

# II INTERNATIONAL MEETING IN ONCOLOGY RESEARCH

## DIET AND UNHEALTHY BEHAVIORS: RISK FACTORS FOR CANCER IN THE BRAZILIAN POPULATION

JONAS EDUARDO MONTEIRO DOS SANTOS<sup>1</sup>, LIZ MARIA DE ALMEIDA<sup>1</sup>, SANDRA PATRÍCIA CRISPIM<sup>2</sup>, MARIANNA DE CAMARGO CANCELA<sup>1</sup>  
 Institution: <sup>1</sup>Division of Population Research, Brazilian National Cancer Institute; <sup>2</sup>Nutrition Department, Federal University of Paraná

### INTRODUCTION

Brazilian population experiences epidemiological and nutritional transitions in the last decades. Binge drinking, physical inactivity, smoking and western diet – alone or combined – increase the incidence and premature mortality of noncommunicable diseases (NCDs), including cancer. The aim of this study is to identify the main dietary patterns in Brazil and to measure their association with unhealthy behaviors.

### METHODS AND RESULTS

Data was extracted from the Brazilian National Health Survey (NHS), conducted in 2013, with complex sample design, representative of the Brazilian adult population. A questionnaire containing 22 questions about dietary intake was applied. Dietary patterns were identified using factor analyses (FA), then categorized into quartiles from lower to higher (Q1-Q4) and defined as dependent variables. Poisson regression with robust error variance was carried out to measure the association between Q1-Q4 (for each dietary pattern), physical inactivity, binge drinking and smoking. Multivariate models were adjusted for socio-demographic and health-related variables. For all analyses  $p < 0.05$  was considered statistically significant. Total of survey's respondents was 60,202 (estimated population size=146,308,458). FA identified three distinct dietary patterns: "healthy"; "protein" and "western" (FIGURE 1). Adherence to the healthy pattern was lower in physically inactive individuals (IRR: 0.83; 95%CI: 0.80-0.87), smokers (IRR: 0.76; 95%CI: 0.71-0.81) and binge drinkers (IRR: 0.84; 95%CI: 0.79-0.90) when compared to active, non-smokers and abstainers, respectively (TABLE 1). The adoption of the protein pattern was positively associated with binge drinking (IRR: 1.09; 95%CI: 1.05-1.14) and smoking (IRR: 1.15; 95%CI: 1.11-1.19) when compared to abstainers and non-smokers (TABLE 1). Being young (18-24) (IRR: 1.80; 95%CI: 1.68-1.93) (FIGURE 3) and binge drinker (IRR: 1.10; 95%CI: 1.06-1.15) (TABLE 1) was associated to the western pattern when compared to the elderly (60 and older) and non-drinkers. Being physically inactive and smoker was not significantly associated to this pattern (TABLE 1).

