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sustainable solutions for ending hunger and poverty

Assessing food consumption patterns and adult nutrition outcomes in Kyrgyzstan

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Outline

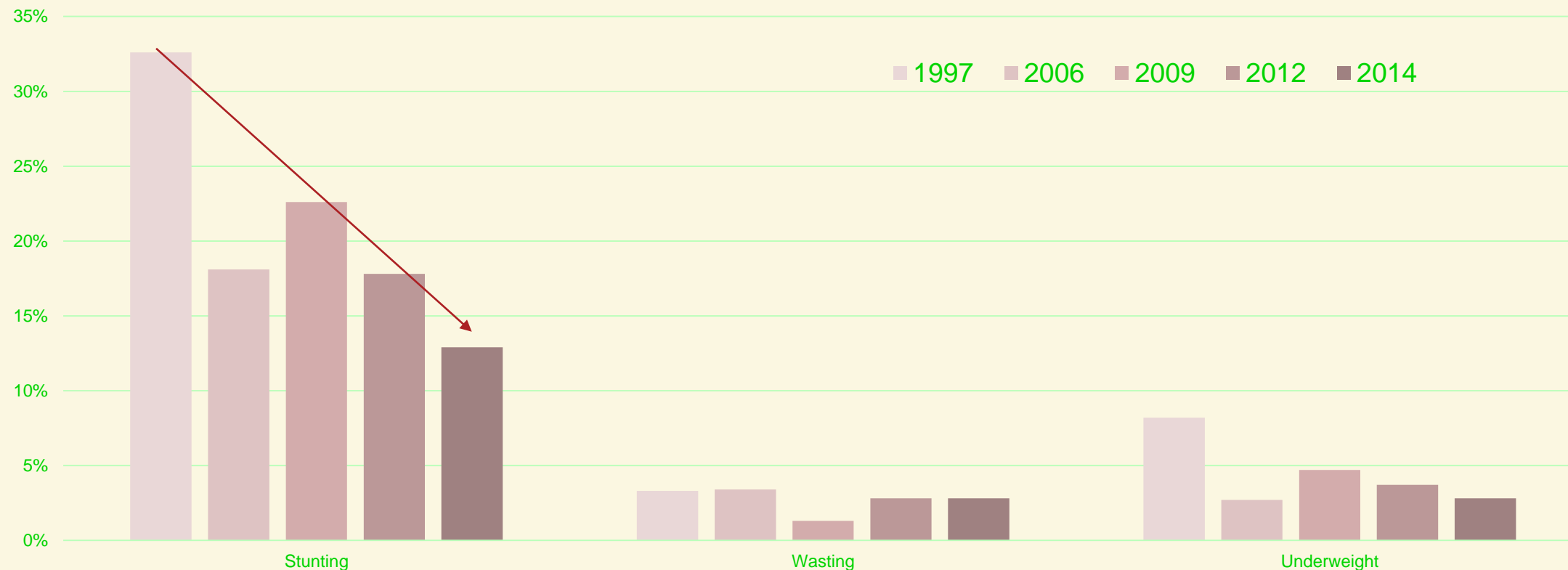
- Introduction
- Objective of this study
- Methodology and data
- Descriptive trends
 - Adult nutrition
 - Food consumption patterns
- Key findings
- Conclusions and future research

Introduction

- Kyrgyzstan achieved significant progress in reducing child undernutrition during last two decades
 - Child stunting declined from 36.2% in 1997 to 12.9% in 2014
 - Child wasting and underweight no longer a problem
- Some suggest that prevalence of adult overnutrition (overweight and obesity) is on the rise in the region (EBRD 2016)
- International evidence suggests that adult overnutrition may have negative health and socioeconomic consequences (Cawley 2015)
- Different factors may cause overweight and obesity
 - Biological, socioeconomic, diets, etc.

