



# Dietary Data for Cohort Studies

*I Jornada de Cohortes Poblacionales LatinoAmericanas para el Estudio de Enfermedades Crónicas-COPLAS*

*4-6 Abril 2018 Linares, Chile*

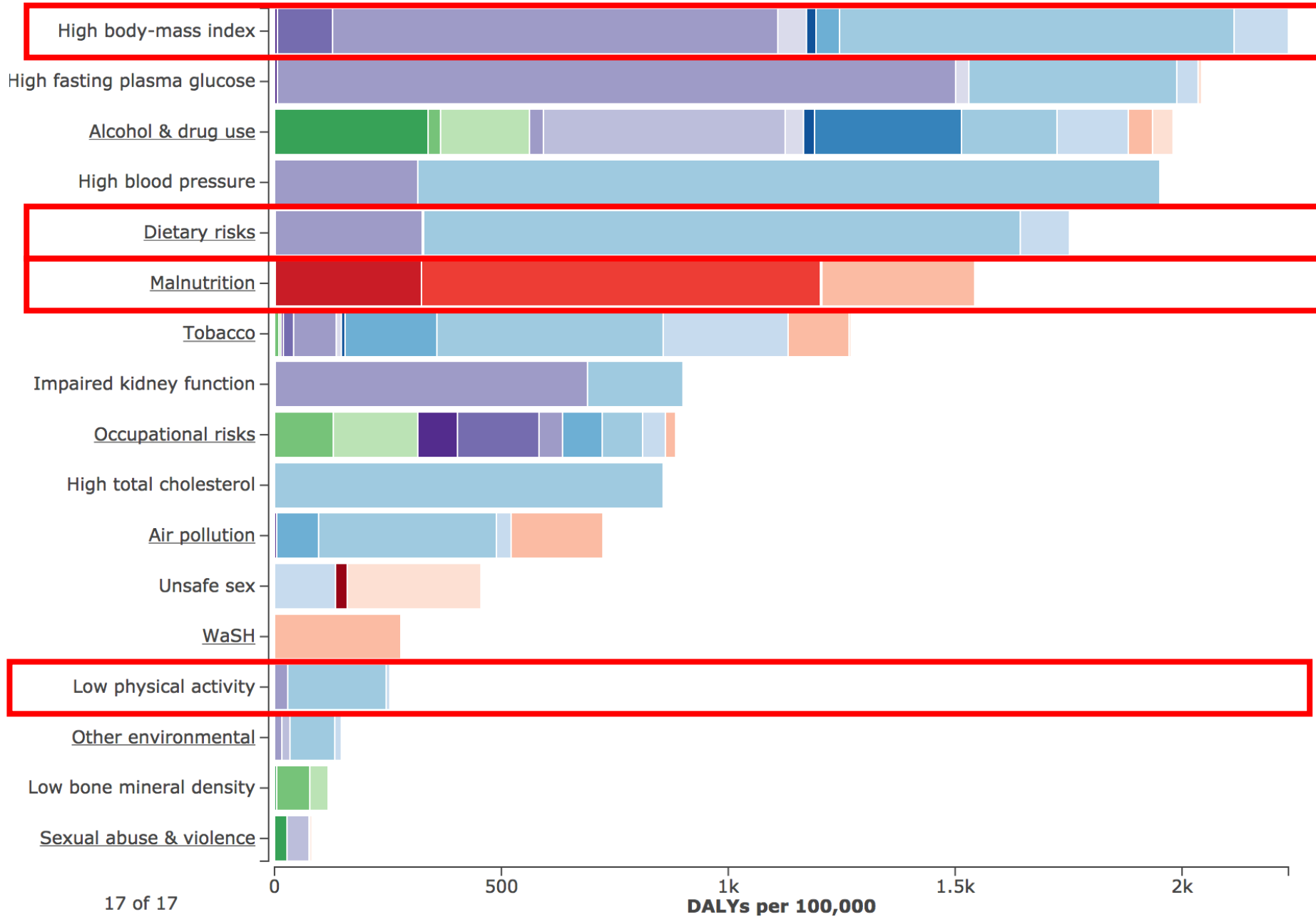
# Outline

- Why measuring diet?
- When measuring diet?
- How to measure diet?
- How to use dietary information?

# WHY?



"Is it just me or is it a bad idea to eat at a place that prints CPR instructions on their placemats?"



## DIET, NUTRITION AND THE PREVENTION OF CHRONIC DISEASES

Report of a  
Joint WHO/FAO Expert ConsultationWorld Health Organization  
Geneva

