091 (-1.351 to 1.533)	4.970 (3.677 to 6.262)***	0.806 (-0.269 to 1.880)	-1.500 (-6.619 to 3.620)	10.198 (9.093 to 11.303)***
	CnI	0.006 (0.004 to 0.008)***	-0.001 (-0.003 to 0.000)	0.003 (0.001 to 0.005)***	-0.001 (-0.003 to 0.002)	-0.003 (-0.012 to 0.007)	0.021 (0.018 to 0.023)***
Treatment of diabetes	RII	0.284 (0.188 to 0.380)***	-0.637 (-0.815 to -0.460)	-0.918 (-1.015 to -0.822)***	-1.266 (-1.352 to -1.180)***	0.598 (0.200 to 0.996)	0.483 (0.399 to 0.568)***
	SII	16.029 (13.136 to 18.922)***	-0.080 (-3.569 to 3.409)	-8.490 (-11.408 to -5.573)***	-5.912 (-8.397 to -3.427)***	12.401 (0.510 to 24.292)	13.187 (10.622 to 15.751)***
	CnI	0.080 (0.069 to 0.092)***	-0.020 (-0.029 to -0.011)***	-0.043 (-0.055 to -0.031)***	-0.070 (-0.083 to -0.057)***	0.061 (-0.002 to 0.124)	0.073 (0.060 to 0.087)***
Treatment of hypertension	RII	-0.033 (-0.218 to 0.152)	-0.259 (-0.689 to 0.171)	1.436 (1.225 to 1.646)***	0.657 (0.487 to 0.827)*	-0.166 (-0.908 to 0.577)	0.155 (-0.003 to 0.313)
	SII	3.495 (-4.204 to 11.194)	-16.168 (-26.358 to -5.979)**	9.227 (1.688 to 16.766)*	-7.386 (-13.774 to -0.998)*	-9.683 (-41.138 to 21.772)	7.998 (1.169 to 14.826)*
	CnI	-0.008 (-0.030 to 0.015)	0.010 (-0.005 to 0.025)	0.051 (0.030 to 0.073)***	0.018 (-0.006 to 0.042)	-0.008 (-0.125 to 0.109)	0.024 (-0.001 to 0.049)

Notes: ***, **, * Statistically significant results with P<0·001, P<0·01, and P<0·05, respectively; RII=Relative Index of Inequality; SII=Slope Index of Inequality; CnI=Concentrate Index of Inequality; CI=Confidence Interval;

Table S28: Changes in Wealth inequality in NCD management, 2010-2015, stratifying by genders

Indicators	Changes in Social-Economic Inequality among Women			Changes in Social-Economic Inequality among Men		
	RII_Women	SII_Women	CnI_Women	RII_Men	SII_Men	CnI_Men
Non-use of tobacco	-0.02 (-0.03 to -0.01)**	-1.85 (-3.12 to -0.58)**	-0.00 (-0.01 to -0.00)**	0.33 (0.20 to 0.46)**	13.11 (6.75 to 19.47)***	0.04 (0.01 to 0.06)***
Non-harmful use of alcohol	0.00 (-0.02 to 0.03)	0.21 (-2.09 to 2.52)	0.00 (-0.00 to 0.00)	0.27 (0.10 to 0.45)**	14.29 (4.77 to 23.80)**	0.04 (0.01 to 0.07)**
Sufficient physical activity	-0.04 (-0.15 to 0.08)	-0.71 (-8.66 to 7.24)	-0.01 (-0.02 to 0.01)	-0.06 (-0.16 to 0.05)	-5.15 (-13.09 to 2.79)	-0.01 (-0.03 to 0.01)
Sufficient use of fruit and vegetables	-0.15 (-0.39 to 0.09)	35.62 (28.00 to 43.23)***	0.00 (-0.03 to 0.04)	-0.70 (-1.01 to -0.40)	14.49 (5.93 to 23.05)***	-0.03 (-0.08 to 0.01)
Non-overweight	-0.01 (-0.10 to 0.07)	-0.28 (-7.35 to 6.79)	-0.00 (-0.01 to 0.01)	-0.04 (-0.13 to 0.04)	-3.71 (-10.98 to 3.57)	-0.01 (-0.02 to 0.01)
Treatment of diabetes	0.01 (-0.50 to 0.52)	-0.71 (-18.81 to 17.39)	0.00 (-0.08 to 0.08)	1.68 (1.04 to 2.32)*	23.56 (8.34 to 38.78)**	0.12 (0.02 to 0.22)*
Treatment of hypertension	-0.38 (-1.29 to 0.53)	-19.62 (-62.38 to 23.15)	-0.05 (-0.20 to 0.10)	-0.05 (-1.31 to 1.21)	4.97 (-37.46 to 47.41)	0.04 (-0.16 to 0.23)

Note: ***, **, * Statistically significant results with P<0.001, P<0.01, and P<0.05, respectively; RII=Relative Index of Inequality; SII=Slope Index of Inequality; CnI=Concentrate Index of Inequality; CI=Confidence Interval;

Table S29: Changes in Wealth inequality in NCD management, 2010-2015, stratifying by ethnic groups

Indicators	Changes in Social-Economic Inequality among Ethnic Minorities			Changes in Social-Economic Inequality among Ethnic Majority		
	RII_Other	SII_Other	CnI_Other	RII_Kinh	SII_Kinh	CnI_Kinh
Non-use of tobacco	0.11 (-0.03 to 0.25)	7.23 (-3.08 to 17.54)	0.01 (-0.01 to 0.03)	0.03 (-0.02 to 0.08)	2.53 (-1.33 to 6.40)	0.00 (-0.00 to 0.01)
Non-harmful use of alcohol	0.17 (-0.02 to 0.35)	12.97 (-1.31 to 27.26)	0.02 (-0.00 to 0.05)	0.04 (-0.03 to 0.11)	3.41 (-2.33 to 9.15)	0.01 (-0.01 to 0.02)
Sufficient physical activity	-0.17 (-0.31 to -0.03)**	-16.91 (-28.61 to -5.21)**	-0.03 (-0.04 to -0.01)**	0.02 (-0.08 to 0.11)	2.08 (-4.47 to 8.64)	0.00 (-0.01 to 0.02)
Sufficient use of fruit and vegetables	0.62 (0.10 to 1.14)	16.39 (1.03 to 31.74)*	0.04 (-0.03 to 0.12)	-1.53 (-1.73 to -1.33)***	20.49 (14.15 to 26.83)***	-0.06 (-0.09 to -0.03)***
Non-overweight	-0.03 (-0.17 to 0.11)	-2.06 (-13.86 to 9.73)	-0.00 (-0.02 to 0.02)	-0.01 (-0.08 to 0.06)	-0.51 (-6.35 to 5.34)	-0.00 (-0.01 to 0.01)
Treatment of diabetes	1.44 (-0.00 to 2.89)	11.39 (-17.42 to 40.20)	0.07 (-0.13 to 0.28)	0.50 (0.08 to 0.91)	12.89 (-0.42 to 26.19)	0.06 (-0.00 to 0.13)
Treatment of hypertension	NA (NA to NA)NA	NA (NA to NA)NA	NA (NA to NA)NA	-0.39 (-1.14 to 0.35)	-17.29 (-51.51 to 16.94)	-0.04 (-0.16 to 0.08)

Note: ***, **, * Statistically significant results with P<0.001, P<0.01, and P<0.05, respectively; RII=Relative Index of Inequality; SII=Slope Index of Inequality; CnI=Concentrate Index of Inequality; CI=Confidence Interval;

Table S30: Changes in Wealth inequality in NCD management, 2010-2015, stratifying by living areas

Indicators	Changes in Social-Economic Inequality in Rural Areas			Changes in Social-Economic Inequality in Urban Areas		
	RII_rural	SII_rural	CnI_rural	RII_urban	SII_urban	CnI_urban
Non-use of tobacco	0.05 (-0.02 to 0.12)	3.81 (-1.27 to 8.89)	0.01 (-0.00 to 0.02)	0.04 (-0.02 to 0.11)	3.35 (-1.90 to 8.59)	0.01 (-0.00 to 0.02)
Non-harmful use of alcohol	0.07 (-0.03 to 0.17)	5.80 (-1.66 to 13.25)	0.01 (-0.00 to 0.03)	0.04 (-0.06 to 0.13)	3.64 (-4.02 to 11.31)	0.01 (-0.01 to 0.02)
Sufficient physical activity	-0.10 (-0.20 to -0.01)*	-8.14 (-15.41 to -0.86)*	-0.01 (-0.03 to -0.00)*	-0.06 (-0.20 to 0.08)	-4.71 (-14.08 to 4.65)	-0.01 (-0.03 to 0.01)
Sufficient use of fruit and vegetables	0.88 (0.61 to 1.15)**	31.18 (23.22 to 39.15)***	0.07 (0.03 to 0.11)**	-1.43 (-1.70 to -1.17)***	14.79 (6.10 to 23.49)***	-0.06 (-0.10 to -0.03)**
Non-overweight	-0.02 (-0.09 to 0.05)	-1.18 (-7.40 to 5.04)	-0.00 (-0.01 to 0.01)	-0.03 (-0.14 to 0.09)	-1.76 (-10.61 to 7.10)	-0.00 (-0.02 to 0.01)
Treatment of diabetes	-0.04 (-0.66 to 0.59)	-0.73 (-16.21 to 14.74)	-0.01 (-0.10 to 0.09)	1.00 (0.49 to 1.51)**	33.82 (15.18 to 52.46)***	0.14 (0.06 to 0.22)***
Treatment of hypertension	-0.14 (-1.68 to 1.39)	-16.52 (-63.15 to 30.12)	-0.01 (-0.26 to 0.23)	-0.45 (-1.28 to 0.37)	-23.50 (-66.62 to 19.62)	-0.06 (-0.19 to 0.07)

Note: ***, **, * Statistically significant results with P<0.001, P<0.01, and P<0.05, respectively; RII=Relative Index of Inequality; SII=Slope Index of Inequality; CnI=Concentrate Index of Inequality; CI=Confidence Interval;

