

THE LANCET

Diabetes & Endocrinology

Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

Supplement to: Price A J, Crampin A C, Amberbir A, et al. Prevalence of obesity, hypertension, and diabetes, and cascade of care in sub-Saharan Africa: a cross-sectional, population-based study in rural and urban Malawi. *Lancet Diabetes Endocrinol* 2018; published online Jan 19. [http://dx.doi.org/10.1016/S2213-8587\(17\)30432-1](http://dx.doi.org/10.1016/S2213-8587(17)30432-1).

Supplemental materials

The prevalence of obesity, hypertension and diabetes, and cascade of care in sub-Saharan Africa: a large population-based study in rural and urban Malawi

Contents

Suppl. Figure 1. Conceptual model of risk factors for cardiometabolic outcomes (*page 2*)

Suppl. Figure 2. Adult population distributions and participation proportion of a) rural and b) urban populations (*page 3*)

Suppl. Figure 3. Distribution of Body Mass Index by site, sex and age group (*page 4*)

Suppl. Figure 4. Distribution of blood pressure by site, sex and age group (*page 5*)

Suppl. Figure 5. Distribution of blood glucose by site, sex and age group (*page 6*)

Suppl. Table 1: Association of urbanicity and gender with other hypertension, diabetes and anthropometry indices (*page 7*)

Suppl. Table 2: Stratified analyses for overweight/obesity (*page 8*)

Suppl. Table 3: Stratified analyses for hypertension (*page 9*)

Suppl. Table 4: Hypertension: Screening, cascade of care, access to diagnostic test, diagnosis, medication and control (*page 10*)

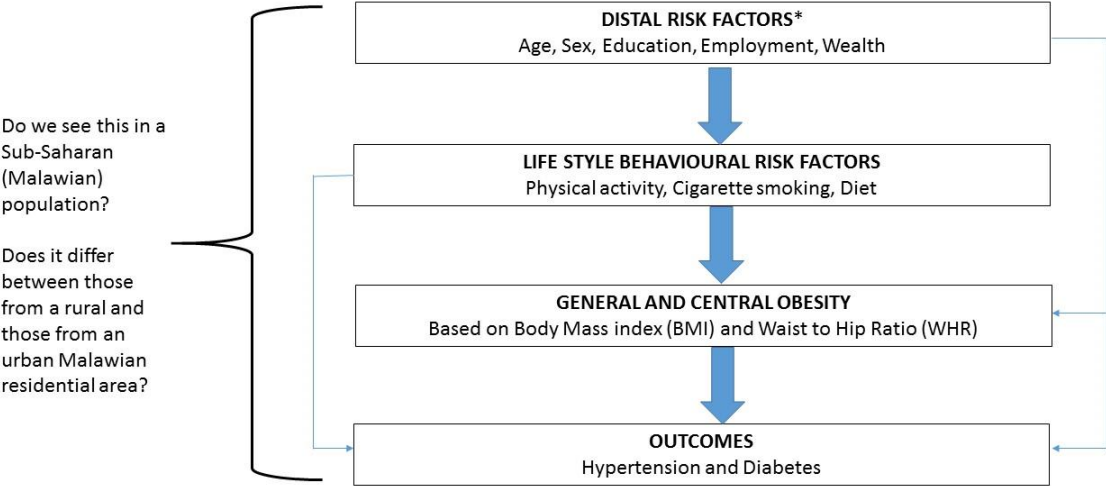
Suppl. Table 5: Diabetes: Screening, cascade of care, access to diagnostic test, diagnosis, medication and control (*page 11*)

Suppl. Table 6: Associations of risk factors with multi-morbidity – age-adjusted and distal factor adjusted risk ratios (*page 12*)

Suppl. Table 7: Prevalence of co-morbidities amongst diabetic and hypertensive patients (*page 13*)

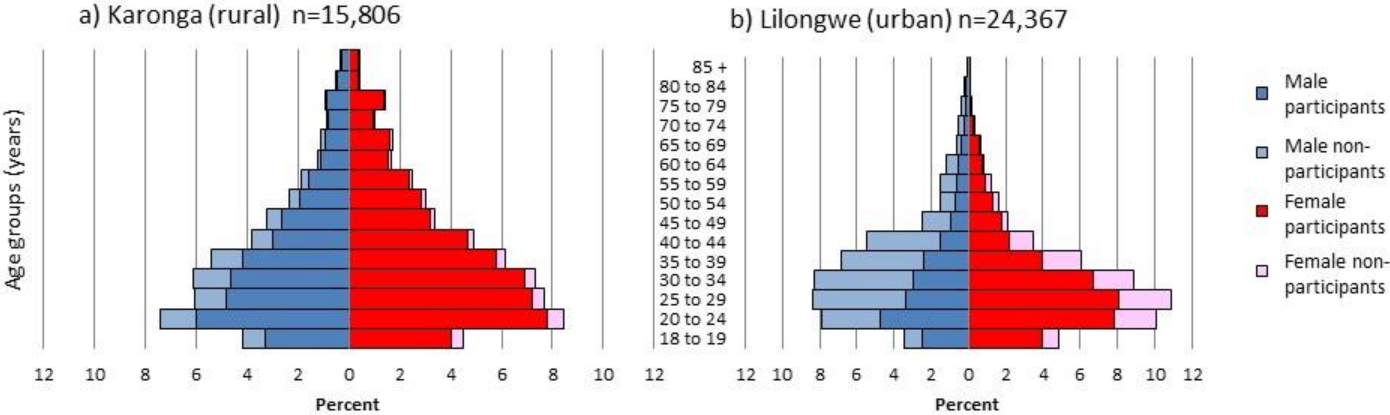
Suppl. Table 8: Risk ratios (RR) for associations between a previous diagnosis and treatment for hypertension or diabetes and a diagnosis and medication for the other condition (*page 14*)