**World  
Cancer  
Research  
Fund International**



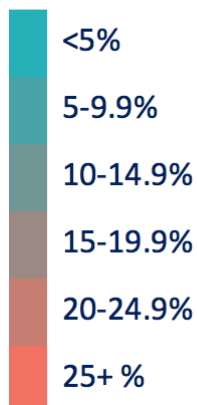
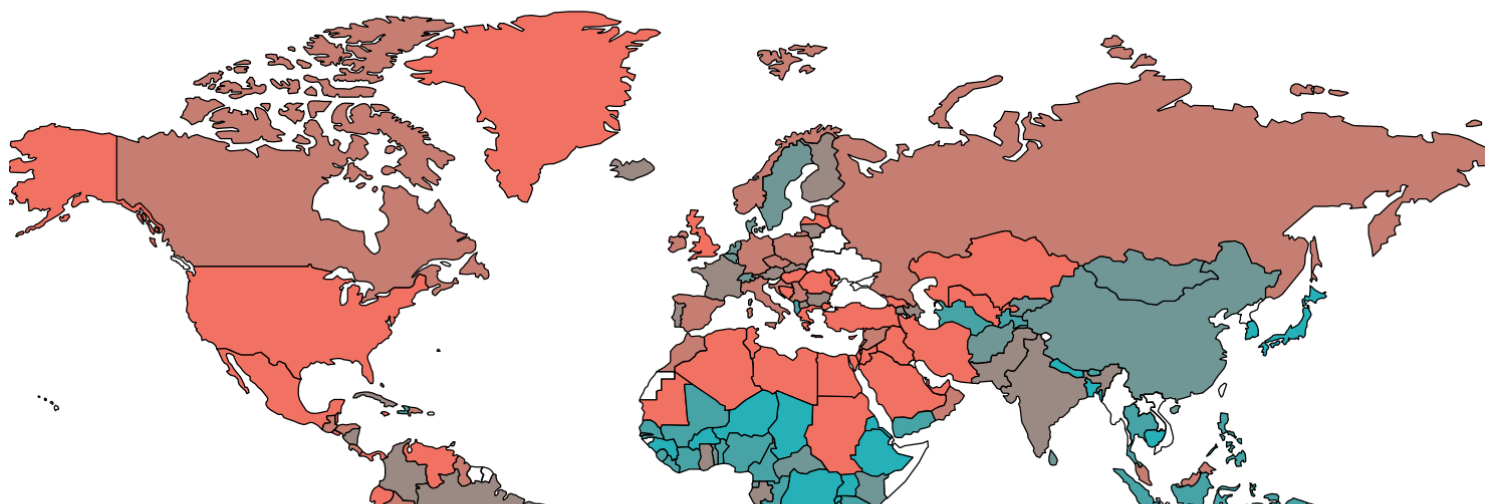
**Continuous Update Project**

## Analysing research on cancer prevention and survival

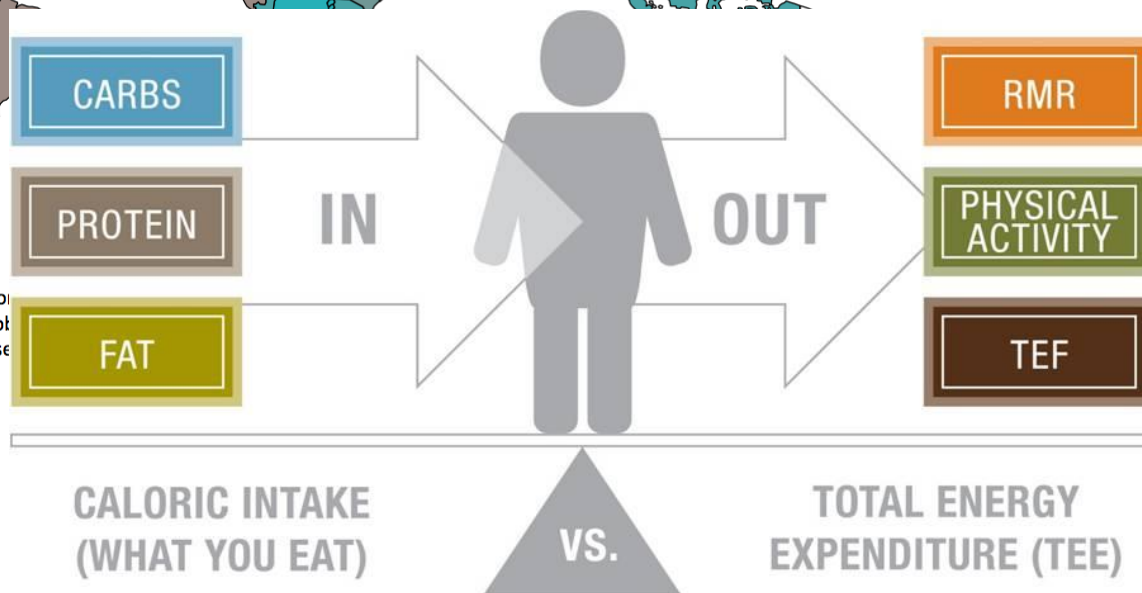
## SUMMARY OF STRONG EVIDENCE ON DIET, NUTRITION, PHYSICAL ACTIVITY AND THE PREVENTION OF CANCER