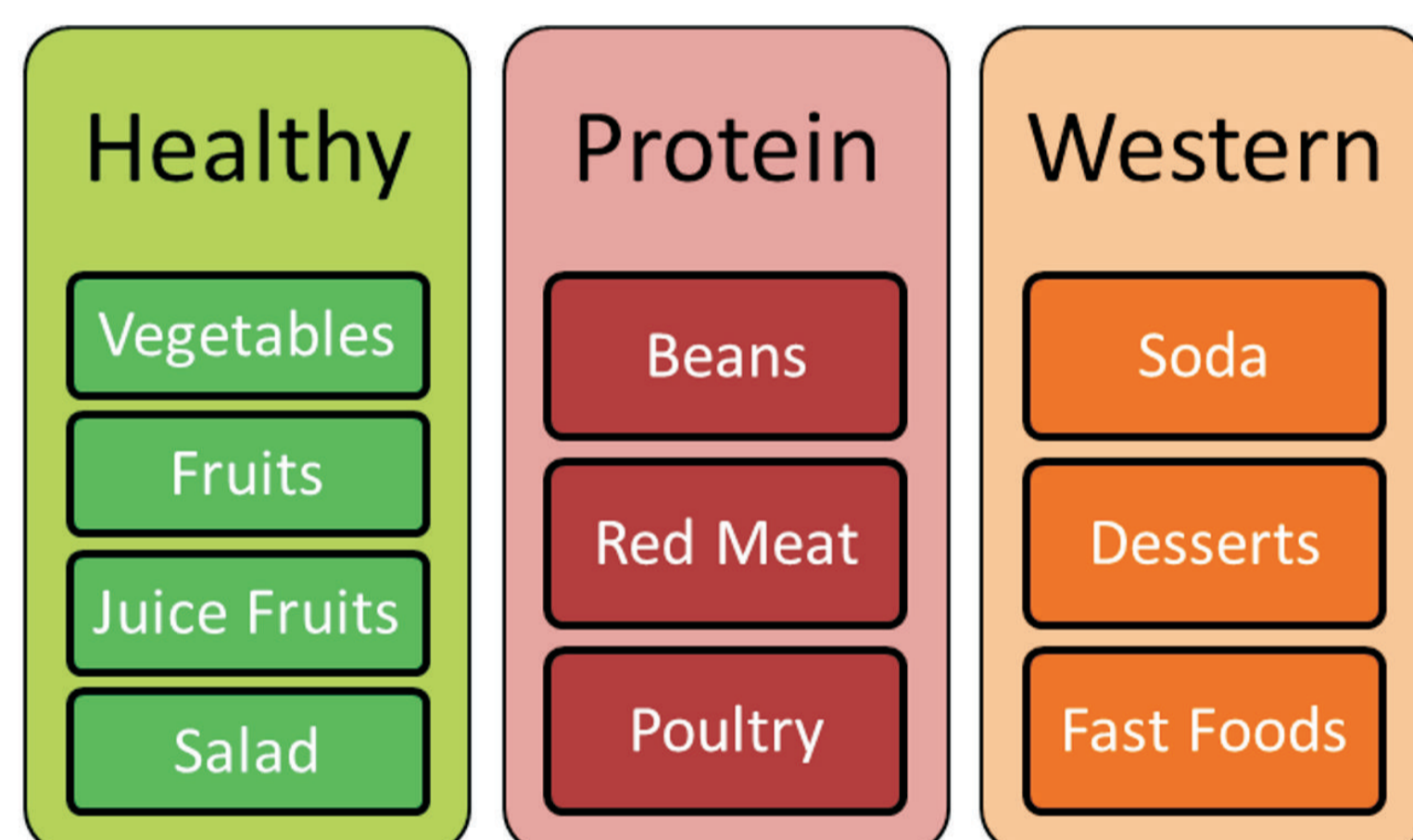


FIGURE 1 - Foods loaded on the three major dietary patterns identified from factor analysis in the Brazilian National Health Survey (NHS), 2013