Child undernutrition indicators are steadily declining

Kyrgyzstan: Child undernutrition indicators (selected years)



Source: WHO/UNICEF/World Bank 2017

Objective

- Objective of this study is to
 - Provide evidence on levels and trends in overweight and obesity in Kyrgyzstan during 2006-2015
 - Examine determinants of overweight and obesity in the country
- Providing evidence on levels and trends in overweight and obesity is essential to
 - Prompt public and policymakers' attention to the rising problem
 - Quantify health and socioeconomic effects
 - Prioritize action and assess where progress is, or is not, being made

Methods

- Literature review
 - Studies from public nutrition and economics fields
- Descriptive analysis of household survey data
- Random effects linear and logit regression analysis

DATA

- Kyrgyzstan Integrated Household Survey
- Rolling panel data
- Covers about 5000 households
- Provides data on food and non-food consumption at the household level
- Food consumption data is collected on quarterly basis
- Anthropometric data for adults and children
- We use data from 2006-2015 rounds

Definitions

Clinical weight classifications	BMI range
Underweight	$\text{BMI} \leq 18.5$
Healthy weight	$18.5 \leq \text{BMI} < 25$
Overweight	$25 \leq \text{BMI} < 30$
Obese	$\text{BMI} \geq 30$
Class 1 obese	$30 \leq \text{BMI} < 35$
Class 2 obese	$35 \leq \text{BMI} < 40$
Class 3 obese	$\text{BMI} \geq 40$

Source: US DHHS (2010) and WHO (2000)

Prevalence modeling

- Model for analysis of BMI

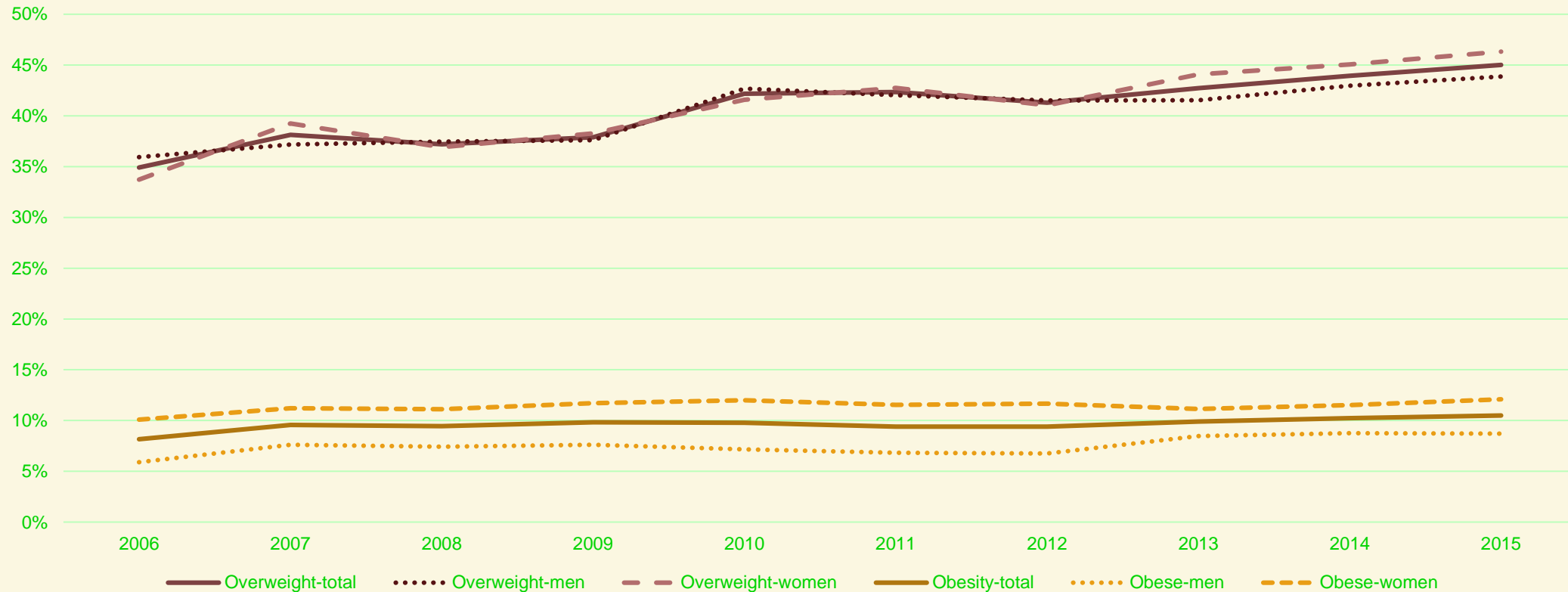
$$BMI_{i,j,r,t} = \beta_0 + \beta_1 IND_{i,j,r,t} + \beta_2 HH_{j,r,t} + \gamma_r + \mu_t + \xi_{i,j,r,t}$$