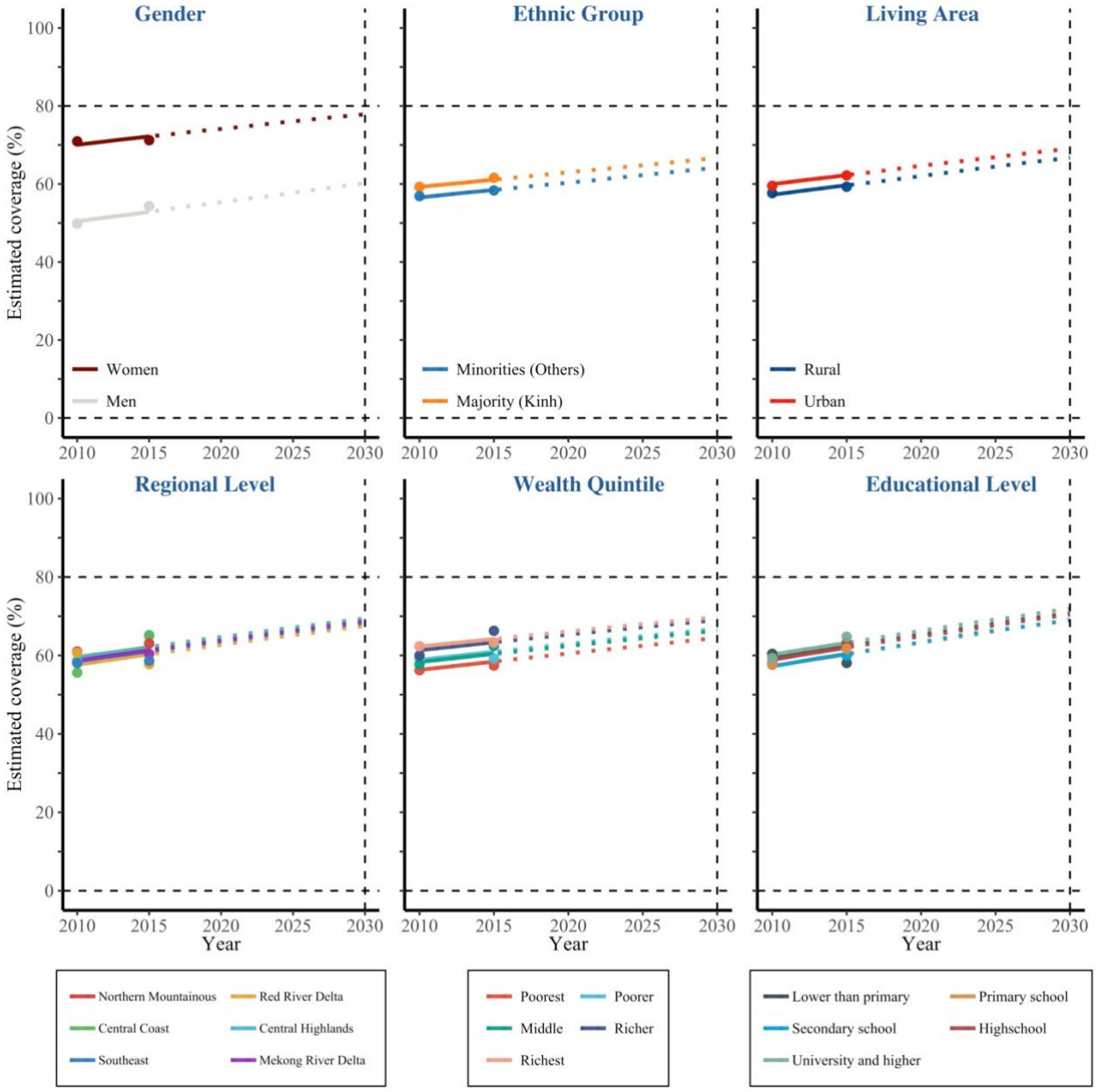

Figure S1: Trends in and projections of coverage of NCD composite coverage

The coloured dots are the observed coverages. The solid lines are the estimated trends to 2015. The dashed lines are the projected trends in future from 2015. The shaded areas are the 95% Credible Intervals; the horizontal dotted lines present the UHC target of 80% (at the top) and 95% (bottom) coverage.

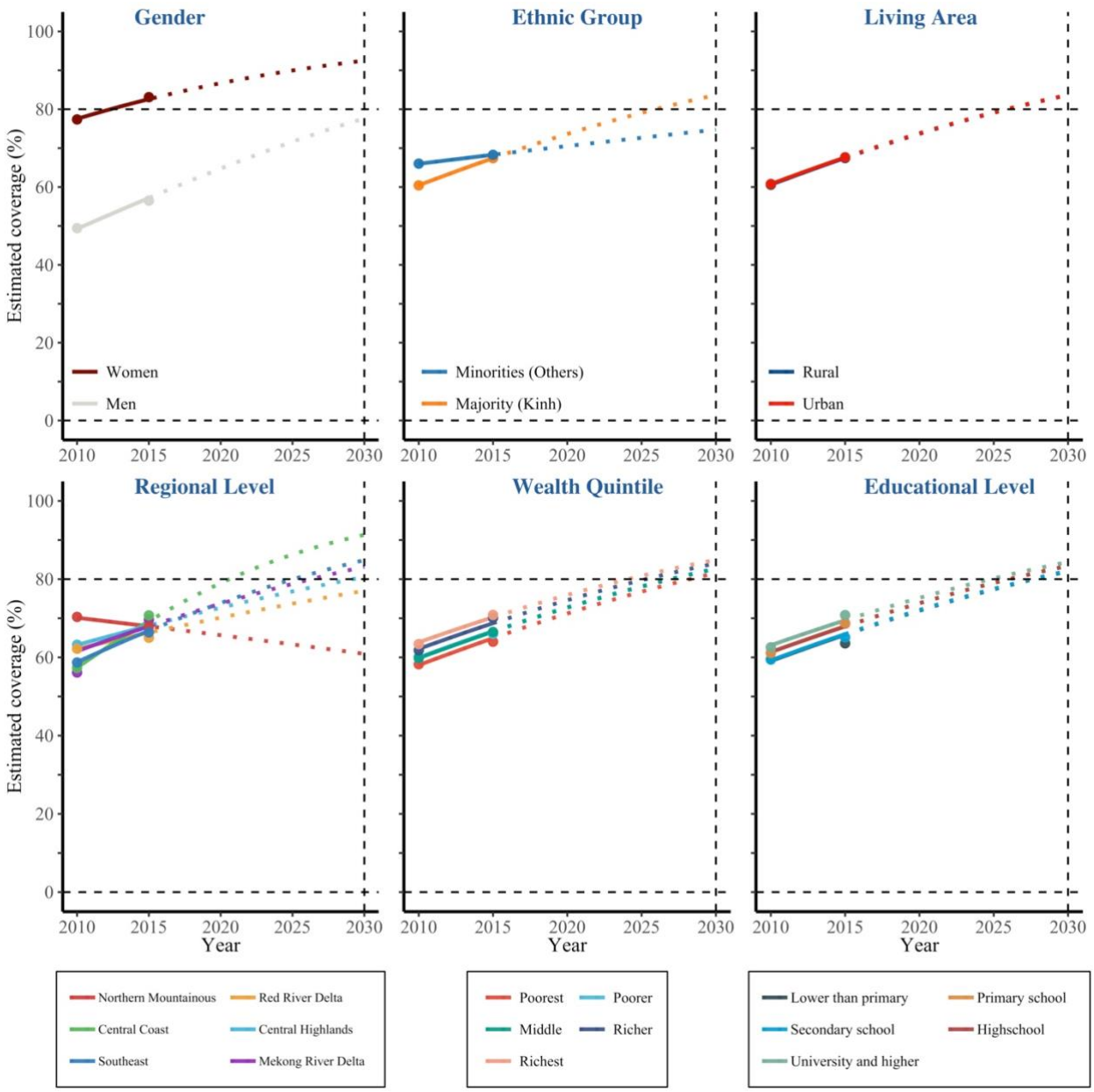

Figure S2: Trends in and projections of coverage of NCD composite prevention

The coloured dots are the observed coverages. The solid lines are the estimated trends to 2015. The dashed lines are the projected trends in future from 2015. The shaded areas are the 95% Credible Intervals; the horizontal dotted lines present the UHC target of 80% (at the top) and 95% (bottom) coverage.

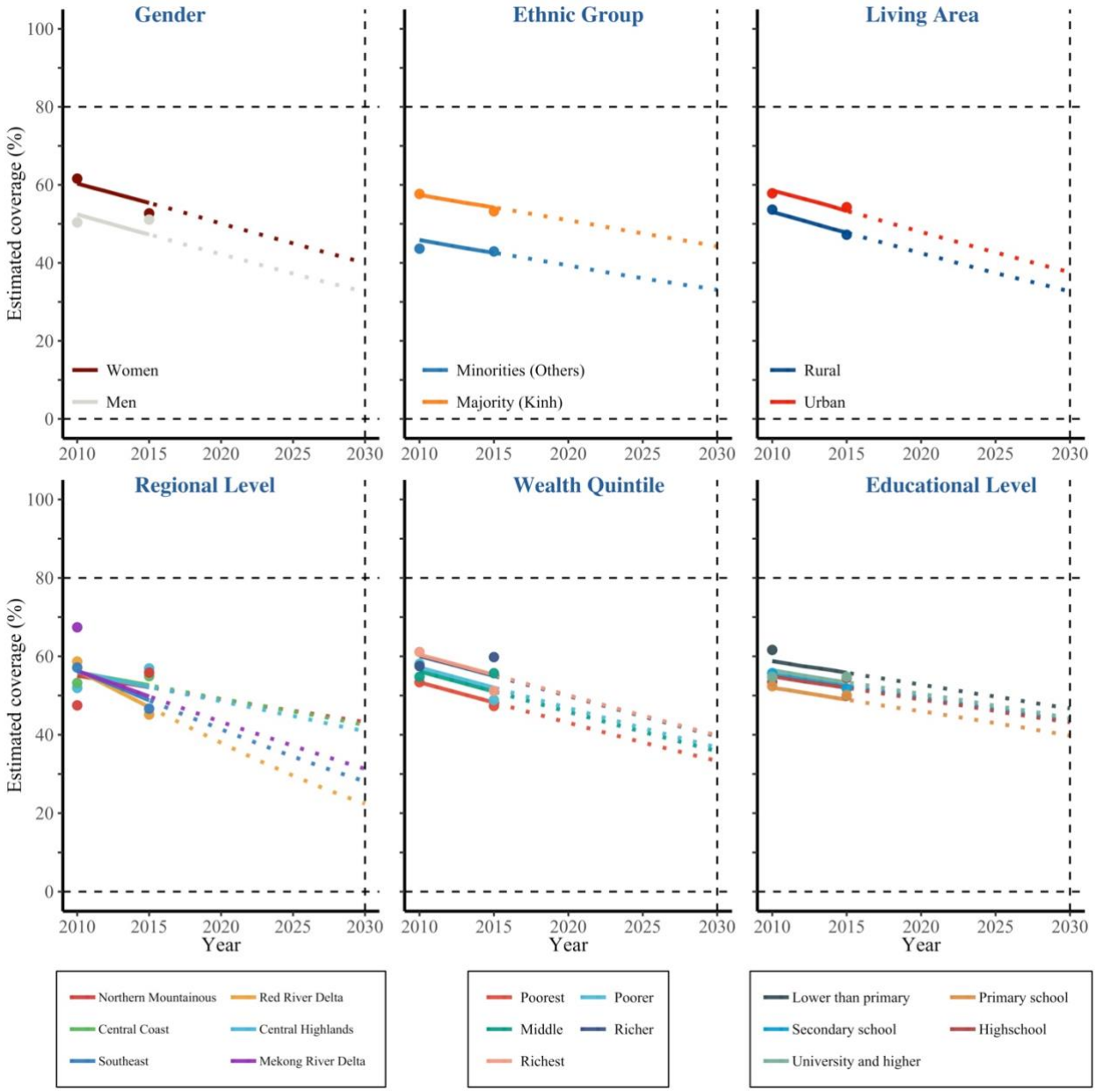

Figure S3: Trends in and projections of coverage of NCD composite treatment

The coloured dots are the observed coverages. The solid lines are the estimated trends to 2015. The dashed lines are the projected trends in future from 2015. The shaded areas are the 95% Credible Intervals; the horizontal dotted lines present the UHC target of 80% (at the top) and 95% (bottom) coverage.