Supplementary Figure 1. Conceptual model of risk factors for cardiometabolic outcomes

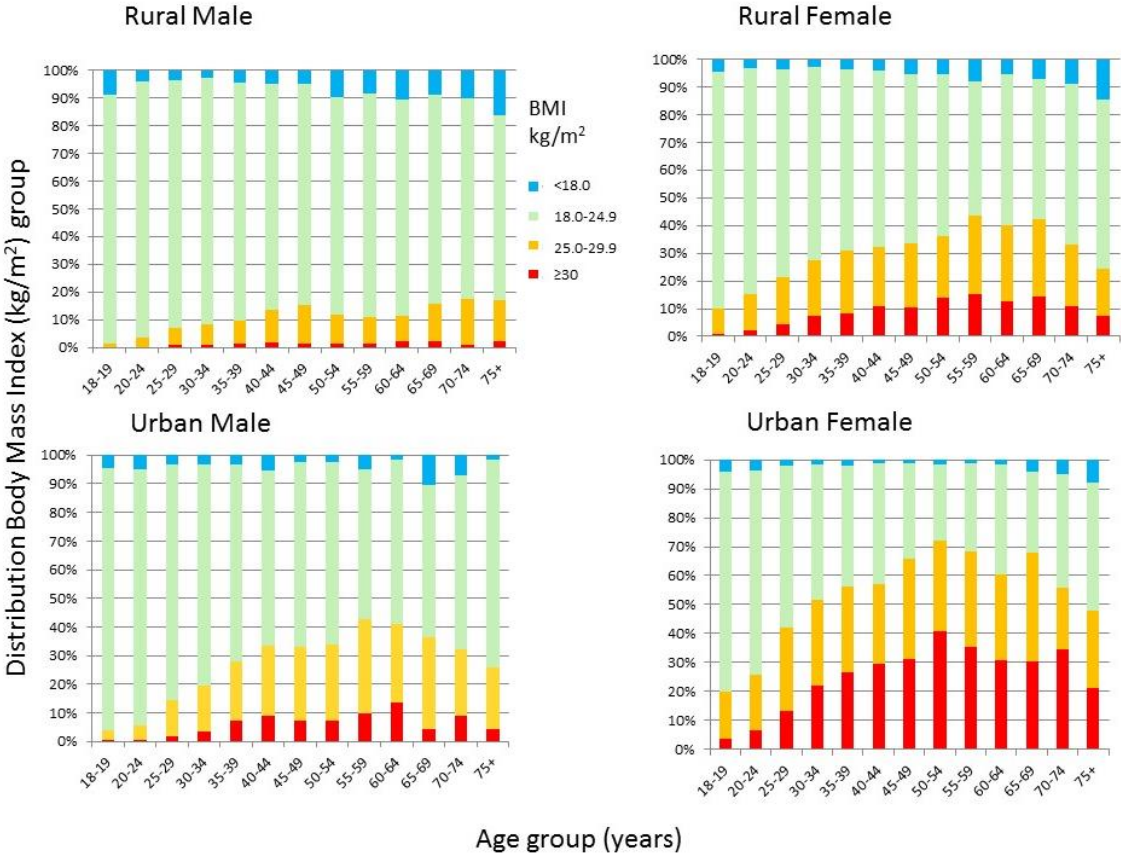


Supplementary Figure 2: Adult population distributions and participation proportion of a) rural and b) urban populations