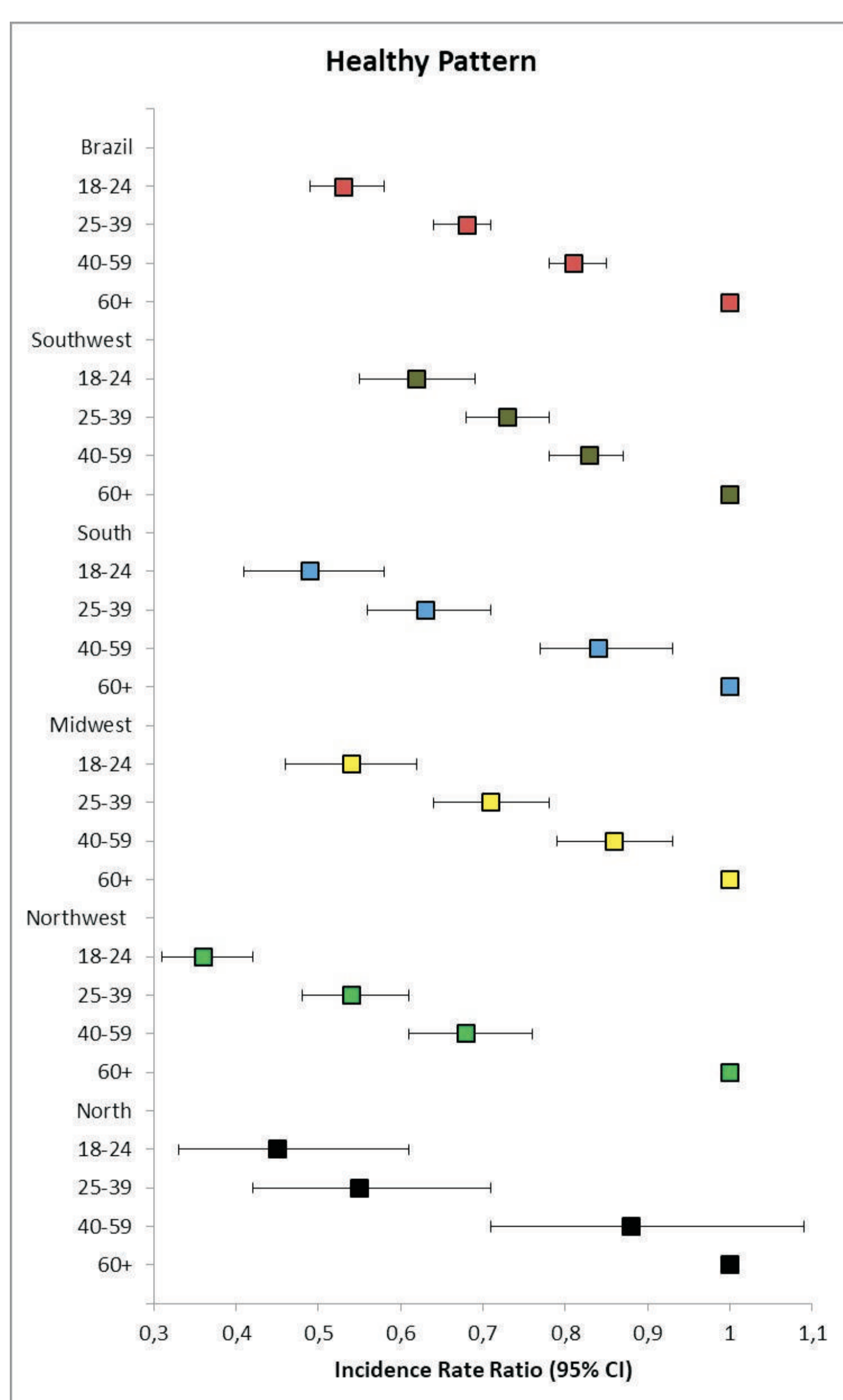


FIGURE 2 - Adjusted Incidence Rate Ratio (IRR) and Confidence Interval (CI 95%) for the association between Healthy Pattern and age-group - Brazil and Brazilian geographic regions

Multivariable models were adjusted for sex, skin color/race/ethnicity, marital status, educational level, physical activity, alcohol intake, smoking, residence area, economic status, multimorbidity and self-perception of health