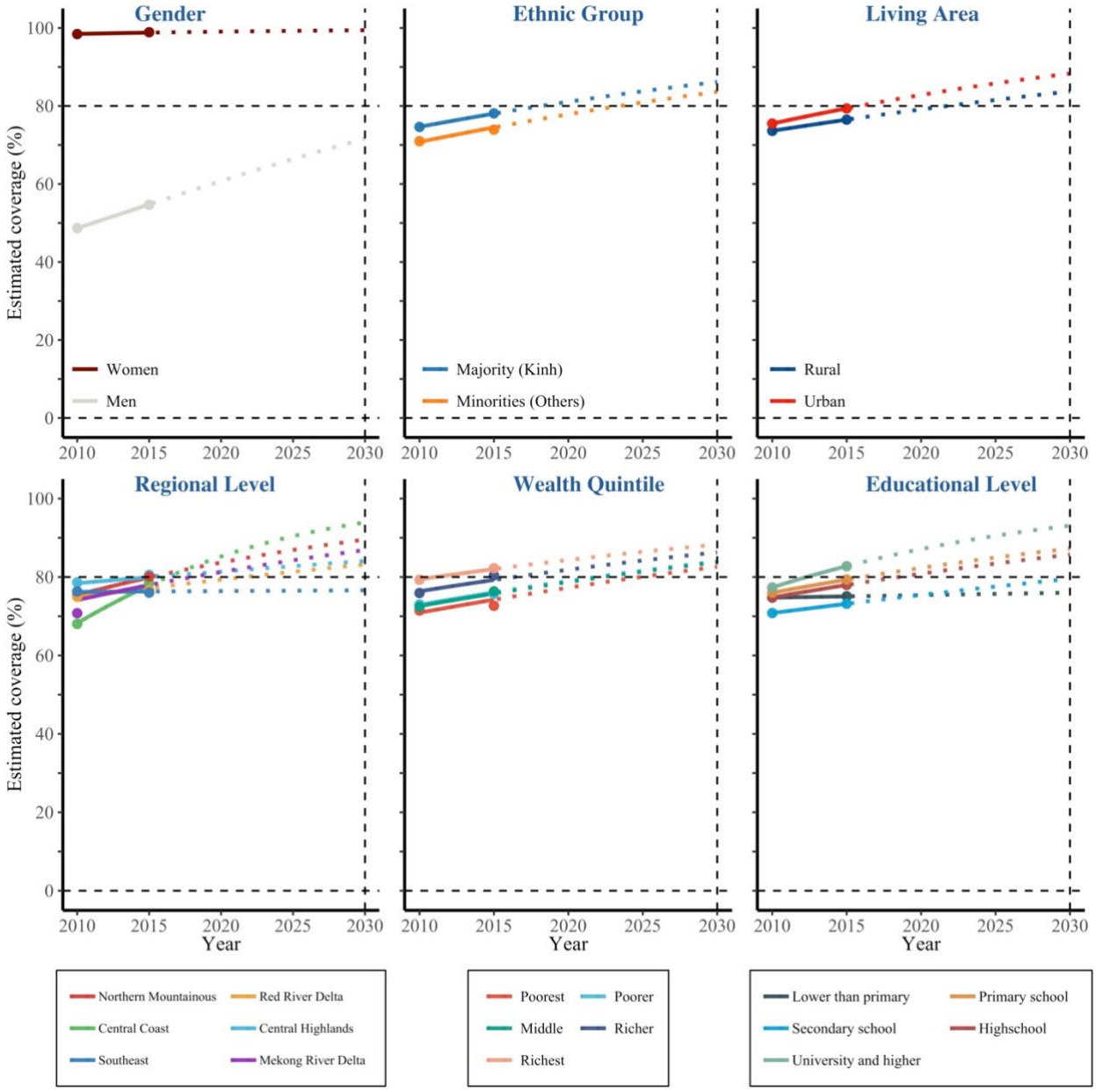

Figure S4: Trends in and projections of coverage of non-use of tobacco

The coloured dots are the observed coverages. The solid lines are the estimated trends to 2015. The dashed lines are the projected trends in future from 2015. The shaded areas are the 95% Credible Intervals; the horizontal dotted lines present the UHC target of 80% (at the top) and 95% (bottom) coverage.

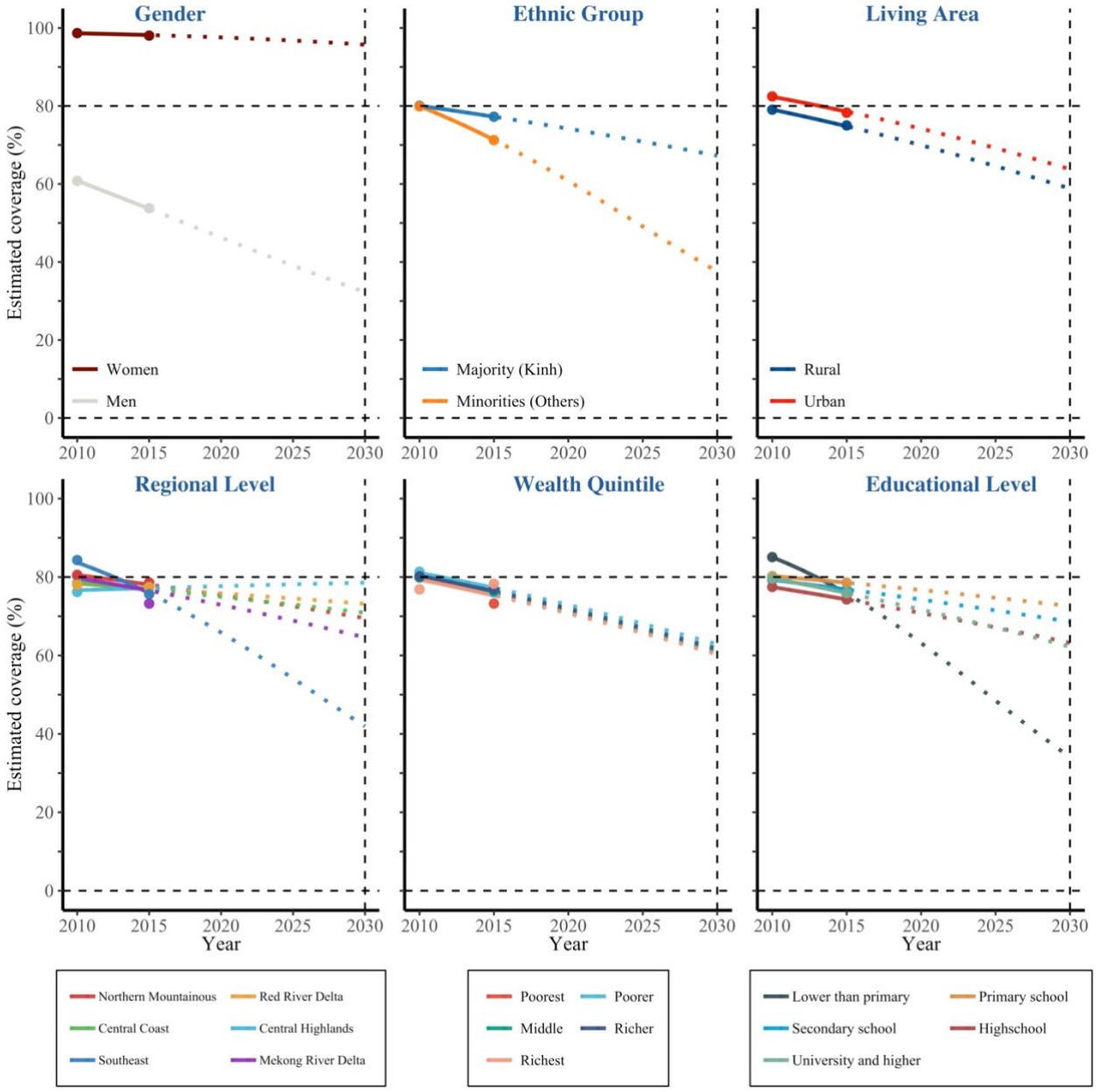

Figure S5: Trends in and projections of coverage of non-harmful use of alcohol

The coloured dots are the observed coverages. The solid lines are the estimated trends to 2015. The dashed lines are the projected trends in future from 2015. The shaded areas are the 95% Credible Intervals; the horizontal dotted lines present the UHC target of 80% (at the top) and 95% (bottom) coverage.

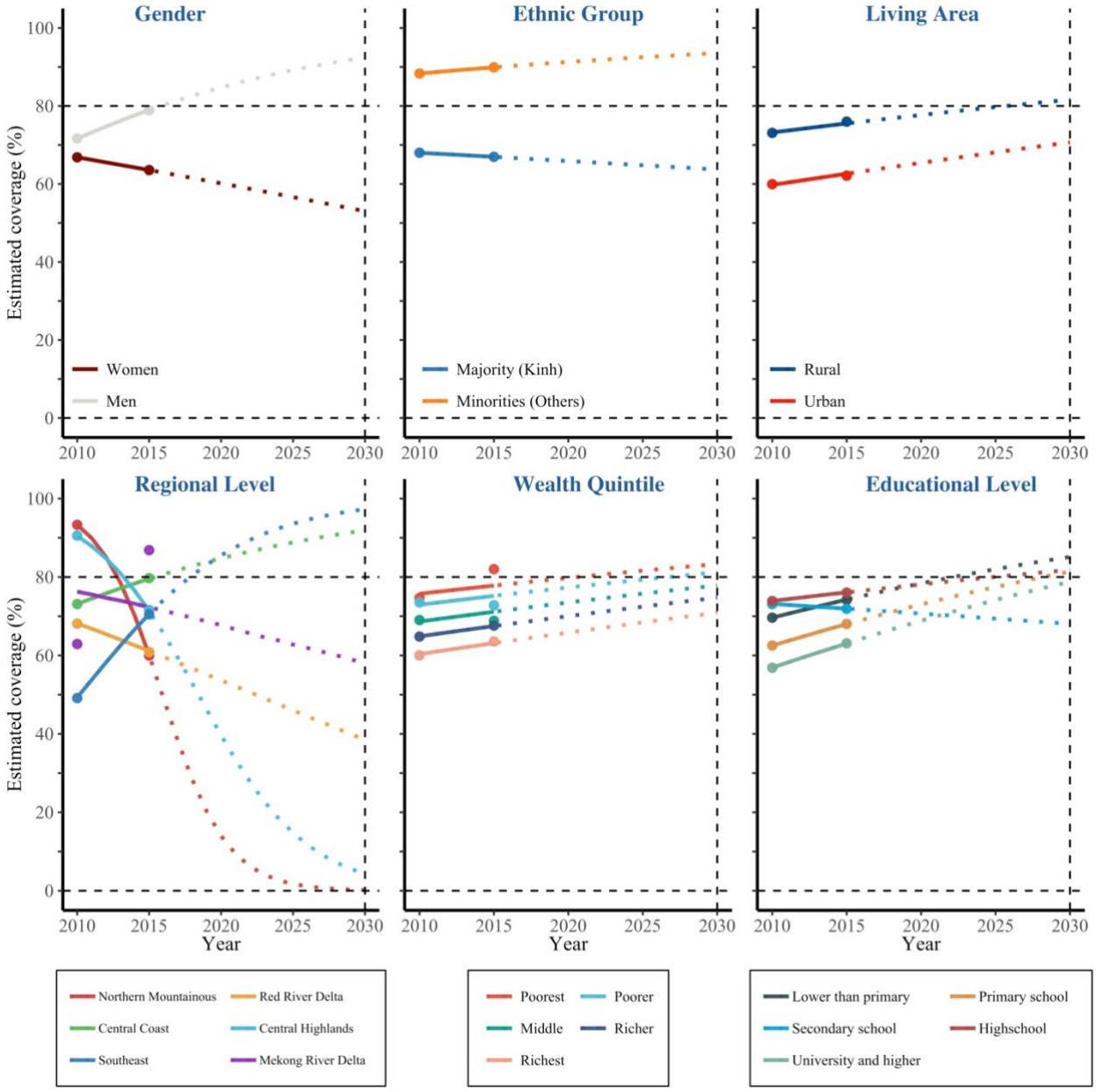

Figure S6: Trends in and projections of coverage of sufficient physical activity

The coloured dots are the observed coverages. The solid lines are the estimated trends to 2015. The dashed lines are the projected trends in future from 2015. The shaded areas are the 95% Credible Intervals; the horizontal dotted lines present the UHC target of 80% (at the top) and 95% (bottom) coverage.