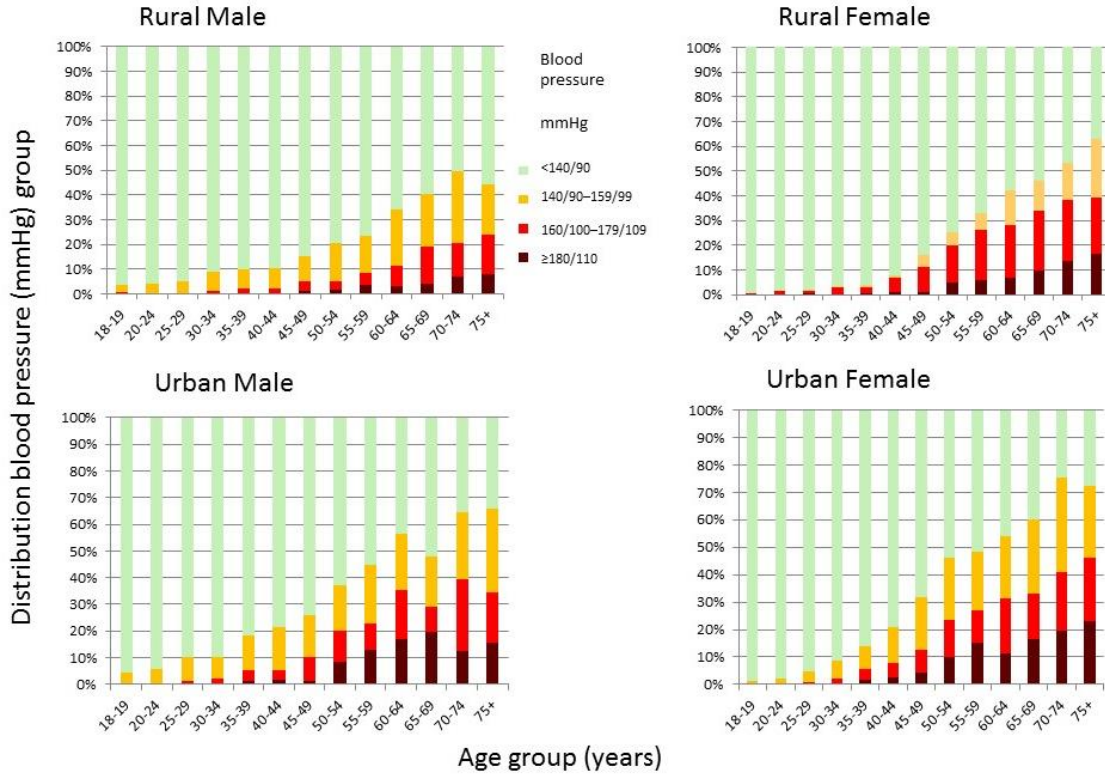
Notes: Lowest age band consists of only two years. Ages of non-participants in urban populations are estimates.



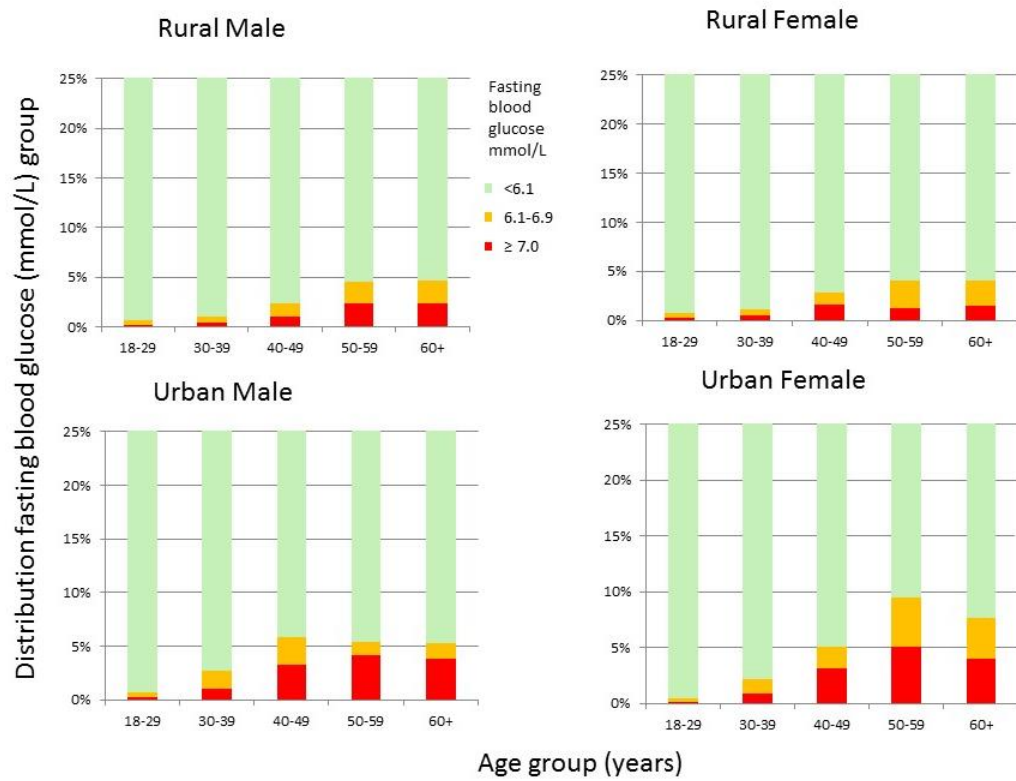
Supplementary Figure 3. Distribution of Body Mass Index by site, sex and age group



Supplementary Figure 4. Distribution of blood pressure by site, sex and age group



Supplementary Figure 5. Distribution of blood glucose by site, sex and age group



Supplementary Table 1. Association of urbanicity and gender with other hypertension, diabetes and anthropometry indices