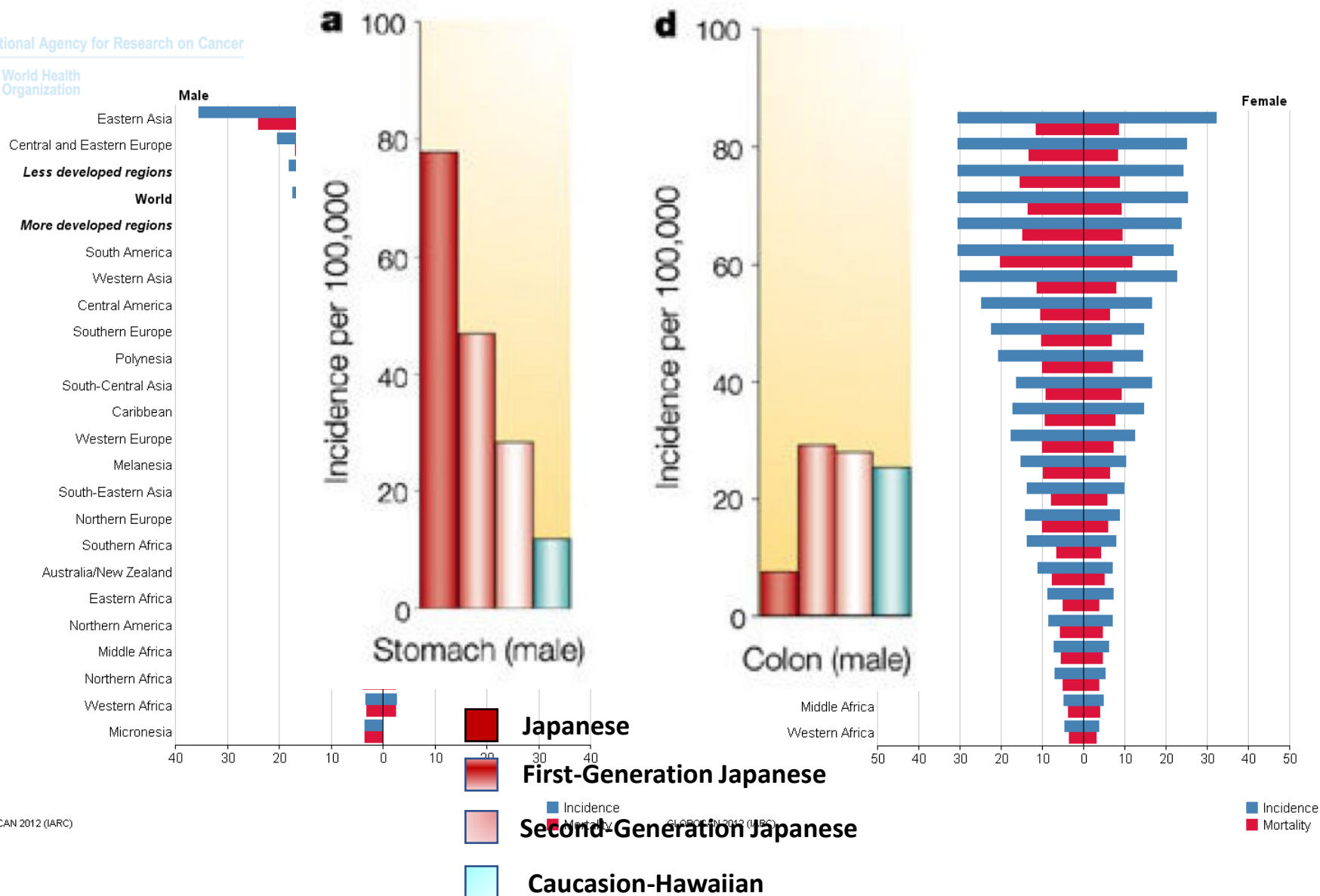
	MOUTH, PHARYNX, LARYNX (2007)	NASOPHARYNX (2007)	OESOPHAGUS SQUAMOUS CELL CARCINOMA (2016)	OESOPHAGUS ADENOCARCINOMA (2016)	LUNG (2007)	STOMACH (2016)	PANCREAS (2012)	GALLBLADDER (2015)	LIVER (2015)	COLORECTUM (2017)	BREAST PREMENOPAUSE (2017)	BREAST POSTMENOPAUSE (2017)	OVARY (2014)	ENDOMETRIUM (2013)	PROSTATE (2014)	KIDNEY (2015)	BLADDER (2015)	SKIN (2007)
<b>Wholegrains</b>										1								
<b> Foods containing dietary fibre</b>										1								
<b>Flatulence</b>									1									
<b>Non-starchy vegetables</b>	1																	
<b>Fruits</b>	1				1													
<b>Red meat</b>										1								
<b>Processed meat</b>						2				1								
<b>Cantonese-style salted fish</b>		1																
<b>Dairy products</b>										3								
<b>Calcium supplements</b>										4								
<b>Foods preserved by salting</b>						1												
<b>Glycaemic load</b>														1				
<b>Arsenic in drinking water</b>					1												1	1
<b>Alcohol</b>			1															
<b>Alcoholic drinks</b>	1		1			5			5	6	1	1				7		
<b>Coffee</b>							1		1					1				
<b>Beta-carotene</b>					8				1						9			9