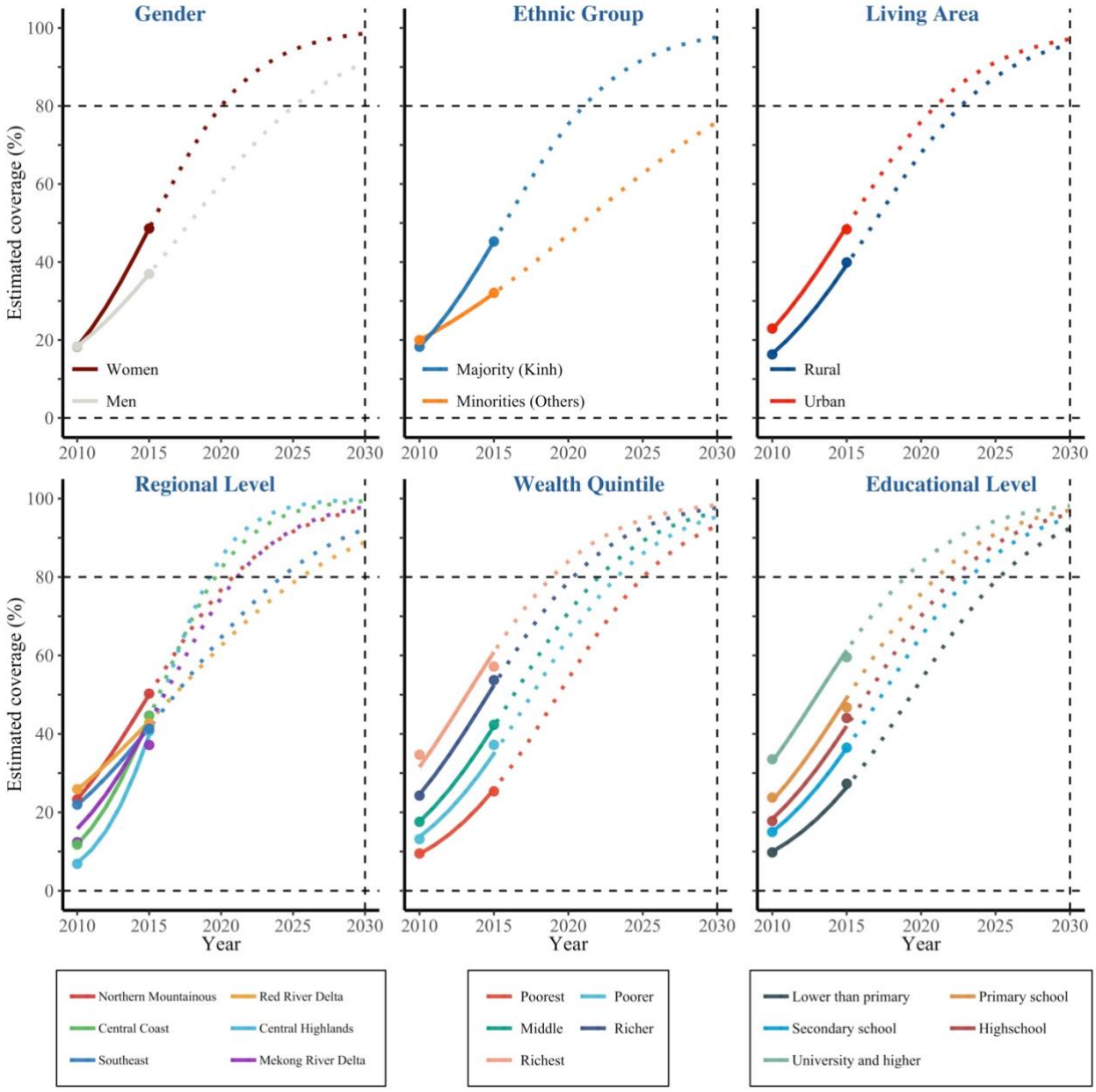

Figure S7: Trends in and projections of coverage of sufficient use of fruit and vegetables

The coloured dots are the observed coverages. The solid lines are the estimated trends to 2015. The dashed lines are the projected trends in future from 2015. The shaded areas are the 95% Credible Intervals; the horizontal dotted lines present the UHC target of 80% (at the top) and 95% (bottom) coverage.

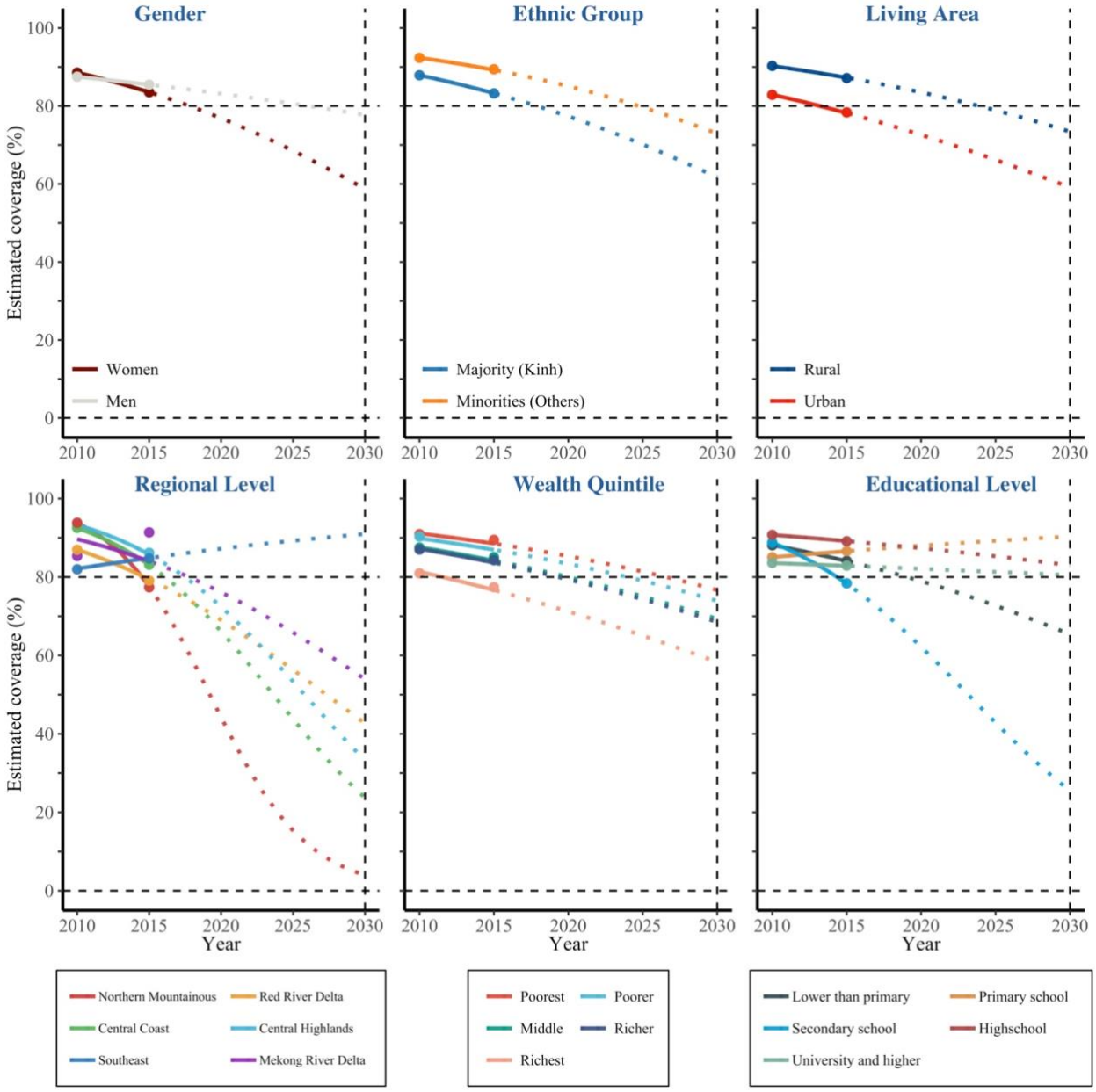

Figure S8: Trends in and projections of coverage of non-overweight

The coloured dots are the observed coverages. The solid lines are the estimated trends to 2015. The dashed lines are the projected trends in future from 2015. The shaded areas are the 95% Credible Intervals; the horizontal dotted lines present the UHC target of 80% (at the top) and 95% (bottom) coverage.

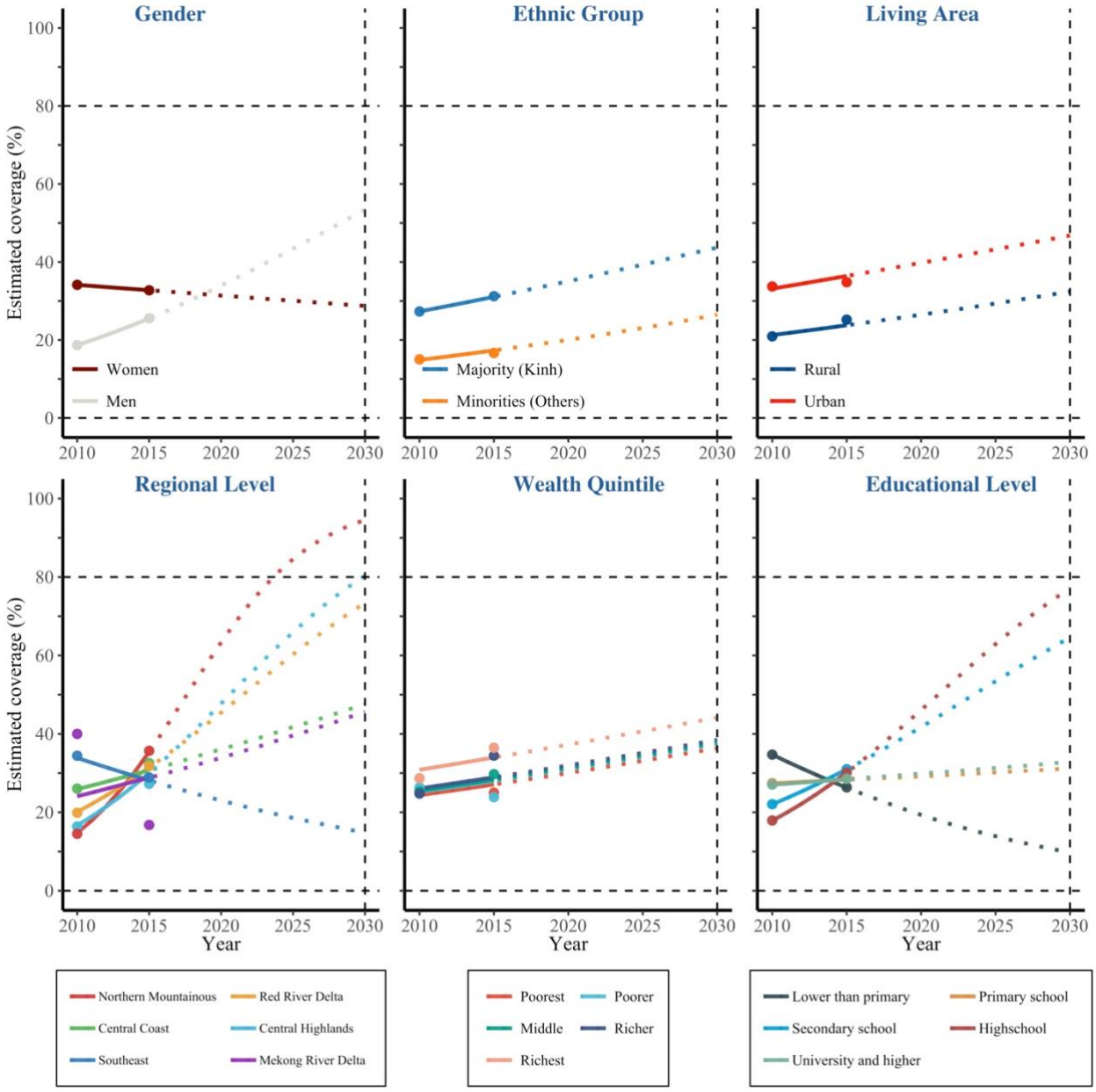

Figure S9: Trends in and projections of coverage of treatment of hypertension

The coloured dots are the observed coverages. The solid lines are the estimated trends to 2015. The dashed lines are the projected trends in future from 2015. The shaded areas are the 95% Credible Intervals; the horizontal dotted lines present the UHC target of 80% (at the top) and 95% (bottom) coverage.