	Rural¹	Urban¹	Male²	Female²
Waist-to-hip ratio high				
n (%)	5,158 (38.7%)	3,063 (21.1%)	2,030 (18.4%)	6,191 (36.9%)
Risk Ratio (Basic adjustment)	Ref	0.63 (0.60-0.65)	Ref	2.17 (2.08-2.26)
Adjusted Risk Ratio ³	Ref	0.67 (0.64-0.71)	Ref	2.14 (2.05-2.23)
Untreated Mod/Severe Hypertension³				
n (%)	435 (3.3%)	513 (3.6%)	369 (3.4%)	579 (3.4%)
Risk Ratio (Basic adjustment)	Ref	2.10 (1.86-2.38)	Ref	1.14 (1.01-1.30)
Adjusted Risk Ratio	Ref	1.67 (1.42-1.99)	Ref	1.13 (0.99-1.30)
On Hypertension medication				
n (%)	509 (3.7%)	680 (4.5%)	307 (2.8%)	882 (5.0%)
Risk Ratio (Basic adjustment)	Ref	2.34 (2.11-2.60)	Ref	1.98 (1.75-2.23)
Adjusted Risk Ratio	Ref	1.37 (1.18-1.58)	Ref	2.51 (2.20-2.86)
Undiagnosed diabetes⁴				
n (%)	98 (0.8%)	135 (1.2%)	92 (1.0%)	141 (1.0%)
Risk Ratio (Basic adjustment)	Ref	2.06 (1.57-2.68)	Ref	0.95 (0.73-1.23)
Adjusted Risk Ratio	Ref	1.58 (1.05-2.37)	Ref	0.97 (0.93-1.28)
On diabetes medication				
n (%)	80 (0.58%)	147 (0.98%)	88 (0.80%)	139 (0.78%)
Risk Ratio (Basic adjustment)	Ref	2.90 (2.22-3.78)	Ref	1.03 (0.79-1.34)
Adjusted Risk Ratio	Ref	1.44 (0.97-2.13)	Ref	1.43 (1.08-1.90)

¹ Adjusted for age & sex

² Adjusted for age & site

³ Untreated moderate or severe blood pressure systolic \geq 160 mmHg and/or diastolic \geq 100 mmHg and not on medication

⁴ Undiagnosed diabetes: plasma glucose \geq 7mmol/L and no prior diagnosis of diabetes

Supplementary Table 2. Stratified analyses for overweight/obesity

Overweight or obesity ¹ Adjusted Risk Ratio ² (95%CI)						
Age – sex stratification						
	Male < 30 years	Male 30-50 years	Male 50+ years	Female < 30 Years	Female 30-50 years	Female 50+ years
Site						
Karonga (rural)	Ref	Ref	Ref	Ref	Ref	Ref
Lilongwe (urban)	1.70 (1.22-2.38)	1.12 (0.94-1.33)	1.51 (1.20-1.89)	1.76 (1.52-2.03)	1.33 (0.21-1.46)	1.35 (1.21-1.51)
Wealth quintiles						
Poorest	Ref	Ref	Ref	Ref	Ref	Ref
2	1.65 (1.08-2.53)	1.38 (0.98-1.94)	1.02 (0.67-1.55)	1.13 (0.96-1.32)	1.16 (1.02-1.31)	1.11 (0.96-1.30)
3	1.37 (0.86-2.13)	2.39 (1.73-3.30)	1.40 (0.94-2.07)	1.25 (1.08-1.44)	1.31 (1.17-1.47)	1.40 (1.21-1.61)
4	1.53 (1.01-2.30)	2.90 (2.12-3.95)	1.57 (0.06-2.33)	1.34 (1.17-1.55)	1.51 (0.35-1.69)	1.40 (1.21-1.62)
Wealthiest	1.80 (1.17-2.77)	4.22 (3.08-5.80)	2.37 (1.60-3.51)	1.48 (1.28-1.72)	1.77 (1.58-1.97)	1.71 (1.47-1.97)
Education						
None	0.83 (0.14-0.55)	0.17 (0.03-1.00)	1.12 (0.68-1.86)	0.91 (0.66-1.26)	0.97 (0.83-1.14)	0.84 (0.74-0.96)