# % Prevalence of Female Obesity (BMI $\geq 30$ kg/m<sup>2</sup>) 2000 to date



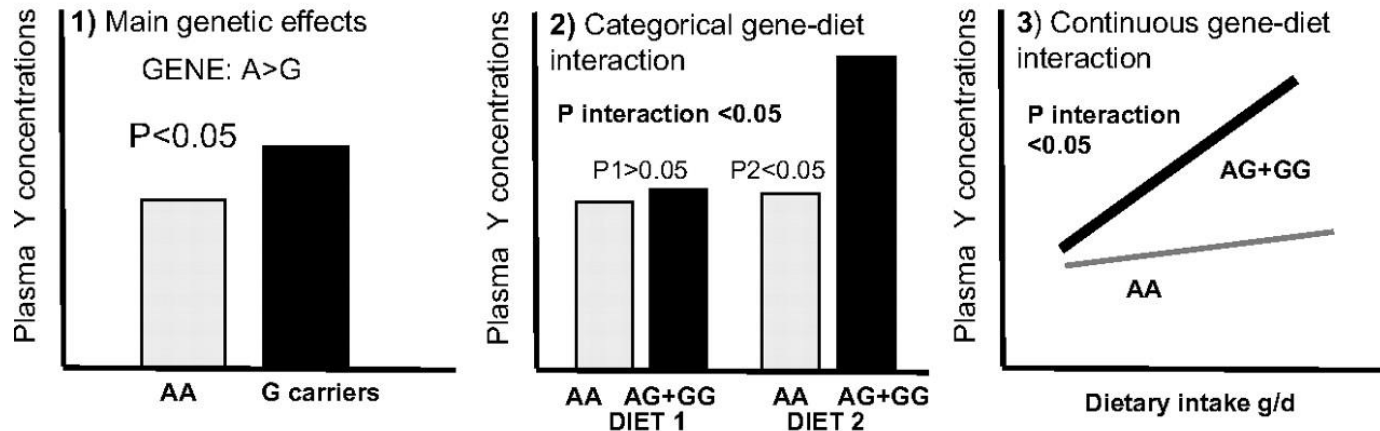
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permissions please email of  
recent data available please  
[www.worldobesity.org](http://www.worldobesity.org)