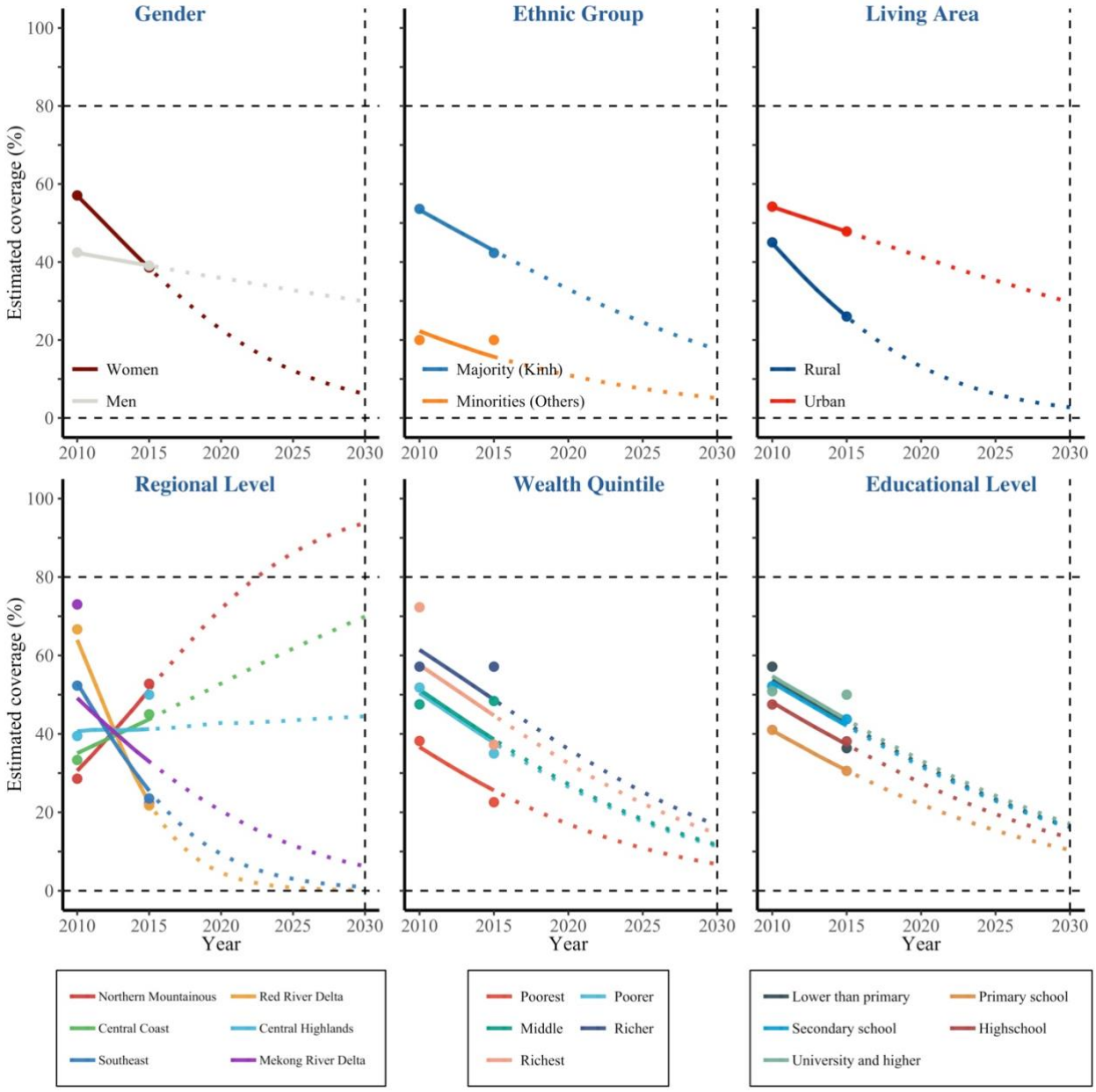

Figure S10: Trends in and projections of coverage of treatment of diabetes

The coloured dots are the observed coverages. The solid lines are the estimated trends to 2015. The dashed lines are the projected trends in future from 2015. The shaded areas are the 95% Credible Intervals; the horizontal dotted lines present the UHC target of 80% (at the top) and 95% (bottom) coverage.