Standard1-5	0.67 (0.32-1.39)	0.75 (0.50-1.13)	1.03 (0.75-1.41)	1.01 (0.84-1.20)	0.97 (0.88-1.07)	0.88 (0.80-0.98)
Standard 6-8	Ref	Ref	Ref	Ref	Ref	Ref
Secondary	1.18 (0.86-1.63)	0.95 (0.79-1.14)	1.75 (1.39-2.20)	0.96 (0.87-1.06)	1.02 (0.95-1.09)	1.15 (1.03-1.27)
Post-secondary	2.09 (1.41-3.08)	1.36 (1.09-1.68)	1.71 (1.32-2.21)	0.98 (0.84-1.15)	1.13 (1.03-1.25)	1.16 (0.99-1.37)
Employment						
Not working	0.40 (0.29-0.55)	0.61 (0.44-0.84)	1.05 (0.83-1.32)	0.60 (0.53-0.68)	0.80 (0.71-0.90)	0.88 (0.74-0.97)
Housework	0.41 (0.21-0.82)	0.57 (0.33-0.98)	0.83 (0.52-1.33)	0.80 (0.72-0.90)	0.86 (0.80-0.92)	0.91 (0.81-1.02)
Subsistence	0.89 (0.58-1.36)	0.52 (0.41-0.67)	0.72 (0.52-0.98)	0.76 (0.63-0.91)	0.69 (0.62-0.77)	0.82 (0.72-0.95)
Self-employed	Ref	Ref	Ref	Ref	Ref	Ref
Salaried	0.96 (0.68-1.33)	1.00 (0.86-1.17)	0.93 (0.73-1.19)	0.80 (0.69-0.93)	0.87 (0.80-0.95)	0.92 (0.76-1.10)
Site – sex stratification						
	Rural Male	Rural Female	Urban Male	Urban Female		
Age group; years						
18-29	Ref	Ref	Ref	Ref		
30-39	2.06 (1.55-2.72)	1.72 (1.53-1.93)	2.24 (1.86-2.70)	1.58 (1.49-1.68)		
40-49	3.00 (2.27-3.97)	1.97 (1.73-2.22)	3.07 (2.53-3.71)	1.75 (0.63-1.87)		
50-59	2.54 (1.83-3.53)	2.48 (2.19-2.82)	3.82 (3.12-4.69)	2.09 (1.94-2.25)		
60-69	3.25 (2.26-4.67)	2.77 (2.40-3.21)	5.13 (4.13-6.36)	2.05 (1.85-2.26)		
70+	5.05 (3.70-6.89)	1.97 (1.62-2.39)	5.35 (3.93-7.28)	1.77 (1.50-2.09)		
Wealth quintiles						
Poorest	Ref	Ref	Ref	Ref		
2	1.24 (0.94-1.65)	1.11 (0.99-1.24)	1.31 (0.90-1.90)	1.16 (1.02-1.30)		
3	1.78 (1.34-2.37)	1.25 (1.11-1.40)	1.71 (1.22-2.39)	1.32 (1.18-1.46)		
4	1.66 (1.24-2.24)	1.37 (1.22-1.55)	2.22 (1.61-3.06)	1.46 (1.21-1.61)		
Wealthiest	3.07 (2.26-4.17)	1.62 (1.41-1.86)	2.71 (1.97-3.73)	1.67 (1.51-1.85)		
Education						
None	0.72 (0.37-1.39)	0.89 (0.75-1.03)	0.74 (0.41-1.33)	0.91 (0.82-1.03)		
Standard1-5	0.78 (0.57-1.06)	0.90 (0.80-0.99)	0.80 (0.56-1.16)	0.99 (0.91-1.07)		
Standard 6-8	Ref	Ref	Ref	Ref		
Secondary	1.20 (0.99-1.45)	1.04 (0.94-1.15)	1.25 (1.03-1.51)	1.00 (0.94-1.06)		
Post-secondary	0.96 (0.65-1.41)	0.91 (0.67-1.24)	1.96 (1.60-2.40)	1.09 (1.00-1.18)		
Employment						
Not working	0.70 (0.52-0.95)	0.75 (0.63-0.88)	0.50 (0.41-0.60)	0.68 (0.63-0.74)		
Housework	0.54 (0.19-1.49)	0.72 (0.62-0.84)	0.53 (0.38-0.73)	0.88 (0.83-0.93)		
Subsistence	0.65 (0.52-0.82)	0.72 (0.65-0.80)	1.22 (0.67-2.22)	0.75 (0.55-1.04)		
Self-employed	Ref	Ref	Ref	Ref		
Salaried	1.27 (0.97-1.65)	1.08 (0.87-1.32)	0.90 (0.78-1.03)	0.85 (0.79-0.92)		