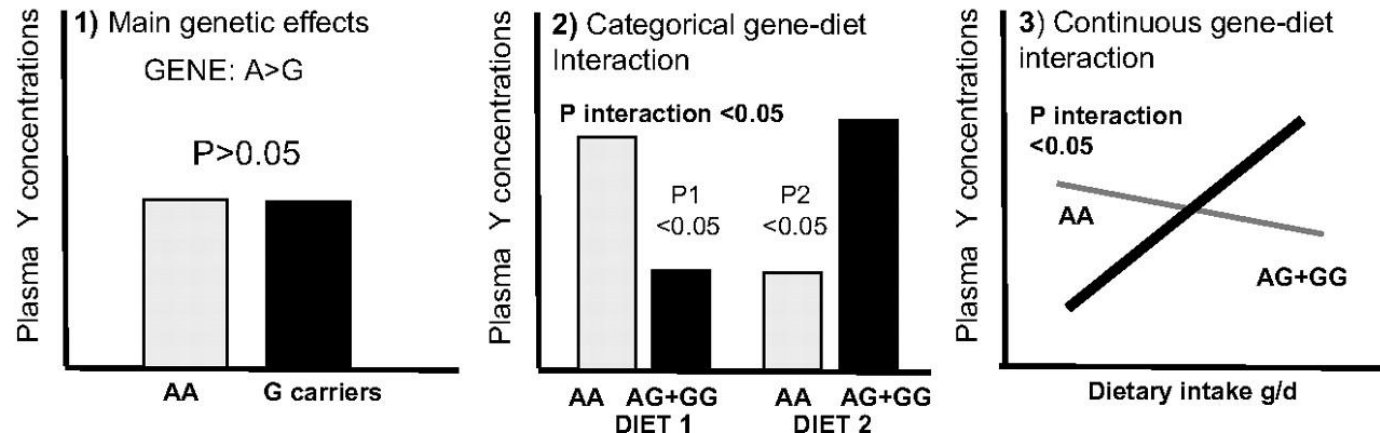


**Figure 1. Types of statistically significant gene-diet interactions.**

**A Statistically significant genetic effects in the whole population**



**B Non-statistically significant genetic effects in the whole population**



Dolores Corella, and Jose M. Ordovas *Circ Cardiovasc Genet.* 2009;2:637-651



# ***WHEN?***

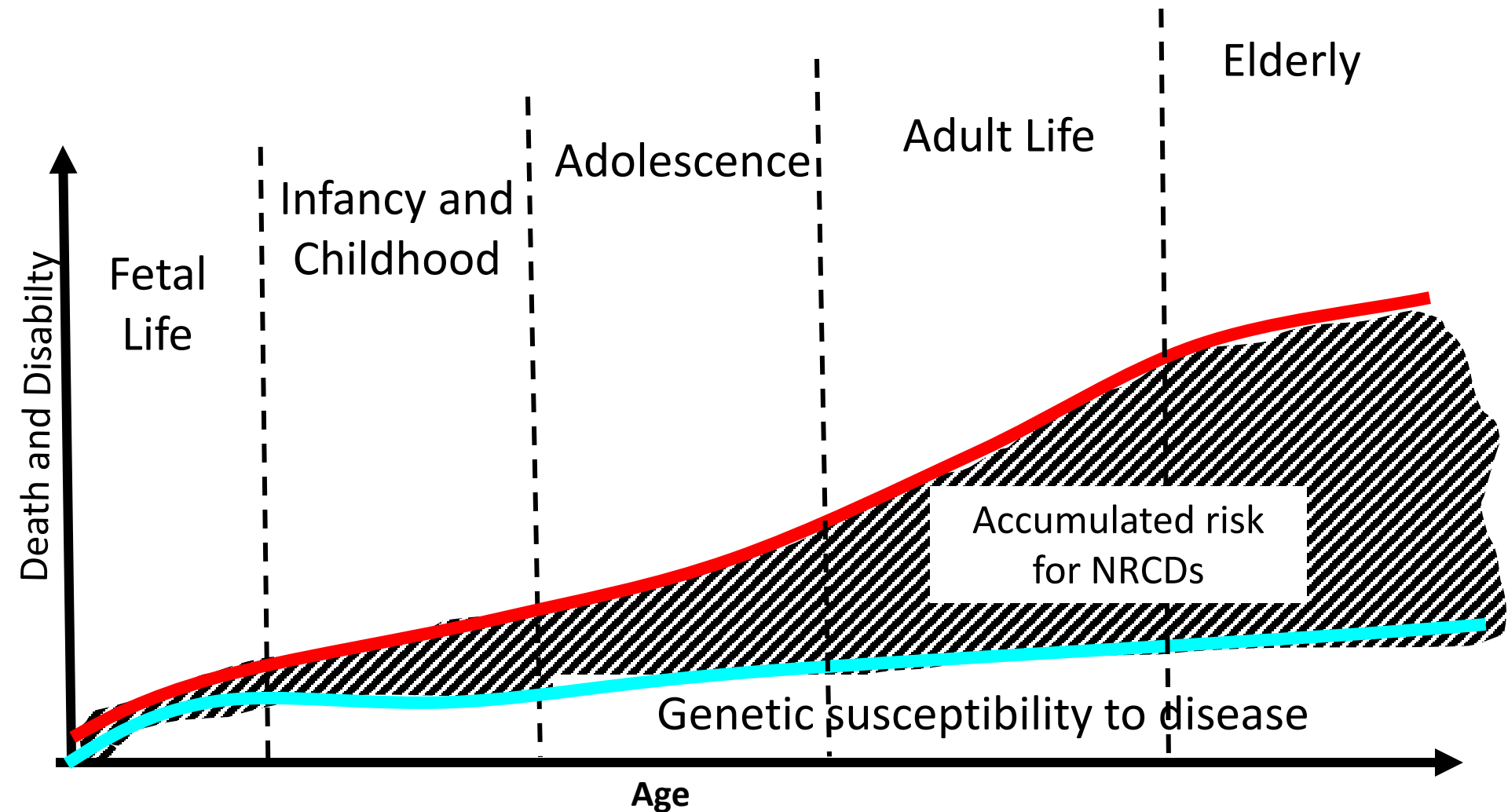


CARTOONSTOCK  
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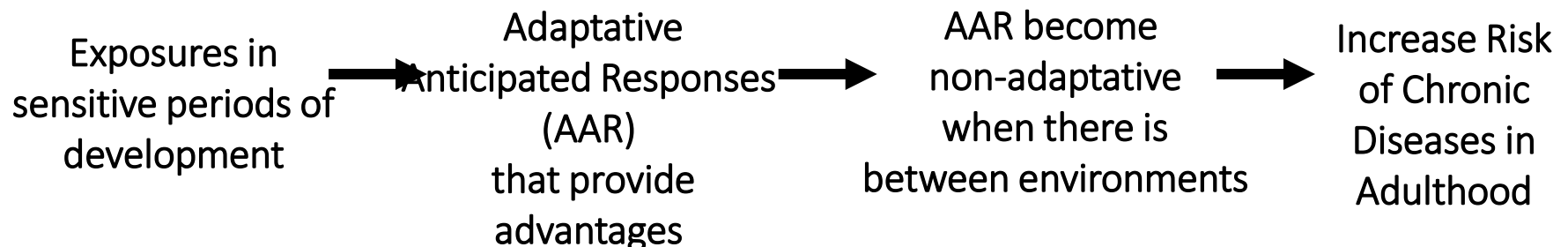
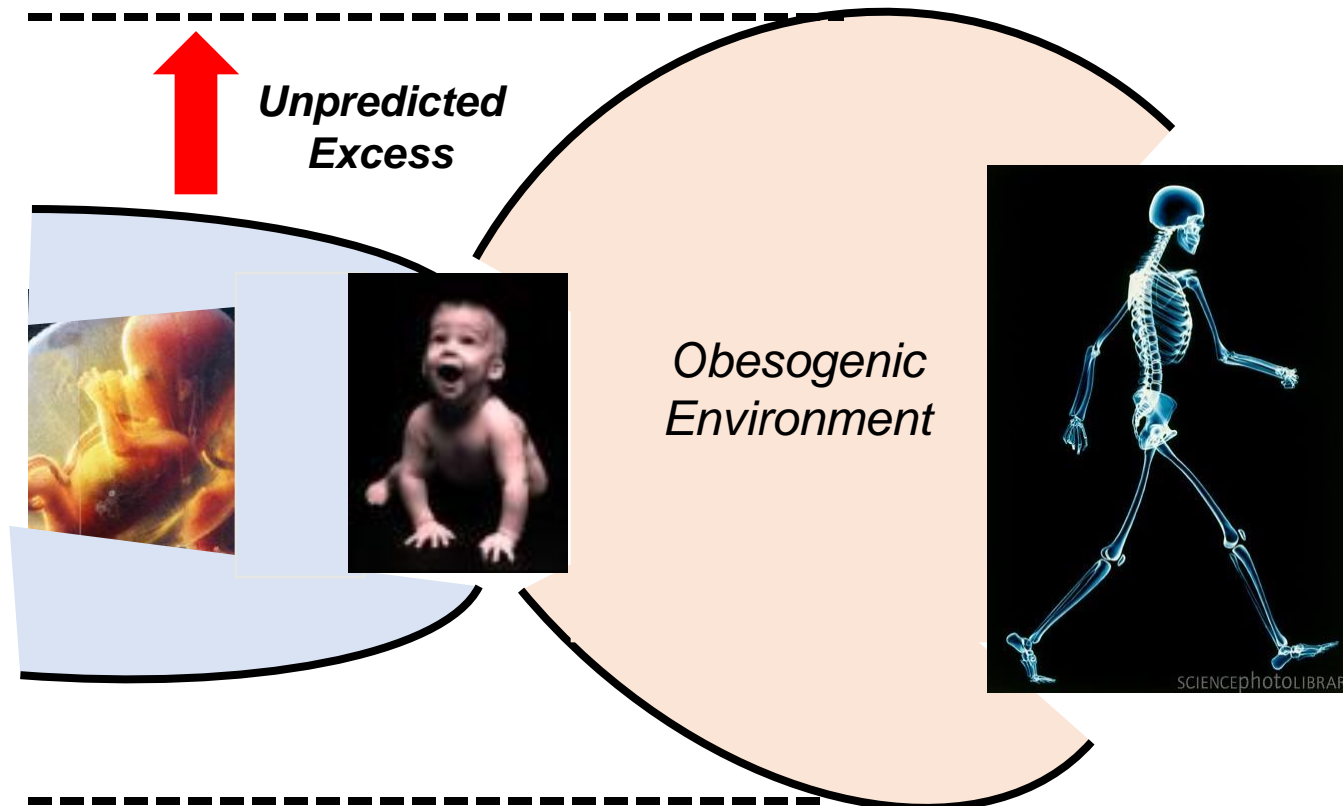
*I eat cheap greasy food so I can  
save for my cardiologist bills  
in the future.*