Process of Principal Component Analysis

We performed principal component analysis in Stata, and presented the process with excuted commands, explanations, and outcomes as below.

```
-------------------------------------------------------------------------------------------------------------
> -
      name:  <unnamed>
       log:  /Users/bongbaymauxanh/Dropbox (Stuart研)/02_PROJECTS/01_Ongoing Projects/NCD in Vietnam/Data
  log type:  text
 opened on:   9 May 2022, 13:05:35

.
. ****** GATS 2010
.
. *** Import data set of GATS2010
. use "gats10.dta", clear
(Written by R.              )

.
. *** Make wscore0 for general
. * Check frequency of each variables
. summarize electric toilet fix_phone cell_phone tivi radio fridge car motor wash airc gene grinder boat

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
    electric |      9,925    .9891184    .1037511          0          1
      toilet |      9,925    .5768262    .4940874          0          1
   fix_phone |      9,925    .5276574    .4992596          0          1
  cell_phone |      9,925    .8242821    .3805991          0          1
        tivi |      9,925    .9193955    .2722405          0          1
-------------+---------------------------------------------------------
       radio |      9,925    .2448363    .4300117          0          1
      fridge |      9,925    .4606549    .4984747          0          1
         car |      9,925    .0378841    .1909256          0          1
       motor |      9,925     .790529    .4069516          0          1
        wash |      9,925    .2423174    .4285069          0          1
-------------+---------------------------------------------------------
        airc |      9,925    .0982368    .2976495          0          1
        gene |      9,925    .0381864    .1916557          0          1
     grinder |      9,925    .0308312     .172869          0          1
        boat |      9,925    .0424181    .2015513          0          1
          pc |      9,925    .2332494    .4229209          0          1
-------------+---------------------------------------------------------
    internet |      9,925    .1528463    .3598575          0          1

. * Remove 5 variables not in 5%-95% including electric, car, gene, grinder, boat
.
. * Run pca for general (only for frequency 5% - 95%)
. pca toilet fix_phone cell_phone tivi radio fridge motor wash airc pc internet

Principal components/correlation                  Number of obs    =      9,925
                                                  Number of comp.  =         11
                                                  Trace            =         11
    Rotation: (unrotated = principal)             Rho              =     1.0000

    --------------------------------------------------------------------------
       Component |   Eigenvalue   Difference         Proportion   Cumulative
    -------------+------------------------------------------------------------
           Comp1 |      3.98439      2.53989             0.3622       0.3622
           Comp2 |       1.4445      .466827             0.1313       0.4935
           Comp3 |      .977669      .061093             0.0889       0.5824
           Comp4 |      .916576      .147422             0.0833       0.6657
           Comp5 |      .769154     .0826299             0.0699       0.7357
           Comp6 |      .686524     .0738032             0.0624       0.7981
           Comp7 |      .612721      .108609             0.0557       0.8538
           Comp8 |      .504113     .0247932             0.0458       0.8996
           Comp9 |      .479319     .0905977             0.0436       0.9432
          Comp10 |      .388722      .152402             0.0353       0.9785
          Comp11 |      .236319            .             0.0215       1.0000
    --------------------------------------------------------------------------

Principal components (eigenvectors)

    ------------------------------------------------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6     Comp7     Comp8      Com
    -------------+----------------------------------------------------------------------------------------------
          toilet |   0.3214    0.0628    0.0242   -0.1100   -0.6631   -0.0483    0.4023    0.1326     0.50
       fix_phone |   0.2830    0.0102    0.4510   -0.4428    0.0801   -0.3109   -0.4442    0.4614     0.00
      cell_phone |   0.2302    0.4619   -0.3300    0.3720   -0.1279    0.0862   -0.0462    0.5596    -0.38
            tivi |   0.1819    0.4928    0.2053   -0.2179    0.5328    0.0283    0.5882   -0.0465     0.00
           radio |   0.1304   -0.0806    0.7017    0.6915   -0.0123    0.0334    0.0433   -0.0384     0.00
```

```
      fridge |   0.3769    0.0822    0.1245   -0.1892   -0.2754    0.0488   -0.0363   -0.3814   -0.46
       motor |   0.2528    0.4913   -0.1429    0.1644    0.1017   -0.0344   -0.5093   -0.4053    0.45
        wash |   0.3831   -0.1565   -0.0228   -0.1290   -0.0742    0.3149   -0.0397   -0.2734   -0.30
        airc |   0.3039   -0.2838   -0.0551   -0.0302    0.2567    0.7144   -0.0810    0.2512    0.28
          pc |   0.3777   -0.2640   -0.2241    0.1608    0.1516   -0.3990    0.1117   -0.0649   -0.00
    internet |   0.3548   -0.3322   -0.2509    0.1468    0.2701   -0.3455    0.0973    0.0299    0.04
-------------------------------------------------------------------------------------------------------

---------------------------
    Variable | Unexplained
-------------+-------------
      toilet |           0
   fix_phone |           0
  cell_phone |           0
        tivi |           0
       radio |           0
      fridge |           0
       motor |           0
        wash |           0
        airc |           0
          pc |           0
    internet |           0
---------------------------

.
. * Create variable
. predict wscore0
(score assumed)
(10 components skipped)

Scoring coefficients
    sum of squares(column-loading) = 1

-------------------------------------------------------------------------------------------------------
    Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6     Comp7     Comp8     Com
-------------+-----------------------------------------------------------------------------------------
      toilet |   0.3214    0.0628    0.0242   -0.1100   -0.6631   -0.0483    0.4023    0.1326    0.50
   fix_phone |   0.2830    0.0102    0.4510   -0.4428    0.0801   -0.3109   -0.4442    0.4614    0.00
  cell_phone |   0.2302    0.4619   -0.3300    0.3720   -0.1279    0.0862   -0.0462    0.5596   -0.38
        tivi |   0.1819    0.4928    0.2053   -0.2179    0.5328    0.0283    0.5882   -0.0465    0.00
       radio |   0.1304   -0.0806    0.7017    0.6915   -0.0123    0.0334    0.0433   -0.0384    0.00
      fridge |   0.3769    0.0822    0.1245   -0.1892   -0.2754    0.0488   -0.0363   -0.3814   -0.46
       motor |   0.2528    0.4913   -0.1429    0.1644    0.1017   -0.0344   -0.5093   -0.4053    0.45
        wash |   0.3831   -0.1565   -0.0228   -0.1290   -0.0742    0.3149   -0.0397   -0.2734   -0.30
        airc |   0.3039   -0.2838   -0.0551   -0.0302    0.2567    0.7144   -0.0810    0.2512    0.28
          pc |   0.3777   -0.2640   -0.2241    0.1608    0.1516   -0.3990    0.1117   -0.0649   -0.00
    internet |   0.3548   -0.3322   -0.2509    0.1468    0.2701   -0.3455    0.0973    0.0299    0.04
-------------------------------------------------------------------------------------------------------

.
. * Scree plot
. screeplot, yline(1) ci(het)

.
. *** Make wscore1 for urban
. * Check frequency of each variables
. summarize electric toilet fix_phone cell_phone tivi radio fridge car motor wash airc gene grinder boat

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
    electric |      4,958    .9989915    .0317436          0          1
      toilet |      4,958    .8079871    .3939229          0          1
   fix_phone |      4,958     .624647    .4842628          0          1
  cell_phone |      4,958    .9015732    .2979209          0          1
        tivi |      4,958    .9417104    .2343139          0          1
-------------+---------------------------------------------------------
       radio |      4,958    .2666398     .442247          0          1
      fridge |      4,958    .6385639     .480465          0          1
         car |      4,958    .0564744    .2308588          0          1
       motor |      4,958    .8507463    .3563743          0          1
        wash |      4,958      .40238    .4904272          0          1
-------------+---------------------------------------------------------
        airc |      4,958    .1789028    .3833096          0          1
        gene |      4,958    .0457846    .2090387          0          1
     grinder |      4,958    .0100847    .0999251          0          1
       boat |      4,958    .0183542    .1342421          0          1
         pc |      4,958     .375353    .4842628          0          1
```

```
    internet |      4,958    .2636144     .440637          0          1

. * Remove 4 variables not in 5%-95% including electric, gene, grinder, boat
.
. * Run pca for urban
. pca toilet fix_phone cell_phone tivi radio fridge car motor wash airc pc internet if area == 1

Principal components/correlation                  Number of obs    =      4,958
                                                  Number of comp.  =         12
                                                  Trace            =         12
    Rotation: (unrotated = principal)             Rho              =     1.0000

    --------------------------------------------------------------------------
       Component |   Eigenvalue   Difference         Proportion   Cumulative
    -------------+------------------------------------------------------------
           Comp1 |      3.89237      2.48919             0.3244       0.3244
           Comp2 |      1.40317       .35503             0.1169       0.4413
           Comp3 |      1.04814     .0807988             0.0873       0.5286
           Comp4 |      .967343     .0588589             0.0806       0.6093
           Comp5 |      .908485     .0650484             0.0757       0.6850
           Comp6 |      .843436      .184487             0.0703       0.7552
           Comp7 |      .658949      .044204             0.0549       0.8102
           Comp8 |      .614745     .0848969             0.0512       0.8614
           Comp9 |      .529849     .0369504             0.0442       0.9055
          Comp10 |      .492898     .0874838             0.0411       0.9466
          Comp11 |      .405414      .170215             0.0338       0.9804
          Comp12 |        .2352            .             0.0196       1.0000
    --------------------------------------------------------------------------

Principal components (eigenvectors)

    ------------------------------------------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6     Comp7     Comp8     Com
    -------------+----------------------------------------------------------------------------------------
          toilet |   0.2567    0.0613   -0.1353   -0.1887   -0.2380    0.7584    0.2619    0.3576    0.14
       fix_phone |   0.3063    0.0837    0.4387   -0.1118   -0.1758   -0.0459    0.2174   -0.5929    0.43
      cell_phone |   0.2094    0.3528   -0.6071    0.0414    0.2113    0.0525   -0.1750   -0.2592    0.42
            tivi |   0.1848    0.5043    0.3701    0.0896    0.0402   -0.3118    0.1600    0.5690    0.21
           radio |   0.1480   -0.1048    0.1674   -0.5899    0.7597    0.0746    0.0261    0.0234   -0.07
          fridge |   0.3704    0.1728    0.2019   -0.0270   -0.1402    0.1454   -0.0605   -0.2151   -0.41
             car |   0.1660   -0.1809    0.0934    0.7326    0.4503    0.2304    0.3533   -0.0766   -0.05
           motor |   0.2658    0.4802   -0.2410    0.0783    0.1275   -0.1739   -0.0213   -0.0237   -0.36
            wash |   0.3822   -0.0732    0.1051    0.0370   -0.1438    0.0904   -0.3850   -0.0291   -0.34
            airc |   0.3147   -0.2772    0.1370    0.1844    0.0828    0.0121   -0.6429    0.2344    0.35
              pc |   0.3691   -0.2975   -0.2616   -0.1107   -0.1081   -0.2935    0.2794    0.0793   -0.07
        internet |   0.3518   -0.3682   -0.2235   -0.0537   -0.1055   -0.3438    0.2421    0.1201    0.06
    ------------------------------------------------------------------------------------------------------

    ---------------------------
        Variable | Unexplained
    -------------+-------------
          toilet |           0
       fix_phone |           0
      cell_phone |           0
            tivi |           0
           radio |           0
          fridge |           0
             car |           0
           motor |           0
            wash |           0
            airc |           0
              pc |           0
        internet |           0
    ---------------------------

. * Create variable
. predict wscore1 if area == 1
(score assumed)
(11 components skipped)

Scoring coefficients
    sum of squares(column-loading) = 1

    ------------------------------------------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6     Comp7     Comp8     Com
    -------------+----------------------------------------------------------------------------------------
```

```
      fix_phone |   0.3063    0.0837    0.4387   -0.1118   -0.1758   -0.0459    0.2174   -0.5929    0.43
     cell_phone |   0.2094    0.3528   -0.6071    0.0414    0.2113    0.0525   -0.1750   -0.2592    0.42
           tivi |   0.1848    0.5043    0.3701    0.0896    0.0402   -0.3118    0.1600    0.5690    0.21
          radio |   0.1480   -0.1048    0.1674   -0.5899    0.7597    0.0746    0.0261    0.0234   -0.07
         fridge |   0.3704    0.1728    0.2019   -0.0270   -0.1402    0.1454   -0.0605   -0.2151   -0.41
            car |   0.1660   -0.1809    0.0934    0.7326    0.4503    0.2304    0.3533   -0.0766   -0.05
          motor |   0.2658    0.4802   -0.2410    0.0783    0.1275   -0.1739   -0.0213   -0.0237   -0.36
           wash |   0.3822   -0.0732    0.1051    0.0370   -0.1438    0.0904   -0.3850   -0.0291   -0.34
           airc |   0.3147   -0.2772    0.1370    0.1844    0.0828    0.0121   -0.6429    0.2344    0.35
             pc |   0.3691   -0.2975   -0.2616   -0.1107   -0.1081   -0.2935    0.2794    0.0793   -0.07
       internet |   0.3518   -0.3682   -0.2235   -0.0537   -0.1055   -0.3438    0.2421    0.1201    0.06
    ------------------------------------------------------------------------------------------------------

.
.
. *** Make wscore2 for rural
. * Check frequency of each variables
. summarize electric toilet fix_phone cell_phone tivi radio fridge car motor wash airc gene grinder boat

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
    electric |      4,967    .9792631    .1425164          0          1
      toilet |      4,967    .3460842    .4757683          0          1
   fix_phone |      4,967    .4308436    .4952441          0          1
  cell_phone |      4,967    .7471311    .4347002          0          1
       tivi |      4,967     .897121    .3038314          0          1
-------------+---------------------------------------------------------
       radio |      4,967    .2230723    .4163483          0          1
      fridge |      4,967    .2830683    .4505347          0          1
         car |      4,967    .0193276    .1376874          0          1
       motor |      4,967    .7304208    .4437859          0          1
        wash |      4,967    .0825448    .2752206          0          1
-------------+---------------------------------------------------------
        airc |      4,967    .0177169    .1319339          0          1
        gene |      4,967     .030602    .1722541          0          1
     grinder |      4,967    .0515402     .221119          0          1
        boat |      4,967    .0664385    .2490721          0          1
          pc |      4,967    .0914033    .2882107          0          1
-------------+---------------------------------------------------------
    internet |      4,967     .042279    .2012453          0          1

. * Remove 5 variables not in 5%-95% including electric, car, airc, gene, internet