¹BMI \geq 25kg/m²

²Adjusted for distal factors; age, site (urban/rural), wealth, education, occupation (see Suppl. Figure 1. Conceptual model of risk factors for cardiometabolic outcomes (web appendix page 2)).

Supplementary Table 3. Stratified analyses for hypertension

Hypertension ¹ Adjusted Risk Ratio ² (95%CI)						
Age – sex stratification						
	Male < 30 years	Male 30-50 years	Male 50+ years	Female < 30 Years	Female 30-50 years	Female 50+ years
Site						
Karonga (rural)	Ref	Ref	Ref	Ref	Ref	Ref
Lilongwe (urban)	1.78 (1.27-2.49)	1.31 (1.05-1.63)	1.22 (1.06-1.41)	1.32 (0.84-2.07)	1.56 (1.24-1.96)	1.10 (1.00-1.22)
Wealth quintiles						
Poorest	Ref	Ref	Ref	Ref	Ref	Ref
2	1.12 (0.76-1.66)	1.25 (0.95-1.66)	0.98 (0.79-1.21)	0.75 (0.45-1.26)	1.36 (1.03-1.80)	0.96 (0.86-1.09)
3	1.23 (0.84-1.81)	1.38 (1.04-1.84)	1.13 (0.92-1.40)	1.02 (0.63-1.65)	1.59 (1.22-2.08)	1.03 (0.91-1.16)
4	0.82 (0.54-1.22)	1.41 (1.07-1.87)	1.26 (1.03-1.55)	1.35 (0.87-2.09)	1.84 (1.42-2.39)	1.14 (1.01-1.28)
Wealthiest	1.09 (0.72-1.63)	1.54 (1.14-2.08)	1.42 (1.16-1.78)	1.27 (0.77-2.10)	2.23 (1.72-2.89)	1.14 (0.99-1.30)
Education						
None	1.51 (0.35-6.57)	1.08 (0.49-2.37)	0.92 (0.68-1.21)	1.45 (0.53-4.00)	1.16 (0.84-1.61)	1.18 (1.06-1.31)
Standard1-5	0.93 (0.52-1.67)	0.94 (0.65-1.37)	1.03 (0.87-1.22)	1.54 (0.89-2.67)	1.09 (0.88-1.34)	1.15 (1.04-1.26)
Standard 6-8	Ref	Ref	Ref	Ref	Ref	Ref
Secondary	0.92 (0.67-1.26)	0.99 (0.81-1.21)	1.16 (1.01-1.34)	1.05 (0.73-1.51)	0.97 (0.82-1.14)	1.01 (0.89-1.15)
Post-secondary	1.39 (0.91-2.14)	1.44 (1.11-1.88)	1.21 (1.01-1.44)	1.03 (0.59-1.80)	1.06 (0.82-1.37)	1.05 (0.84-1.30)
Employment						
Not working	0.58 (0.41-0.81)	0.82 (0.57-1.20)	1.71 (1.42-2.06)	0.66 (0.41-1.08)	0.88 (0.66-1.18)	1.51 (1.32-1.73)
Housework	0.83 (0.49-1.43)	0.62 (0.32-1.17)	1.36 (1.02-1.83)	0.95 (0.61-1.48)	1.02 (0.86-1.21)	1.16 (1.01-1.34)
Subsistence	0.83 (0.54-1.27)	0.96 (0.74-1.25)	1.15 (0.93-1.43)	0.59 (0.32-1.10)	0.73 (0.56-0.97)	0.93 (0.80-1.07)
Self-employed	Ref	Ref	Ref	Ref	Ref	Ref
Salaried	0.68 (0.46-1.01)	1.05 (0.86-1.28)	1.00 (0.81-1.24)	1.20 (0.69-2.09)	0.95 (0.77-1.17)	1.20 (0.96-1.50)
Site – age stratification						
	Rural < 30 years	Rural 30-50 years	Rural 50+ years	Urban < 30 Years	Urban 30-50 years	Urban 50+ years
Sex						
Male	Ref	Ref	Ref	Ref	Ref	Ref
Female	0.33 (0.23-0.47)	0.65 (0.54-0.78)	1.30 (1.18-1.44)	0.43 (0.34-0.54)	0.90 (0.79-1.04)	1.14 (1.03-1.26)
Wealth quintiles						
Poorest	Ref	Ref	Ref	Ref	Ref	Ref
2	1.16 (0.76-1.76)	1.23 (0.96-1.58)	0.95 (0.84-1.06)	0.72 (0.44-1.17)	1.44 (1.04-1.98)	1.09 (0.85-1.40)
3	1.10 (0.69-1.77)	1.35 (1.03-1.78)	1.05 (0.93-1.19)	1.16 (0.78-1.72)	1.72 (1.29-2.30)	1.27 (1.02-1.58)
4	0.87 (0.50-1.50)	1.40 (1.05-1.86)	1.02 (0.89-1.17)	1.10 (0.75-1.60)	1.97 (1.49-2.60)	1.61 (0.31-1.97)
Wealthiest	0.78 (0.36-1.70)	1.45 (1.00-2.08)	1.07 (0.89-1.28)	1.23 (0.84-1.82)	2.31 (1.75-3.05)	1.63 (1.33-2.01)
Education						
None	2.95 (0.81-10.75)	1.39 (0.81-2.37)	1.21 (1.07-1.38)	1.06 (0.38-2.95)	1.08 (0.75-1.55)	1.10 (0.95-1.27)
Standard1-5	1.30 (0.70-2.42)	0.96 (0.72-1.29)	1.15 (1.04-1.28)	1.10 (0.65-1.85)	1.11 (0.88-1.41)	1.03 (0.90-1.17)
Standard 6-8	Ref	Ref	Ref	Ref	Ref	Ref
Secondary	1.13 (0.79-1.60)	0.95 (0.77-1.17)	1.14 (0.98-1.32)	0.88 (0.64-1.20)	0.98 (0.83-1.16)	1.02 (0.91-1.15)
Post-secondary	2.38 (0.79-7.15)	1.37 (0.83-2.27)	1.67 (1.28-2.18)	1.09 (0.74-1.60)	1.18 (0.96-1.44)	1.03 (0.89-1.20)
Employment						
Not working	0.75 (0.44-1.28)	0.82 (0.48-1.42)	1.71 (1.42-2.06)	0.53 (0.39-0.73)	0.88 (0.68-1.13)	1.50 (1.31-1.72)
Housework	1.84 (0.89-3.79)	0.94 (0.60-1.46)	1.24 (0.99-1.54)	0.71 (0.51-0.99)	1.05 (0.89-1.24)	1.21 (1.05-1.40)
Subsistence	0.93 (0.57-1.51)	0.78 (0.62-0.97)	1.05 (0.88-1.26)	1.00 (0.16-6.25)	1.47 (0.80-2.68)	1.00 (0.64-1.55)
Self-employed	Ref	Ref	Ref	Ref	Ref	Ref
Salaried	0.86 (0.32-2.30)	0.93 (0.66-1.31)	1.03 (0.78-1.36)	0.75 (0.53-1.07)	1.01 (1.01 (0.87-1.19)	1.01 (0.85-1.20)

¹Systolic ≥ 140 mmHg and/or diastolic ≥ 90 mmHg and/or on antihypertensive medication

²Adjusted for distal factors; age, site (urban/rural), wealth, education, occupation (see Suppl. Figure 1. Conceptual model of risk factors for cardiometabolic outcomes (web appendix page 2)).