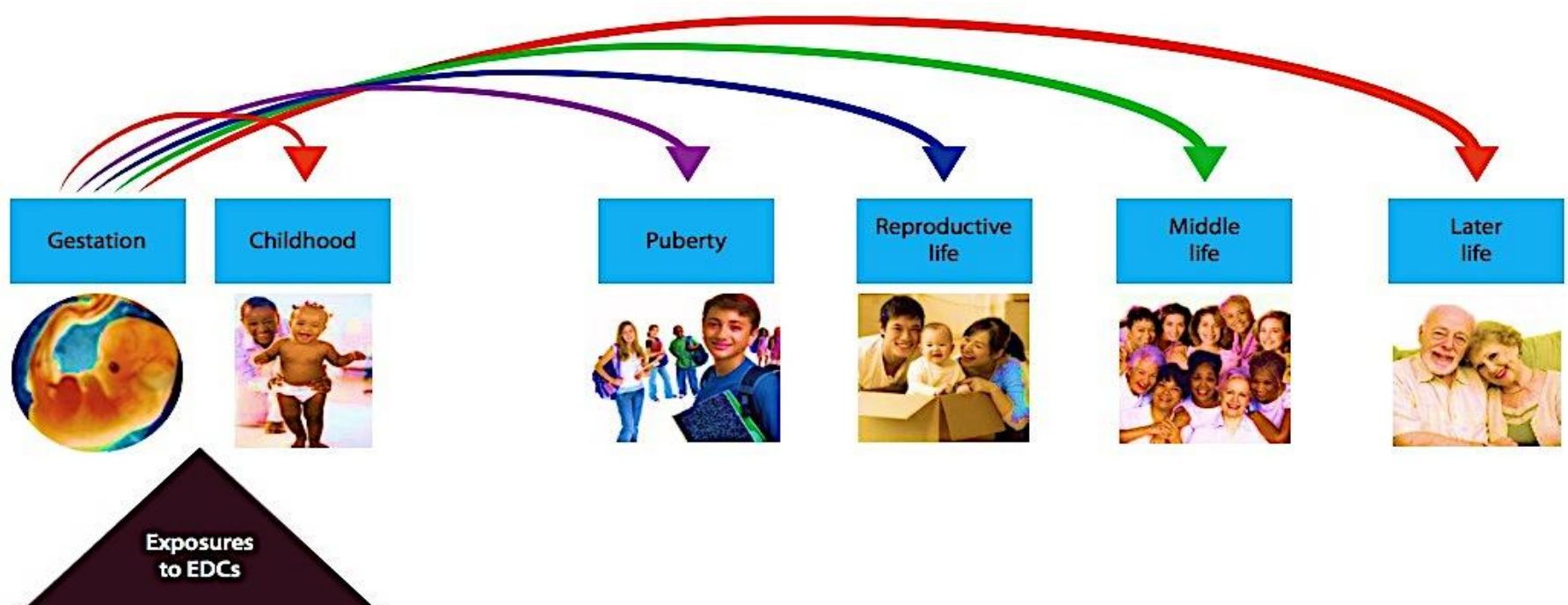
# ***LIFE COURSE APPROACH TO HEALTH & DISEASE***



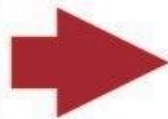
# EARLY ORIGINS OF HEALTH & DISEASE

Gluckman & Hanson Science 2004: 305:1733-6





Developmental Exposures



Learning differences/Behaviour  
Asthma  
Increased sensitivity to infections  
Testicular dysgenesis syndrome