- Model for analysis of overweight/obesity prevalence

$$Logit(p_{i,j,r,t}) = \beta_0 + \beta_1 IND_{i,j,r,t} + \beta_2 HH_{j,r,t} + \gamma_r + \mu_t + \xi_{i,j,r,t}$$

Trends in prevalence of overweight and obesity

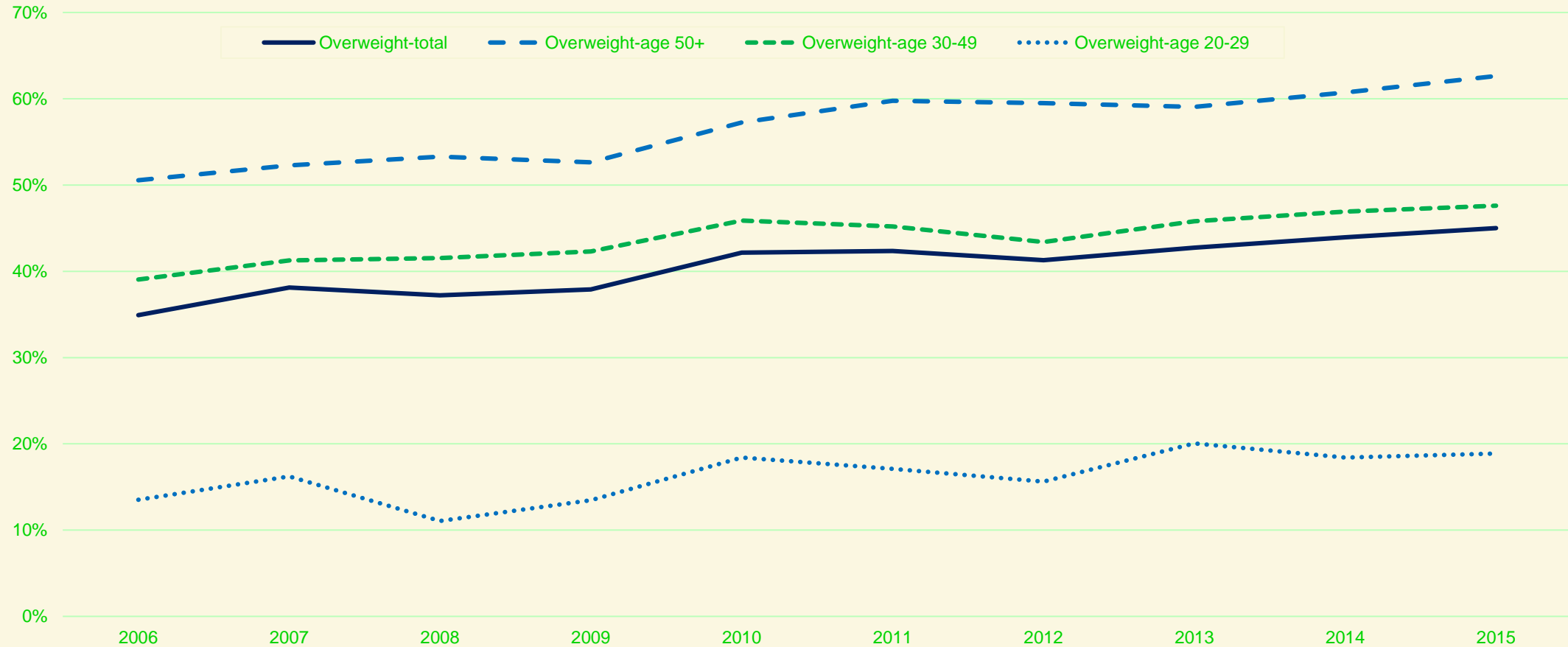
Adult overweight and obesity by gender (2006-2015)