Supplementary Table 4: Hypertension: Screening, cascade of care, access to diagnostic testing, a previous diagnosis, medication and control

	Total	Rural Male	Rural Female	Urban Male	Urban Female
Of individuals aged ≥40 years N=8,552					
Blood pressure measured ever	3,564/8,552 41.7%	378/2,180 17.3%	998/3,061 32.6%	742/1,288 57.6%	1,446/2,023 71.5%
Blood pressure measured ≥40 years	3,140/8,552 36.7%	354/2,180 16.2%	820/3,061 26.8%	682/1,288 53.0%	1,284/2,023 63.5%
Of overweight and obese individuals N=8,702					
Blood pressure measured ever	5,238/8,702 60.2%	132/536 24.6%	1,178/2,570 45.8%	611/8,702 63.5%	3,317/4,633 71.2%
Of all current hypertensives, previously diagnosed¹ and on medication, and undiagnosed N=4,096					
Blood pressure measured ever	2,277/4,096 55.6%	214/787 27.2%	483/1,101 43.9%	507/859 59.0%	1,073/1,349 79.5%
Previously diagnosed	1,708/4,096 41.7%	172/787 21.9%	482/1,101 43.8%	295/859 34.3%	759/1,349 56.3%
On medication	1,189/4,096 29.0%	127/787 16.1%	382/1,101 34.7%	180/859 21.0%	500/1,349 37.1%
Of previously diagnosed hypertensives on regular medication and for whom a blood pressure measurement was available N=1,183²					
Blood pressure controlled <140/90 mmHg	440/1,183 37.2%	41/127 32.3%	148/378 39.2%	50/179 27.9%	201/499 40.3%

¹Excludes 849 people with a prior diagnosis of hypertension who were not on medication but did not have hypertension (BP>140/90) when measured in the study

²Excludes 6 people who did not have blood pressure measured during the study

Supplementary Table 5: Diabetes: Screening, cascade of care, access to diagnostic testing, a previous diagnosis, medication and control

	Total	Rural Male	Rural Female	Urban Male	Urban Female
Of individuals aged ≥ 40 years and over N=8,552					
Blood glucose test ever	858/8,552	109/2,180	140/3,061	243/1,288	366/2,023
	10.0%	5.0%	4.6%	18.9%	18.1%
Blood glucose measured ≥40 years	784/8,552	99/2,180	130/3,061	220/1,288	335/2,023
	9.2%	4.5%	4.3%	17.1%	16.6%
Of overweight and obese individuals N=8,702					
Blood glucose test ever	891/8,702	42/536	109/2,570	191/963	549/4,633
	10.2%	7.8%	4.2%	19.8%	11.8%
Of all individuals with diabetes, previously diagnosed & undiagnosed N=566					
Blood glucose test ever ¹	304/566	32/84	53/124	86/133	133/225
	53.7%	38.1%	42.7%	64.7%	59.1%
Previously diagnosed	333/566	41/84	69/124	84/133	139/225
	58.8%	48.8%	55.7%	63.2%	61.8%
Of all previously diagnosed diabetic individuals N=333					
On regular medication	227/333	33/41	47/69	55/84	92/139
	68.2%	80.5%	68.1%	65.5%	66.2%
Blood glucose controlled FBG <7.0 mmol/L	157/293	21/37	32/63	44/69	60/124
	53.6%	56.8%	50.8%	63.8%	48.4%
Of diagnosed diabetic individuals on regular medication N=227					
Blood glucose controlled FBG <7.0 mmol/L	84/207	14/29	18/46	25/47	27/83
	40.6%	48.3%	39.1%	53.2%	31.8%

¹54 individuals previously diagnosed with diabetes reported never to have had a blood test for glucose, including 19 people on regular medication.

Supplementary Table 6: Associations of risk factors with multi-morbidity¹ – age-adjusted and distal factor adjusted risk ratios