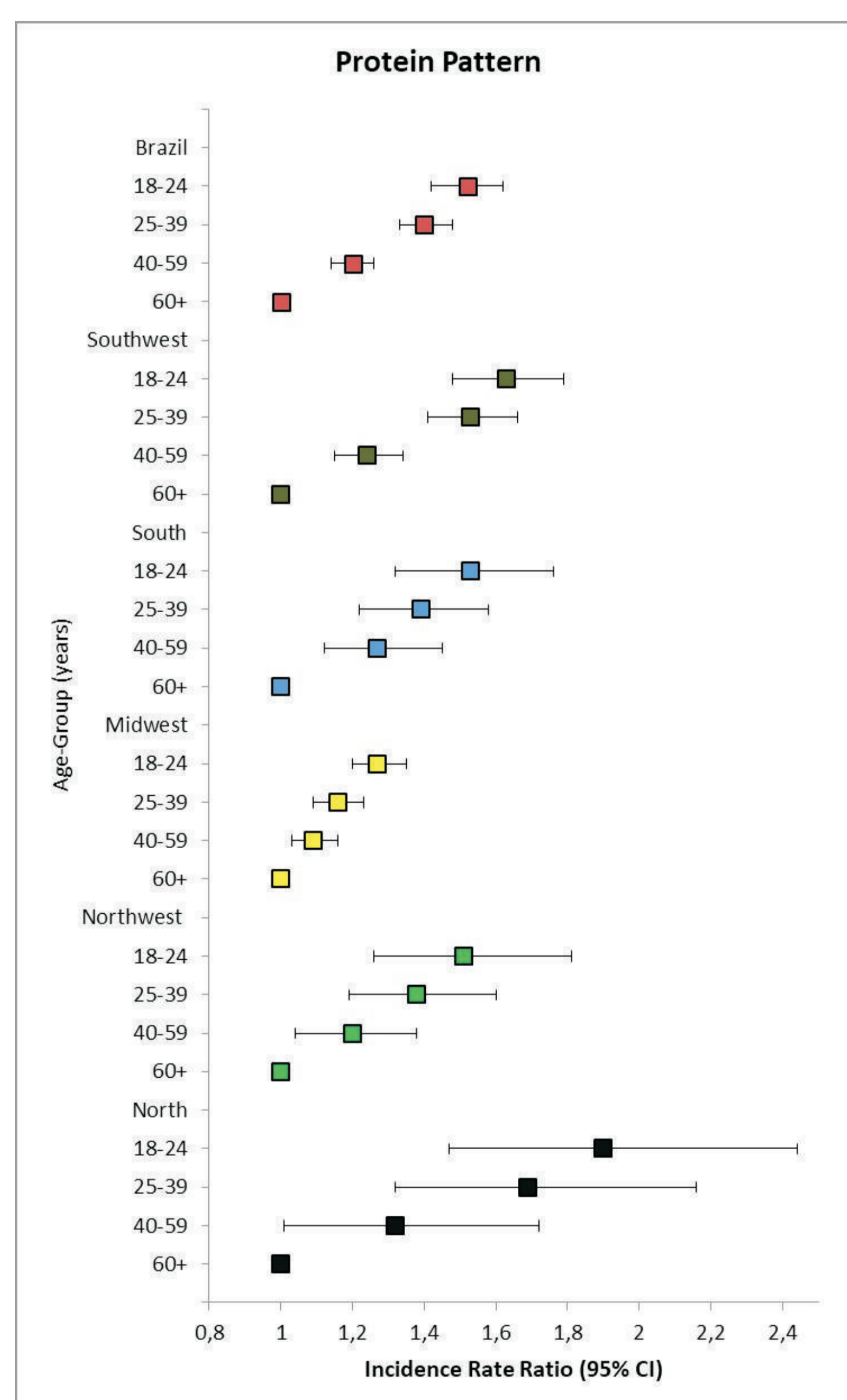


FIGURE 3 - Adjusted Incidence Rate Ratio (IRR) and Confidence Interval (CI 95%) for the association between Protein Pattern and age-group - Brazil and Brazilian geographic regions