Source: Authors' estimates using KIHS data

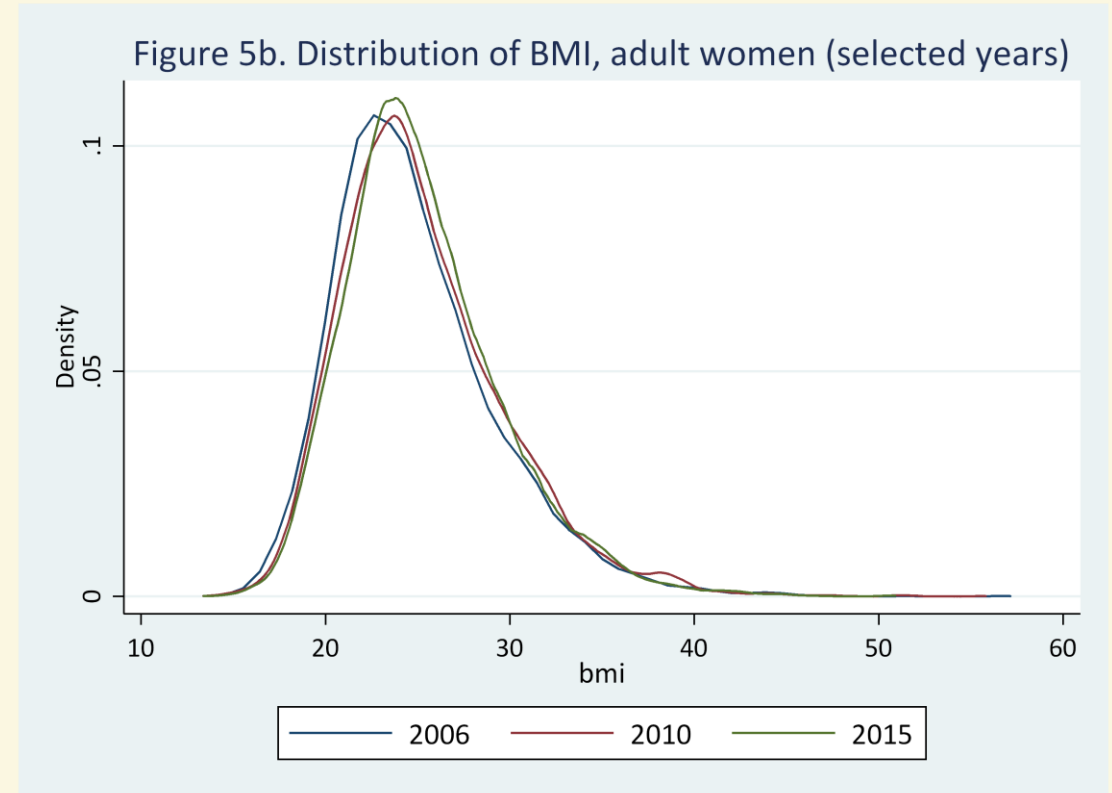
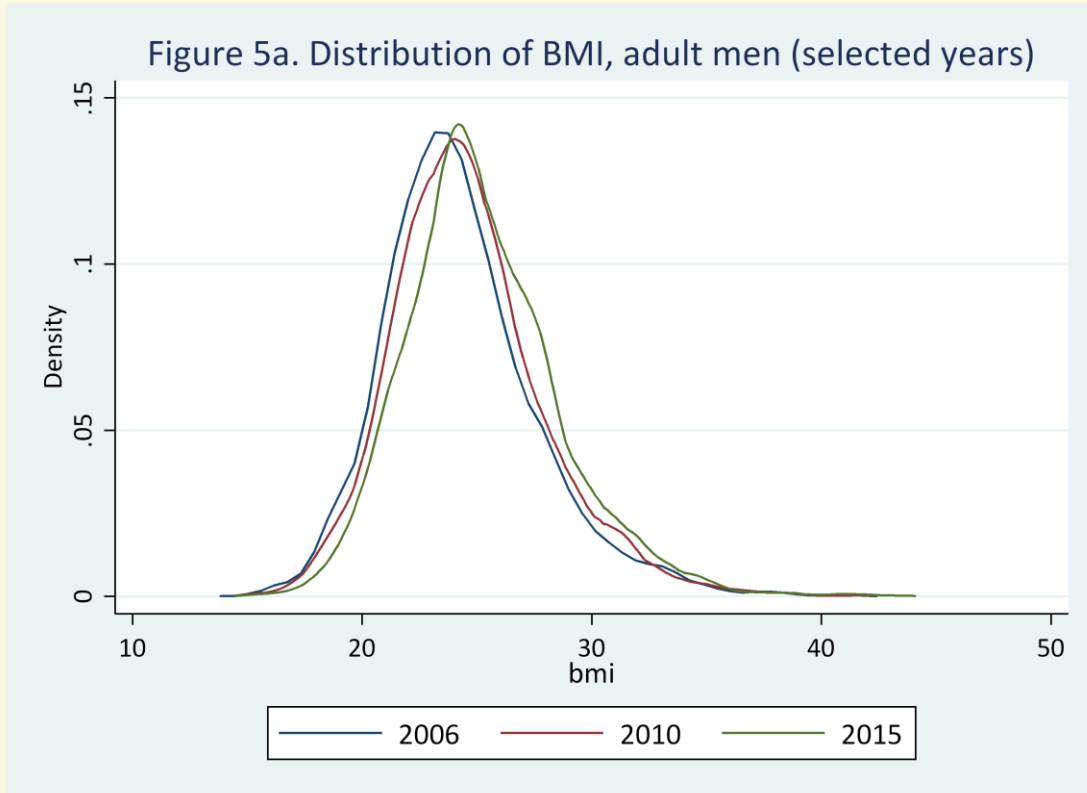
There is considerable variation across age groups, but ...