Characteristics	Males N=8,936		Females N=14,199	
	Age-adjusted Risk Ratio (95% CI)	Adjusted Risk Ratio ² (95%CI)	Age-adjusted Risk Ratio (95% CI)	Adjusted Risk Ratio ² (95%CI)
Site				
Karonga (rural)	Ref	Ref	Ref	Ref
Lilongwe (urban)	4.00 (3.04-5.25)	1.91 (1.31-2.78)	3.11 (2.71-3.58)	1.43 (1.17-1.74)
Age group; years				
18-29	Ref	Re	Ref	Ref
30-39	8.66 (4.05-18.49)	9.81 (4.44-21.68)	5.89 (4.04-8.58)	5.72 (3.89-8.42)
40-49	16.10 (7.59-34.15)	17.71 (8.05-38.96)	16.34 (11.37-23.48)	17.44 (11.92-25.51)
50-59	28.41 (13.46-59.95)	37.83 (17.45-82.03)	29.72 (20.78-42.51)	36.47 (25.11-52.98)
60-69	61.07 (29.37-127.00)	75.19 (36.16-156.35)	36.57 (25.36-52.73)	50.81 (34.94-73.88)
70+	31.57 (14.48-68.83)	72.70 (32.89-160.70)	31.76 (21.48-46.94)	51.76 (34.42-77.87)
Wealth quintiles				
Poorest	Ref	Ref	Ref	Ref
2	1.50 (0.70-3.24)	1.27 (0.59-2.76)	1.62 (1.16-2.29)	1.64 (1.17-2.31)
3	2.34 (1.11-4.91)	1.59 (0.75-3.37)	2.62 (1.91-3.61)	2.19 (1.59-3.03)
4	4.91 (2.44-9.84)	2.56 (1.25-5.24)	4.56 (3.39-6.12)	3.24 (2.40-4.38)
Wealthiest	10.54 (5.34-20.81)	3.91 (1.91-7.98)	6.48 (4.82-8.70)	3.96 (2.90-5.39)
Education				
None	<0.001 (0.001-<0.001)	<0.001 (0.001-<0.001)	0.82 (0.63-1.08)	0.95 (0.72-1.25)
Standard 1-5	0.60 (0.30-1.19)	0.65 (0.33-1.30)	0.85 (0.77-1.16)	1.07 (0.88-1.30)
Standard 5-8	Ref	Ref	Ref	Ref
Secondary	2.44 (1.70-3.51)	1.67 (1.13-2.46)	1.88 (2.59-3.99)	1.16 (0.96-1.39)
Post-secondary	7.06 (4.90-10.12)	2.90 (1.89-4.44)	3.21 (2.59-3.99)	1.46 (1.11-1.93)
Employment				
Not working	1.17 (0.80-1.71)	0.80 (0.54-1.18)	0.87 (0.68-1.11)	0.74 (0.58-0.96)
Housework	0.66 (0.29-1.53)	0.66 (0.29-1.48)	0.96 (0.79-1.16)	0.88 (0.72-1.07)
Subsistence	0.29 (0.19-0.44)	0.74 (0.45-1.21)	0.30 (0.24-0.38)	0.50 (0.38-0.65)
Self-employed	Ref	Ref	Ref	Ref
Salaried	1.08 (0.75-1.55)	0.73 (0.50-1.05)	1.36 (1.08-1.72)	0.87 (0.67-1.15)
Physical activity				
Did not meet	2.58 (1.92-3.47)	1.23 (1.01-1.51)	1.68 (1.29-2.20)	1.31 (1.00-1.73)
Met recommendation	Ref	Ref	Ref	Ref
Smoking				
Not current	Ref	Ref	Ref	Ref
Current	0.26 (0.13-0.50)	0.47 (0.24-0.92)	0.33 (0.05-2.21)	0.46 (0.08-2.75)
Alcohol				
Not in last year	Ref	Ref	Ref	Ref
In last year	0.73 (0.55-0.96)	0.98 (0.74-1.29)	1.84 (1.43-2.37)	1.84 (1.42-2.38)
Sugary drinks intake				
<6 tsps/day	Ref	Ref	Ref	Ref
≥6 tsps/day	0.86 (0.64-1.34)	0.74 (0.56-0.99)	1.09 (0.93-1.27)	0.93 (0.79-1.09)

¹ Multi-morbidity is defined as more than one concurrent condition of hypertension (Systolic \geq 140mmHg and/or diastolic \geq 90mmHg and/or on antihypertensive medication), diabetes (FBG \geq 7.0mmol/L, or a previous self-reported diagnosis by a health professional, whether or not on medication) or obesity (BMI \geq 30kg/m²)

²Adjusted for distal factors; age, site, wealth, education, occupation (see Suppl. Figure 1. Conceptual model of risk factors for cardiometabolic outcomes (web appendix page 2))

Supplementary Table 7: Prevalence of co-morbidities amongst diabetic and hypertensive participants

	Rural Male n/N (%)	Rural Female n/N (%)	Urban Male n/N (%)	Urban Female n/N (%)
Diabetic participants				
Hypertension	44/84 (52.4)	64/124 (51.6)	79/133 (59.4)	138/225 (61.3)
Obesity	5/84 (6.0)	42/120 (35.0)	23/133 (17.3)	120/219 (54.8)
Hypertensive participants				
Diabetes	44/677 (6.5)	64/941 (6.8)	79/670 (11.8)	138/1,134 (12.2)
Obesity	33/781 (4.2)	210/1,073 (19.6)	106/858 (12.4)	504/1,329 (37.9)

Supplementary Table 8: Risk ratios (RR) for associations between a previous diagnosis and treatment for hypertension or diabetes and a diagnosis and medication for the other condition

Hypertension status in study	RR of previous diabetes diagnosis N =566 Adjusted RR¹ (95% CI)	RR of already being on medication in those with previous diabetes diagnosis N=333 Adjusted RR¹ (95% CI)
No hypertension	Ref	Ref
Hypertension; previously undiagnosed	0.57 (0.39-0.82)	0.91 (0.65-1.26)
Previously diagnosed hypertension; no medication	1.23 (0.99-1.54)	0.62 (0.42-0.92)
Previously diagnosed hypertension; on medication	1.35 (1.12-1.64)	1.21 (1.00-1.47)
Diabetes status in study	RR of hypertension diagnosis N=3422 Adjusted RR¹ (95% CI)	RR of already being on medication in those with a previous hypertension diagnosis N=2216 Adjusted RR¹ (95% CI)
No diabetes	Ref	Ref
Diabetes; previously undiagnosed	1.16 (0.98-1.36)	1.38 (1.17-1.63)
Previously diagnosed diabetes; no medication	1.80 (1.53-2.11)	1.05 (0.79-1.41)
Previously diagnosed diabetes; on medication	1.83 (1.69-1.99)	1.61 (1.48-1.75)

¹Adjusted for site, sex and age