Atherosclerosis  
Cardiovascular disease

Infertility

Breast cancer

Obesity

Altered puberty

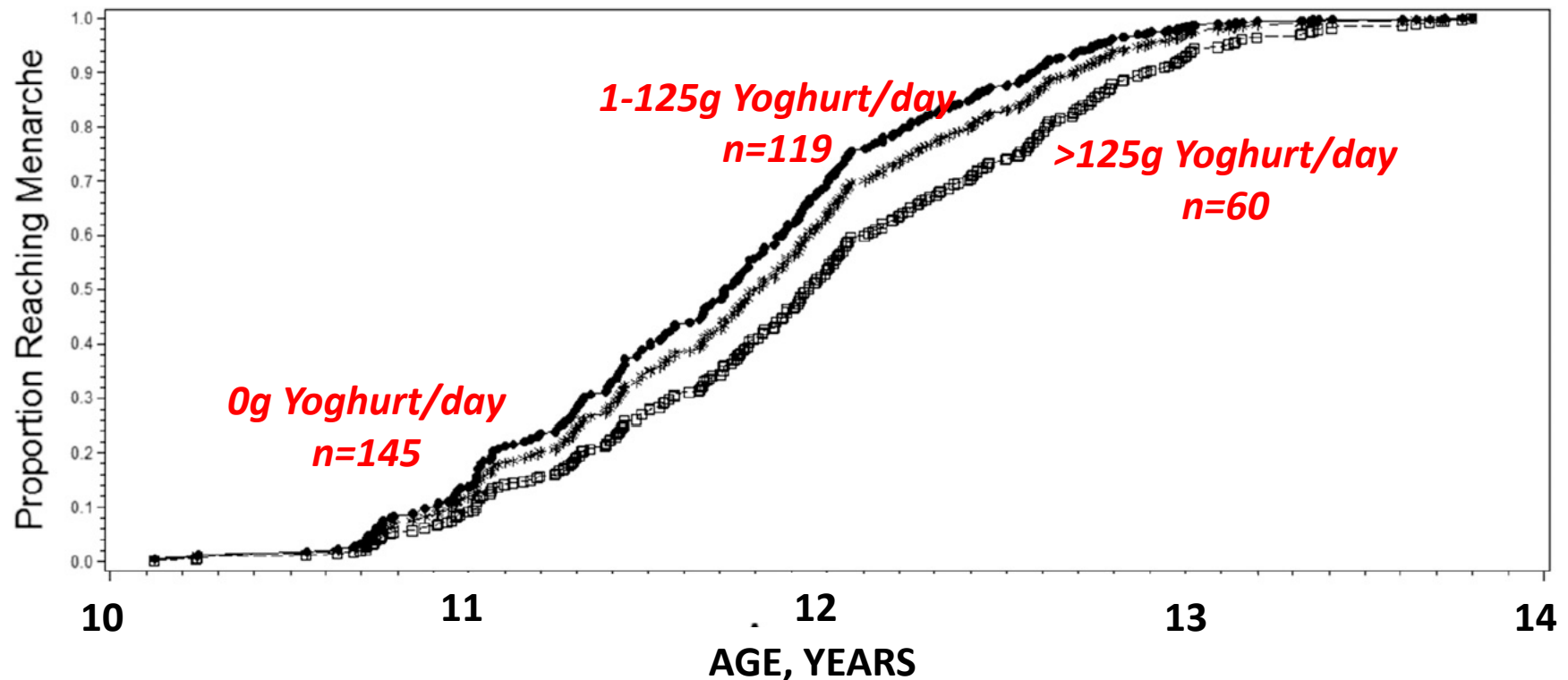
Fibroids  
Premature menopause

Prostate cancer  
Alzheimer disease  
Parkinson disease

Age  
(years)