Adult overweight trends by age group (2006-2015)



Source: Authors' estimates using KIHS data

Distributions of BMI are shifting to the right



Source: Authors' estimates using KIHS data

Changes in prevalence of overweight between 2006 and 2015 by gender and age

Sex	Age	2015			2006			Change		
		n	%	SE	n	%	SE	%	95% CI lower	95% CI upper
Total	Total	11487	45.0	0.46	10604	34.9	0.46	10.1	8.8	11.4
Male	All	5128	46.3	0.70	4666	33.7	0.69	12.6	10.7	14.5
	20-29	1203	22.5	1.20	1122	13.3	1.01	9.3	6.2	12.4
	30-39	1044	44.0	1.54	1032	34.8	1.48	9.2	5.0	13.4
	40-49	1071	57.2	1.51	1157	42.3	1.45	14.9	10.7	19.0
	50-59	1005	62.9	1.52	720	51.4	1.86	11.5	6.7	16.2
	60-69	495	65.8	2.14	339	54.1	2.71	11.6	4.9	18.4
	70+	310	49.3	2.84	296	35.0	2.78	14.3	6.5	22.1
Female	All	6359	43.9	0.62	5938	35.9	0.62	7.9	6.2	9.7
	20-29	1288	15.7	1.01	1185	13.8	1.00	1.9	-0.9	4.7
	30-39	1130	39.1	1.45	1288	32.7	1.31	6.4	2.6	10.2
	40-49	1305	52.3	1.38	1466	46.0	1.30	6.3	2.5	10.0
	50-59	1304	65.6	1.32	948	60.6	1.59	4.9	0.9	9.0
	60-69	749	69.2	1.69	510	52.7	2.21	16.6	11.1	22.0
	70+	583	51.0	2.07	541	36.1	2.07	14.9	9.1	20.6