.
. * Run pca for rural
. pca toilet fix_phone cell_phone tivi radio fridge motor wash grinder boat pc if area == 2

Principal components/correlation                  Number of obs    =      4,967
                                                  Number of comp.  =         11
                                                  Trace            =         11
    Rotation: (unrotated = principal)             Rho              =     1.0000

    ------------------------------------------------------------------------------
       Component |   Eigenvalue   Difference         Proportion   Cumulative
    -------------+----------------------------------------------------------------
           Comp1 |      2.83673      1.49509             0.2579       0.2579
           Comp2 |      1.34164      .280575             0.1220       0.3799
           Comp3 |      1.06107     .0875997             0.0965       0.4763
           Comp4 |      .973466      .033364             0.0885       0.5648
           Comp5 |      .940102     .0688322             0.0855       0.6503
           Comp6 |       .87127      .182324             0.0792       0.7295
           Comp7 |      .688946     .0268995             0.0626       0.7921
           Comp8 |      .662047     .0595017             0.0602       0.8523
           Comp9 |      .602545     .0725929             0.0548       0.9071
          Comp10 |      .529952     .0377196             0.0482       0.9553
          Comp11 |      .492232            .             0.0447       1.0000
    ------------------------------------------------------------------------------

Principal components (eigenvectors)

    ------------------------------------------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6     Comp7     Comp8     Com
    -------------+----------------------------------------------------------------------------------------
          toilet |   0.3867   -0.1754   -0.1115    0.0036   -0.0481   -0.0667   -0.6732    0.2315    0.41
       fix_phone |   0.2938   -0.2340    0.0768   -0.2501    0.4810   -0.4830    0.1381   -0.4105    0.06
      cell_phone |   0.3178    0.4973   -0.1500    0.1701   -0.1587    0.2359   -0.0652   -0.0706   -0.02
            tivi |   0.2850    0.4025   -0.1064   -0.0684    0.3177   -0.3116    0.2528    0.6652   -0.10
```

```
           motor |   0.3414    0.4364   -0.1343   -0.0245    0.0612    0.1602    0.0667   -0.5370   -0.00
            wash |   0.3629   -0.3182    0.0825   -0.0790   -0.3024    0.0804    0.0943    0.0910   -0.69
         grinder |   0.0369    0.1849    0.6234   -0.6519    0.0365    0.3454   -0.0672    0.1037    0.11
            boat |   0.0565    0.2240    0.6431    0.3965   -0.3426   -0.4944   -0.0318   -0.0772    0.04
              pc |   0.3461   -0.2763   -0.0008    0.0544   -0.3025    0.1663    0.6233    0.0924    0.53
    ------------------------------------------------------------------------------------------------------

    --------------------------
        Variable | Unexplained
    -------------+------------
          toilet |           0
       fix_phone |           0
      cell_phone |           0
            tivi |           0
           radio |           0
          fridge |           0
           motor |           0
            wash |           0
         grinder |           0
            boat |           0
              pc |           0
    --------------------------

. * Create variable
. predict wscore2 if area == 2
(score assumed)
(10 components skipped)

Scoring coefficients
    sum of squares(column-loading) = 1

    ------------------------------------------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6     Comp7     Comp8      Com
    -------------+----------------------------------------------------------------------------------------
          toilet |   0.3867   -0.1754   -0.1115    0.0036   -0.0481   -0.0667   -0.6732    0.2315    0.41
       fix_phone |   0.2938   -0.2340    0.0768   -0.2501    0.4810   -0.4830    0.1381   -0.4105    0.06
      cell_phone |   0.3178    0.4973   -0.1500    0.1701   -0.1587    0.2359   -0.0652   -0.0706   -0.02
            tivi |   0.2850    0.4025   -0.1064   -0.0684    0.3177   -0.3116    0.2528    0.6652   -0.10
           radio |   0.1444   -0.1639    0.3474    0.5560    0.5733    0.4310   -0.0049    0.0684   -0.04
          fridge |   0.4341   -0.1609    0.0122   -0.0527   -0.0784   -0.0159   -0.2286   -0.0624   -0.15
           motor |   0.3414    0.4364   -0.1343   -0.0245    0.0612    0.1602    0.0667   -0.5370   -0.00
            wash |   0.3629   -0.3182    0.0825   -0.0790   -0.3024    0.0804    0.0943    0.0910   -0.69
         grinder |   0.0369    0.1849    0.6234   -0.6519    0.0365    0.3454   -0.0672    0.1037    0.11
            boat |   0.0565    0.2240    0.6431    0.3965   -0.3426   -0.4944   -0.0318   -0.0772    0.04
              pc |   0.3461   -0.2763   -0.0008    0.0544   -0.3025    0.1663    0.6233    0.0924    0.53
    ------------------------------------------------------------------------------------------------------

.
.
. *** Score data from coefficient vectors using matrix score - wcom1
. * Make the regress and coef
. quietly regress wscore0 wscore1

. matrix coefs = e(b)

. matrix list coefs

coefs[1,2]
      wscore1      _cons
y1  1.0328658  .90707496

.
. * Scoring the data with this vector would create a new variable equal to the linear combination
. * Form this linear combination
. matrix score wcom1 = coefs

.
. * Check wcom1
. summarize wcom1

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
       wcom1 |      4,958     .907075    2.037749  -3.752484   5.033465

.
```

```
. * Make the regress and coef
. quietly regress wscore0 wscore2

. matrix coefs = e(b)

. matrix list coefs

coefs[1,2]
      wscore2      _cons
y1  .85466233  -.9054314

.
. * Scoring the data with this vector would create a new variable equal to the linear combination
. * Form this linear combination
. matrix score wcom2 = coefs

.
. * Check wcom1
. summarize wcom2

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
       wcom2 |      4,967   -.9054314    1.439473  -3.536861   3.358375

.
.
. *** Make the final wscore from wcom1 and wcom2
. gen WSCORE = wcom1
(4,967 missing values generated)

. replace WSCORE = wcom2 if area == 2
(4,967 real changes made)

.
. *** Cut to quintile to make wealthindex
. xtile wi=WSCORE [pw = weight], nq(5)

.
.
. * Check the wi
. tab wi

5 quantiles |
 of WSCORE  |      Freq.     Percent        Cum.
------------+-----------------------------------
          1 |      2,106       21.22       21.22
          2 |      1,624       16.36       37.58
          3 |      1,674       16.87       54.45
          4 |      2,029       20.44       74.89
          5 |      2,492       25.11      100.00
------------+-----------------------------------
      Total |      9,925      100.00

. by wi, sort: summarize WSCORE

-------------------------------------------------------------------------------------------------------------------
> -
-> wi = 1

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
      WSCORE |      2,106   -2.369935    .6059737  -3.752484  -1.533452

-------------------------------------------------------------------------------------------------------------------
> -
-> wi = 2

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
      WSCORE |      1,624   -1.302514    .1943723   -1.52912  -.9457986

-------------------------------------------------------------------------------------------------------------------
> -
-> wi = 3
```

```
-------------------------------------------------------------------------------------------------------------
> -
-> wi = 4

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
      WSCORE |      2,029    .5284624    .4217433  -.1101432   1.467825

-------------------------------------------------------------------------------------------------------------
> -
-> wi = 5

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
      WSCORE |      2,492    2.803964    .9898326   1.476386   5.033465


. * Recode wi: 1=poorest, 2=poorer, 3=midle, 4=richer, 5=richest
.
. * Check with smoke
. tab smoke wi, col chi

+-------------------+
| Key               |
|-------------------|
|     frequency     |
| column percentage |
+-------------------+

           |                5 quantiles of WSCORE
     smoke |         1          2          3          4          5 |     Total
-----------+-----------------------------------------------------+----------
         0 |     1,592      1,200      1,283      1,562      2,028 |     7,665
           |     75.59      73.89      76.64      76.98      81.38 |     77.23
-----------+-----------------------------------------------------+----------
         1 |       514        424        391        467        464 |     2,260
           |     24.41      26.11      23.36      23.02      18.62 |     22.77
-----------+-----------------------------------------------------+----------
     Total |     2,106      1,624      1,674      2,029      2,492 |     9,925
           |    100.00     100.00     100.00     100.00     100.00 |    100.00

          Pearson chi2(4) =  38.3075   Pr = 0.000

.
. *** Finally, save the dataset
. save "gats10-wi.dta", replace
file gats10-wi.dta saved

.
.
.
. ****** GATS 2015
.
. *** Import data set of GATS2010
. use "gats15.dta", clear
(Written by R.              )

.
. *** Make wscore0 for general
. * Check frequency of each variables
. summarize electric toilet fix_phone cell_phone tivi radio fridge car motor wash airc gene grinder boat

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
    electric |      8,996    .9897732    .1006146          0          1
      toilet |      8,996     .738217    .4396296          0          1
   fix_phone |      8,996    .1747443    .3797694          0          1
  cell_phone |      8,996    .9484215    .2211867          0          1
        tivi |      8,996    .9474211    .2232038          0          1
-------------+---------------------------------------------------------
       radio |      8,996    .1477323    .3548542          0          1
      fridge |      8,996    .7291018    .4444483          0          1
         car |      8,996    .0472432    .2121705          0          1
```

```
        airc |      8,996    .2447755    .4299779          0          1
        gene |      8,996    .0402401    .1965328          0          1
     grinder |      8,996    .0234549    .1513515          0          1
        boat |      8,996    .0347932    .1832659          0          1
          pc |      8,996    .3292574    .4699697          0          1
-------------+---------------------------------------------------------
    internet |      8,996    .3905069    .4878911          0          1

. * Remove 5 variables not in 5%-95% including electric, car, gene, grinder, boat
.
. * Run pca for general (only for frequency 5% - 95%)
. pca toilet fix_phone cell_phone tivi radio fridge motor wash airc pc internet

Principal components/correlation                  Number of obs    =      8,996
                                                  Number of comp.  =         11
                                                  Trace            =         11
    Rotation: (unrotated = principal)             Rho              =     1.0000

    --------------------------------------------------------------------------
       Component |   Eigenvalue   Difference         Proportion   Cumulative
    -------------+------------------------------------------------------------
           Comp1 |       3.7453      2.31461             0.3405       0.3405
           Comp2 |      1.43068       .361245             0.1301       0.4705
           Comp3 |      1.06944       .194619             0.0972       0.5678
           Comp4 |       .874821     .0703587             0.0795       0.6473
           Comp5 |       .804462       .123605             0.0731       0.7204
           Comp6 |       .680857     .0448526             0.0619       0.7823
           Comp7 |       .636005     .0140792             0.0578       0.8401
           Comp8 |       .621926       .131007             0.0565       0.8967
           Comp9 |       .490919     .0998807             0.0446       0.9413
          Comp10 |       .391038       .136486             0.0355       0.9769
          Comp11 |       .254552             .             0.0231       1.0000
    --------------------------------------------------------------------------

Principal components (eigenvectors)

    ------------------------------------------------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6     Comp7     Comp8      Com
    -------------+----------------------------------------------------------------------------------------------
          toilet |   0.3240    0.0206    0.1787   -0.3981   -0.3372   -0.3623    0.2988    0.3345    0.50
       fix_phone |   0.2280   -0.2608    0.2716    0.0226    0.8254   -0.2505    0.2023    0.1278   -0.04
      cell_phone |   0.1865    0.5372   -0.1062    0.3598    0.0670    0.0353   -0.1183    0.7032   -0.14
            tivi |   0.1874    0.4728    0.2855   -0.2999    0.2084    0.6499    0.1708   -0.2034    0.16
           radio |   0.0683   -0.0779    0.7797    0.5358   -0.2808    0.0080   -0.0648   -0.0936    0.02
          fridge |   0.3586    0.1961    0.1470   -0.2875   -0.1642   -0.2317    0.0007   -0.1893   -0.69
           motor |   0.2322    0.4495   -0.2208    0.3140    0.1299   -0.4274   -0.0669   -0.5329    0.32
            wash |   0.4024   -0.1150   -0.0143   -0.1649   -0.0458   -0.0464   -0.3804   -0.0300   -0.14
            airc |   0.3515   -0.2372   -0.0360   -0.0552    0.0656    0.2088   -0.6728    0.0449    0.28
              pc |   0.3910   -0.2448   -0.2181    0.2480   -0.0776    0.2385    0.3038   -0.0525   -0.05
        internet |   0.3842   -0.2085   -0.2722    0.2481   -0.1480    0.2081    0.3581   -0.0410   -0.02
    ------------------------------------------------------------------------------------------------------------

    ---------------------------
        Variable | Unexplained
    -------------+-------------
          toilet |           0
       fix_phone |           0
      cell_phone |           0
            tivi |           0
           radio |           0
          fridge |           0
           motor |           0
            wash |           0
            airc |           0
              pc |           0
        internet |           0
    ---------------------------

. * Create variable
. predict wscore0
(score assumed)
(10 components skipped)

Scoring coefficients
```

```
-------------+------------------------------------------------------------------------------------------
      toilet |   0.3240    0.0206    0.1787   -0.3981   -0.3372   -0.3623    0.2988    0.3345    0.50
   fix_phone |   0.2280   -0.2608    0.2716    0.0226    0.8254   -0.2505    0.2023    0.1278   -0.04
  cell_phone |   0.1865    0.5372   -0.1062    0.3598    0.0670    0.0353   -0.1183    0.7032   -0.14
        tivi |   0.1874    0.4728    0.2855   -0.2999    0.2084    0.6499    0.1708   -0.2034    0.16
       radio |   0.0683   -0.0779    0.7797    0.5358   -0.2808    0.0080   -0.0648   -0.0936    0.02
      fridge |   0.3586    0.1961    0.1470   -0.2875   -0.1642   -0.2317    0.0007   -0.1893   -0.69
       motor |   0.2322    0.4495   -0.2208    0.3140    0.1299   -0.4274   -0.0669   -0.5329    0.32
        wash |   0.4024   -0.1150   -0.0143   -0.1649   -0.0458   -0.0464   -0.3804   -0.0300   -0.14
        airc |   0.3515   -0.2372   -0.0360   -0.0552    0.0656    0.2088   -0.6728    0.0449    0.28
          pc |   0.3910   -0.2448   -0.2181    0.2480   -0.0776    0.2385    0.3038   -0.0525   -0.05
    internet |   0.3842   -0.2085   -0.2722    0.2481   -0.1480    0.2081    0.3581   -0.0410   -0.02
-------------------------------------------------------------------------------------------------------

.
.
. *** Make wscore1 for urban
. * Check frequency of each variables
. summarize electric toilet fix_phone cell_phone tivi radio fridge car motor wash airc gene grinder boat

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
    electric |      4,421    .9979643    .0450783          0          1