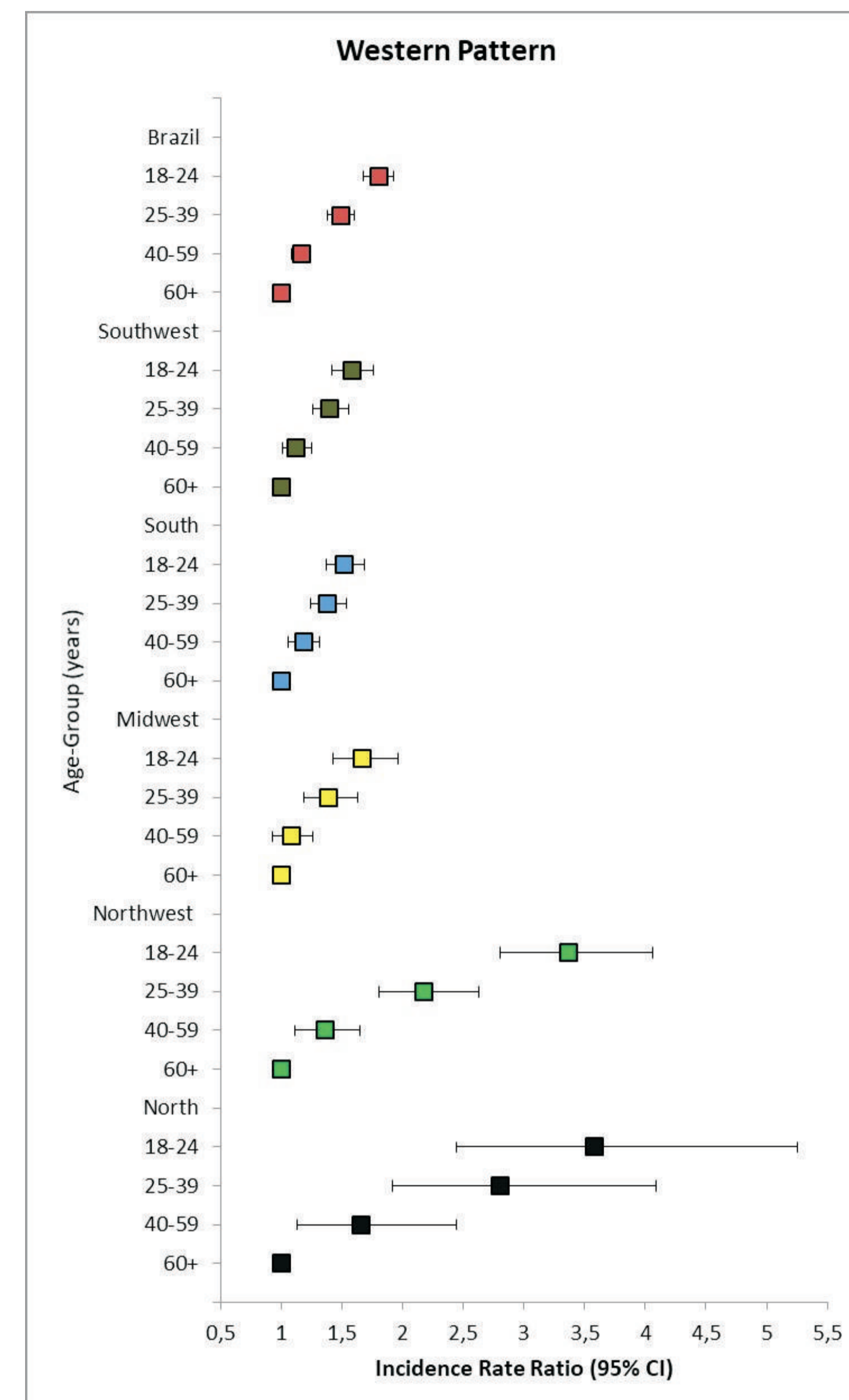


FIGURE 4 - Adjusted Incidence Rate Ratio (IRR) and Confidence Interval (CI 95%) for the association between Western Pattern and age-group - Brazil and Brazilian geographic regions

Multivariable models were adjusted for sex, skin color/race/ethnicity, marital status, educational level, physical activity, alcohol intake, smoking, residence area, economic status, multimorbidity and self-perception of health

TABLE 1 - Adjusted Incidence Rate Ratio (IRR) and Confidence Interval (CI 95%) for the association between Brazilian geographic regions, lifestyle-related variables and dietary patterns in the Brazilian adult population. Data from Brazilian National Health Survey (NHS - 2013)

Patterns	30,101 72,190,359 Healthy Pattern		30,101 72,135,995 Protein Pattern		30,101 72,207,779 Western Pattern	
	IRR (CI 95%)	p-value	IRR (CI 95%)	p-value	IRR (CI 95%)	p-value
<b>Physical Activity</b>						
Sufficient	1.00	<0.005	-	-	-	-
Insufficient	0.86 (0.82 - 0.90)		-	-	-	-
None	0.83 (0.80 - 0.87)		-	-	-	-
<b>Smoking</b>						
Never	1.00	<0.005	1.00	<0.005	-	-
Ex-smokers	0.91 (0.87 - 0.96)		1.04 (1.00 - 1.09)		-	-
Current	0.76 (0.71 - 0.81)		1.15 (1.11 - 1.19)		-	-
<b>Alcohol intake</b>						
Abstainer	1.00	<0.005	1.00	<0.005	1.00	<0.005
Moderate	0.95 (0.92 - 0.99)		1.02 (0.98 - 1.06)		1.09 (1.06 - 1.14)	
Binge drinkers	0.84 (0.79 - 0.90)		1.09 (1.05 - 1.14)		1.10 (1.06 - 1.15)	
<b>Regions</b>						
Southeast	1.00	<0.005	1.00	<0.005	1.00	<0.005
South	0.89 (0.85 - 0.94)		0.96 (0.92 - 1.00)		1.13 (1.09 - 1.17)	
Midwest	0.99 (0.95 - 1.04)		1.21 (1.17 - 1.25)		0.95 (0.91 - 0.99)	
Northeast	0.71 (0.67 - 0.76)		0.59 (0.56 - 0.62)		0.65 (0.62 - 0.69)	
North	0.49 (0.45 - 0.54)		0.42 (0.38 - 0.46)		0.68 (0.64 - 0.73)	

IRR: Incidence Rate Ratio; CI: Confidence Interval.

Multivariable models were adjusted for age-group, sex, skin color/race/ethnicity, marital status, educational level, residence area, economic status, multimorbidity and self-perception of health.

Poisson regression models with robust error variance carried out to measure the association between quartiles 1 and 4 for each dietary pattern and Brazilian geographic regions and lifestyle-related variables

### CONCLUSION

We identified significant associations between the 3 dietary patterns and unhealthy behaviors in the Brazilian adult population. However, younger age was the main characteristic related to the three patterns. The association was stronger for the western pattern showing a dose response effect of age in all Brazilian geographic regions, more pronounced in the Northeast and the North. This study shows that young adults should be targeted in the context of public health nutrition campaigns.

### REFERENCE

INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA (IBGE). Pesquisa Nacional de Saúde (PNS), 2013. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística; 2014

Financial Support: Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq; Ministry of Health – Brazilian National Cancer Institute