Source: Authors' estimates using KIHS data

Adult overweight across provinces (age>19), 2015

Region	Total		Urban		Rural	
	Overweight	(n)	Overweight	(n)	Overweight	(n)
Issyk-Kul	49.3	1402	52.6	725	45.8	677
Jalalabad	47.3	1640	46.2	923	48.7	717
Naryn	45.1	1244	42.6	528	46.9	716
Batken	48.9	1269	53.9	570	44.9	699
Osh	45.0	1331	48.5	639	41.8	692
Talas	36.2	1214	32.4	515	39.1	699
Chui	51.2	1499	52.4	534	50.6	965
Bishkek	49.4	1250	49.4	1250	*	0
Osh city	53.1	638	53.1	638	*	0

Source: Authors' estimates using KIHS data

Food consumption patterns

- Share of cereals in total calorie intake remains significant (about 53-54% on average during 2006-2015)
 - Significant variation across provinces and households
 - In some provinces cereals account for nearly 60% of calorie intake
 - Relatively small differences between rural and urban areas
 - No significant differences in the share of cereals in total calorie intake across income quintiles
- Oils and sweets account for substantial share of calorie intake
- Share of fruits, vegetables, and pulses remain significantly low
 - High seasonality, significant variations across provinces and households

Trend in calorie intake by food groups, %

Food Type	2006	2009	2012	2015
Cereals	56	54	56	54
Fruits/Vegetables	7	7	7	7
Animal Products	7	8	9	9
Oils	14	15	14	14
Sweets	10	11	10	11
Other	6	5	4	5

Source: Authors' estimates using KIHS data

Per capita calorie intake, income, and education levels are associated with BMI and overweight

	BMI	Overweight	Obesity
Per capita calorie intake	0.2095***	0.1131**	0.1688*
Per capita consumption expenditures	0.2756***	0.2759***	0.3290***
Education levels (reference group: incomplete secondary)			
Completed secondary	1.4611***	1.4911***	1.3313***
Secondary special	1.4681***	1.5755***	1.4399***
Higher education	1.4243***	1.4739***	1.3979***

- Estimates for BMI are obtained from random effects regression model
- Estimates for overweight and obesity are obtained from random effects logit models
- All regression models control for household and individual characteristics, also for oblast and year fixed effects

Diets with greater content on sugar and fat seem associated with higher levels of BMI and overweight

	BMI	Overweight	Obesity
Sugar intake (log)	0.0832	0.1583***	-0.0253
Saturated fat, g (log)	0.1387**	0.1361***	0.1351
Mono saturated fat, g (log)	0.1157***	0.1248***	0.0966

- All regressions control for calorie intake
- Estimates for BMI are obtained from random effects regression model
- Estimates for overweight and obesity are obtained from random effects logit models
- All regression models control for household and individual characteristics, also for oblast and year fixed effects

Conclusion

- Descriptive analyses suggest
 - Prevalence of overweight and obesity has risen substantially in the past decade in Kyrgyzstan
 - Some variation across age groups, but overall increasing trends observed for all
- Regression analyses suggest
 - Positive association with calorie intake, income, and education
 - Food consumption patterns may have contributed to rising trends in overweight and obesity
- Caveats
 - Calorie intake and food consumption patterns are measured at household level

Future research priorities

- Overweight and obesity measurement
- Assessing prevalence of overweight and obesity in the region
 - Explaining sub-regional disparities and heterogeneities across population groups
- Causes and consequences of overweight and obesity
- Effective prevention methods and interventions
- Behavioral economics approaches
- Cost-effectiveness analysis

Thank you