      toilet |      4,421     .894594    .3071106          0          1
   fix_phone |      4,421    .2660032    .4419159          0          1
  cell_phone |      4,421    .9690115     .173306          0          1
        tivi |      4,421    .9635829    .1873468          0          1
-------------+---------------------------------------------------------
       radio |      4,421    .1515494    .3586242          0          1
      fridge |      4,421    .8421172    .3646724          0          1
         car |      4,421     .066727    .2495768          0          1
       motor |      4,421    .9174395    .2752479          0          1
        wash |      4,421    .6154716    .4865386          0          1
-------------+---------------------------------------------------------
        airc |      4,421    .3938023    .4886472          0          1
        gene |      4,421     .046822    .2112813          0          1
     grinder |      4,421    .0122144    .1098543          0          1
        boat |      4,421    .0214884    .1450219          0          1
          pc |      4,421    .4917439    .4999884          0          1
-------------+---------------------------------------------------------
    internet |      4,421    .5521375    .4973305          0          1

. * Remove 6 variables not in 5%-95% including electric, cell_phone, tivi, gene, grinder, boat
.
. * Run pca for urban
. pca toilet fix_phone radio fridge car motor wash airc pc internet if area == 1

Principal components/correlation                  Number of obs    =      4,421
                                                  Number of comp.  =         10
                                                  Trace            =         10
    Rotation: (unrotated = principal)             Rho              =     1.0000

    --------------------------------------------------------------------------
       Component |   Eigenvalue   Difference         Proportion   Cumulative
    -------------+------------------------------------------------------------
           Comp1 |      3.38295      2.26805             0.3383       0.3383
           Comp2 |      1.11491     .0620011             0.1115       0.4498
           Comp3 |      1.05291      .148055             0.1053       0.5551
           Comp4 |       .90485      .046075             0.0905       0.6456
           Comp5 |      .858775     .0835133             0.0859       0.7314
           Comp6 |      .775262     .0849797             0.0775       0.8090
           Comp7 |      .690282      .128658             0.0690       0.8780
           Comp8 |      .561624      .152196             0.0562       0.9342
           Comp9 |      .409428      .160415             0.0409       0.9751
          Comp10 |      .249013            .             0.0249       1.0000
    --------------------------------------------------------------------------

Principal components (eigenvectors)

    ---------------------------------------------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6     Comp7     Comp8      Com
    -------------+-------------------------------------------------------------------------------------------
          toilet |   0.2759   -0.0995    0.5123    0.1528   -0.3007    0.2740    0.5492    0.3971   -0.05
```

```
           motor |   0.2227   -0.4409    0.1278    0.0129    0.7214   -0.3622    0.0528    0.2903    0.02
            wash |   0.4205   -0.0289    0.1136    0.0935   -0.1102   -0.0576   -0.3957   -0.0888   -0.78
            airc |   0.3772    0.1107   -0.0836    0.0759   -0.2291   -0.0248   -0.5554    0.5195    0.44
              pc |   0.4171   -0.0379   -0.3480   -0.3312    0.0155    0.1770    0.1825   -0.1117    0.00
        internet |   0.4045   -0.1086   -0.3581   -0.3499    0.0246    0.2197    0.1937   -0.0793    0.04
    -------------------------------------------------------------------------------------------------

. * Create variable
. predict wscore1 if area == 1
(score assumed)
(9 components skipped)

Scoring coefficients
    sum of squares(column-loading) = 1

    ---------------------------------------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6     Comp7     Comp8     Com
    -------------+-------------------------------------------------------------------------------------
          toilet |   0.2759   -0.0995    0.5123    0.1528   -0.3007    0.2740    0.5492    0.3971   -0.05
       fix_phone |   0.2421    0.4869   -0.0155   -0.0497   -0.1543   -0.7525    0.3259   -0.0501    0.02
           radio |   0.0655    0.6733    0.3408   -0.2699    0.4849    0.3252   -0.0919    0.0547   -0.02
          fridge |   0.3524   -0.1390    0.4332    0.1644   -0.0009    0.0074   -0.1264   -0.6736    0.41
             car |   0.1749    0.2442   -0.3847    0.7922    0.2543    0.1953    0.1704   -0.0471   -0.00
           motor |   0.2227   -0.4409    0.1278    0.0129    0.7214   -0.3622    0.0528    0.2903    0.02
            wash |   0.4205   -0.0289    0.1136    0.0935   -0.1102   -0.0576   -0.3957   -0.0888   -0.78
            airc |   0.3772    0.1107   -0.0836    0.0759   -0.2291   -0.0248   -0.5554    0.5195    0.44
              pc |   0.4171   -0.0379   -0.3480   -0.3312    0.0155    0.1770    0.1825   -0.1117    0.00
        internet |   0.4045   -0.1086   -0.3581   -0.3499    0.0246    0.2197    0.1937   -0.0793    0.04
    ---------------------------------------------------------------------------------------------------

.
.
. *** Make wscore2 for rural
. * Check frequency of each variables
. summarize electric toilet fix_phone cell_phone tivi radio fridge car motor wash airc gene grinder boat

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
    electric |      4,575    .9818579    .1334797          0          1
      toilet |      4,575    .5871038    .4924083          0          1
   fix_phone |      4,575    .0865574    .2812161          0          1
  cell_phone |      4,575    .9285246    .2576455          0          1
        tivi |      4,575    .9318033    .2521107          0          1
-------------+---------------------------------------------------------
       radio |      4,575    .1440437    .3511724          0          1
      fridge |      4,575    .6198907    .4854665          0          1
         car |      4,575    .0284153    .1661743          0          1
       motor |      4,575    .8485246    .3585508          0          1
        wash |      4,575    .2574863    .4372973          0          1
-------------+---------------------------------------------------------
        airc |      4,575     .100765    .3010502          0          1
        gene |      4,575    .0338798    .1809395          0          1
     grinder |      4,575    .0343169    .1820619          0          1
        boat |      4,575    .0476503    .2130485          0          1
          pc |      4,575    .1722404    .3776306          0          1
-------------+---------------------------------------------------------
    internet |      4,575    .2343169    .4236174          0          1

. * Remove 5 variables not in 5%-95% including electric, car, gene, grinder, boat
.
. * Run pca for rural
. pca toilet fix_phone cell_phone tivi radio fridge motor wash airc pc internet if area == 2

Principal components/correlation                  Number of obs    =      4,575
                                                  Number of comp.  =         11
                                                  Trace            =         11
    Rotation: (unrotated = principal)             Rho              =     1.0000

    --------------------------------------------------------------------------
       Component |   Eigenvalue   Difference         Proportion   Cumulative
    -------------+------------------------------------------------------------
           Comp1 |      3.31625      1.83438             0.3015       0.3015
           Comp2 |      1.48188      .421517             0.1347       0.4362
```

```
           Comp8 |      .593744     .0750566            0.0540       0.8791
           Comp9 |      .518687     .0475299            0.0472       0.9263
          Comp10 |      .471158      .131575            0.0428       0.9691
          Comp11 |      .339582            .            0.0309       1.0000
    ------------------------------------------------------------------------------

Principal components (eigenvectors)

    ------------------------------------------------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6     Comp7     Comp8     Com
    -------------+----------------------------------------------------------------------------------------------
          toilet |   0.3402   -0.0278    0.2498   -0.0564   -0.4723   -0.3495   -0.1408    0.4420    0.50
       fix_phone |   0.1644   -0.2011    0.3283    0.8653    0.2566    0.0031   -0.0069    0.0794   -0.01
      cell_phone |   0.2105    0.5417   -0.0828   -0.0292    0.2670    0.1636    0.1835    0.6722   -0.25
            tivi |   0.2243    0.4661    0.2229    0.0686   -0.1140   -0.1607    0.6390   -0.4410    0.12
           radio |   0.0915   -0.1002    0.7435   -0.4502    0.4430    0.0994   -0.1090   -0.0349    0.00
          fridge |   0.3741    0.1658    0.1533   -0.0088   -0.3059   -0.0717   -0.3433   -0.2604   -0.54
           motor |   0.2503    0.4365   -0.2102    0.0885    0.2655    0.1927   -0.5496   -0.2743    0.44
            wash |   0.3942   -0.1688   -0.0350    0.0022   -0.2658    0.2991   -0.0615    0.0272   -0.29
            airc |   0.3202   -0.2733   -0.0770   -0.0792   -0.1028    0.6848    0.2850   -0.0360    0.27
              pc |   0.3845   -0.2668   -0.2440   -0.0943    0.3193   -0.2709    0.1277   -0.0730   -0.05
         internet |   0.3818   -0.2135   -0.2936   -0.1290    0.2887   -0.3759    0.0706   -0.0206    0.00
    ------------------------------------------------------------------------------------------------------------

    ---------------------------
        Variable | Unexplained
    -------------+-------------
          toilet |           0
       fix_phone |           0
      cell_phone |           0
            tivi |           0
           radio |           0
          fridge |           0
           motor |           0
            wash |           0
            airc |           0
              pc |           0
         internet |           0
    ---------------------------

. * Create variable
. predict wscore2 if area == 2
(score assumed)
(10 components skipped)

Scoring coefficients
    sum of squares(column-loading) = 1

    ------------------------------------------------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6     Comp7     Comp8     Com
    -------------+----------------------------------------------------------------------------------------------
          toilet |   0.3402   -0.0278    0.2498   -0.0564   -0.4723   -0.3495   -0.1408    0.4420    0.50
       fix_phone |   0.1644   -0.2011    0.3283    0.8653    0.2566    0.0031   -0.0069    0.0794   -0.01
      cell_phone |   0.2105    0.5417   -0.0828   -0.0292    0.2670    0.1636    0.1835    0.6722   -0.25
            tivi |   0.2243    0.4661    0.2229    0.0686   -0.1140   -0.1607    0.6390   -0.4410    0.12
           radio |   0.0915   -0.1002    0.7435   -0.4502    0.4430    0.0994   -0.1090   -0.0349    0.00
          fridge |   0.3741    0.1658    0.1533   -0.0088   -0.3059   -0.0717   -0.3433   -0.2604   -0.54
           motor |   0.2503    0.4365   -0.2102    0.0885    0.2655    0.1927   -0.5496   -0.2743    0.44
            wash |   0.3942   -0.1688   -0.0350    0.0022   -0.2658    0.2991   -0.0615    0.0272   -0.29
            airc |   0.3202   -0.2733   -0.0770   -0.0792   -0.1028    0.6848    0.2850   -0.0360    0.27
              pc |   0.3845   -0.2668   -0.2440   -0.0943    0.3193   -0.2709    0.1277   -0.0730   -0.05
         internet |   0.3818   -0.2135   -0.2936   -0.1290    0.2887   -0.3759    0.0706   -0.0206    0.00
    ------------------------------------------------------------------------------------------------------------

.
.
. *** Score data from coefficient vectors using matrix score - wcom1
. * Make the regress and coef
. quietly regress wscore0 wscore1

. matrix coefs = e(b)
```

```
.
. * Scoring the data with this vector would create a new variable equal to the linear combination
. * Form this linear combination
. matrix score wcom1 = coefs

.
. * Check wcom1
. summarize wcom1

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
       wcom1 |      4,421     .850256    1.776957  -3.279942   3.858304

.
.
. *** Score data from coefficient vectors using matrix score - wcom2
. * Make the regress and coef
. quietly regress wscore0 wscore2

. matrix coefs = e(b)

. matrix list coefs

coefs[1,2]
       wscore2       _cons
y1   .92882899  -.82163531

.
. * Scoring the data with this vector would create a new variable equal to the linear combination
. * Form this linear combination
. matrix score wcom2 = coefs

.
. * Check wcom1
. summarize wcom2

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
       wcom2 |      4,575   -.8216353    1.691452  -4.423059   3.561571

.
.
. *** Make the final wscore from wcom1 and wcom2
. gen WSCORE = wcom1
(4,575 missing values generated)

. replace WSCORE = wcom2 if area == 2
(4,575 real changes made)

.
. *** Cut to quintile to make wealthindex
. xtile wi=WSCORE [pw = weight], nq(5)

.
. * Check the wi
. tab wi

5 quantiles |
 of WSCORE  |      Freq.     Percent        Cum.
------------+-----------------------------------
          1 |      1,922       21.37       21.37
          2 |      1,606       17.85       39.22
          3 |      1,817       20.20       59.42
          4 |      1,810       20.12       79.54
          5 |      1,841       20.46      100.00
------------+-----------------------------------
      Total |      8,996      100.00

. by wi, sort: summarize WSCORE

-------------------------------------------------------------------------------------------------------------
```

```
-------------------------------------------------------------------------------------------------------------------
> -
-> wi = 2

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
      WSCORE |      1,606   -1.235596    .3070301  -1.605991  -.8318407

-------------------------------------------------------------------------------------------------------------------
> -
-> wi = 3

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
      WSCORE |      1,817   -.2606061    .3659416  -.8243687   .2476547

-------------------------------------------------------------------------------------------------------------------
> -
-> wi = 4

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
      WSCORE |      1,810    1.219978     .460294   .2527223   1.938952

-------------------------------------------------------------------------------------------------------------------
> -
-> wi = 5

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
      WSCORE |      1,841    2.757751    .4204089   1.939202   3.858304


. * Recode wi: 1=poorest, 2=poorer, 3=midle, 4=richer, 5=richest
.
. * Check with smoke
. tab smoke wi, col chi

+--------------------+
| Key                |
|--------------------|
|     frequency      |
| column percentage  |
+--------------------+

           |                5 quantiles of WSCORE
     smoke |         1          2          3          4          5 |     Total
-----------+-----------------------------------------------------+----------
         0 |     1,423      1,225      1,394      1,461      1,521 |     7,024
           |     74.04      76.28      76.72      80.72      82.62 |     78.08
-----------+-----------------------------------------------------+----------
         1 |       499        381        423        349        320 |     1,972
           |     25.96      23.72      23.28      19.28      17.38 |     21.92
-----------+-----------------------------------------------------+----------
     Total |     1,922      1,606      1,817      1,810      1,841 |     8,996
           |    100.00     100.00     100.00     100.00     100.00 |    100.00

          Pearson chi2(4) =  52.8803   Pr = 0.000

.
.
. *** Finally, save the dataset
. save "gats15-wi.dta", replace
file gats15-wi.dta saved

.
.
. * Close log
. log close
      name:  <unnamed>
```