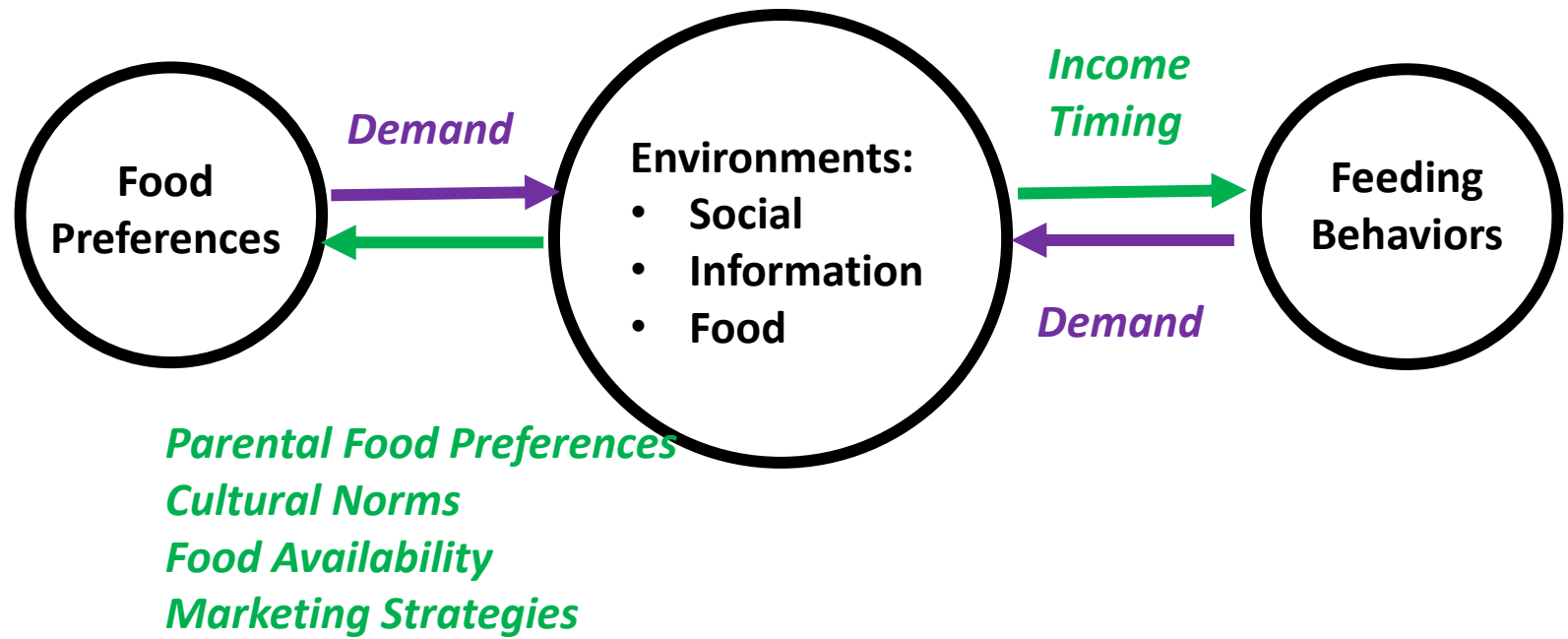


# ***Yoghurt Consumption is inversely associated with Age at Menarche, 324 Chilean Adolescents***



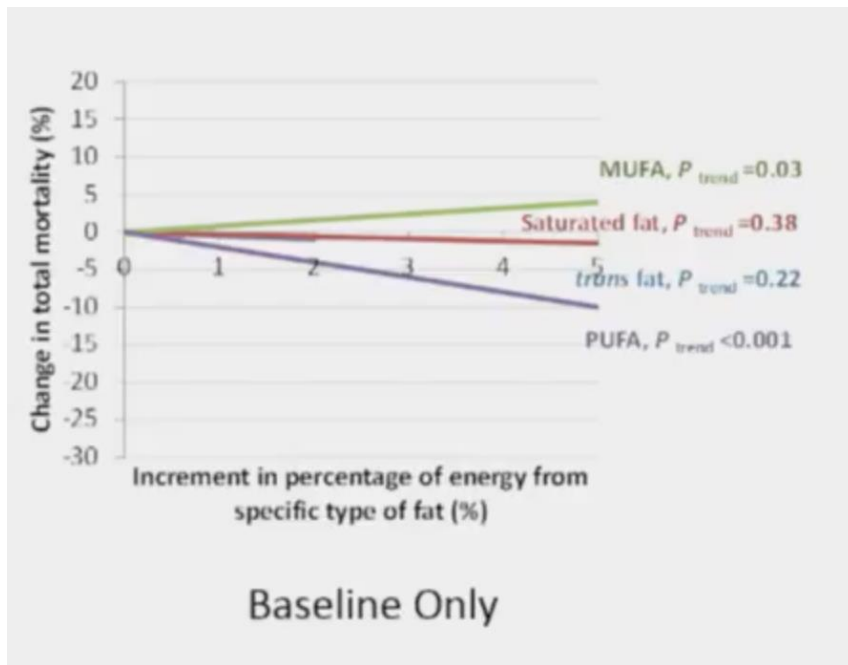
# CONCEPTUAL FRAMEWORK FOR OBESITY PREVENTION

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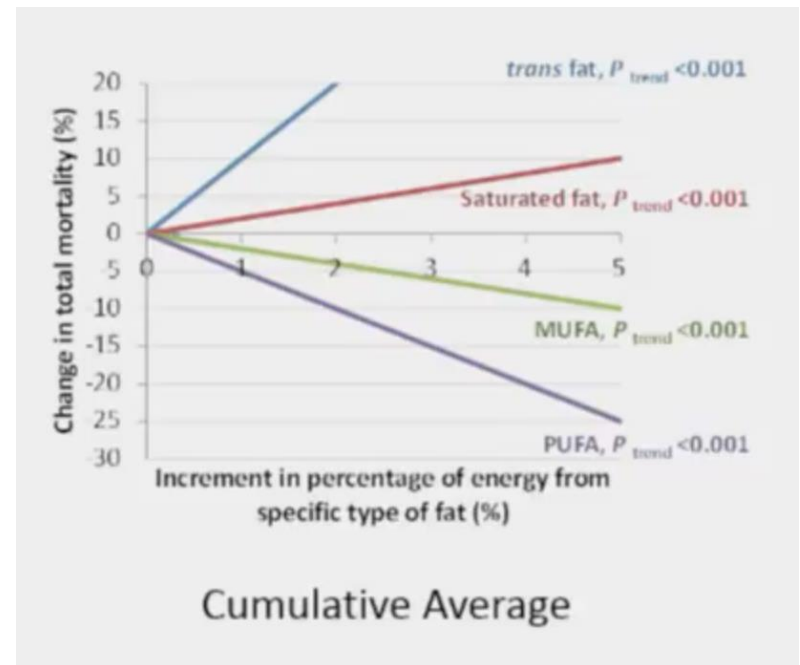


# REPEATED DIETARY MEASUREMENTS?

Types of Fat and Total Mortality

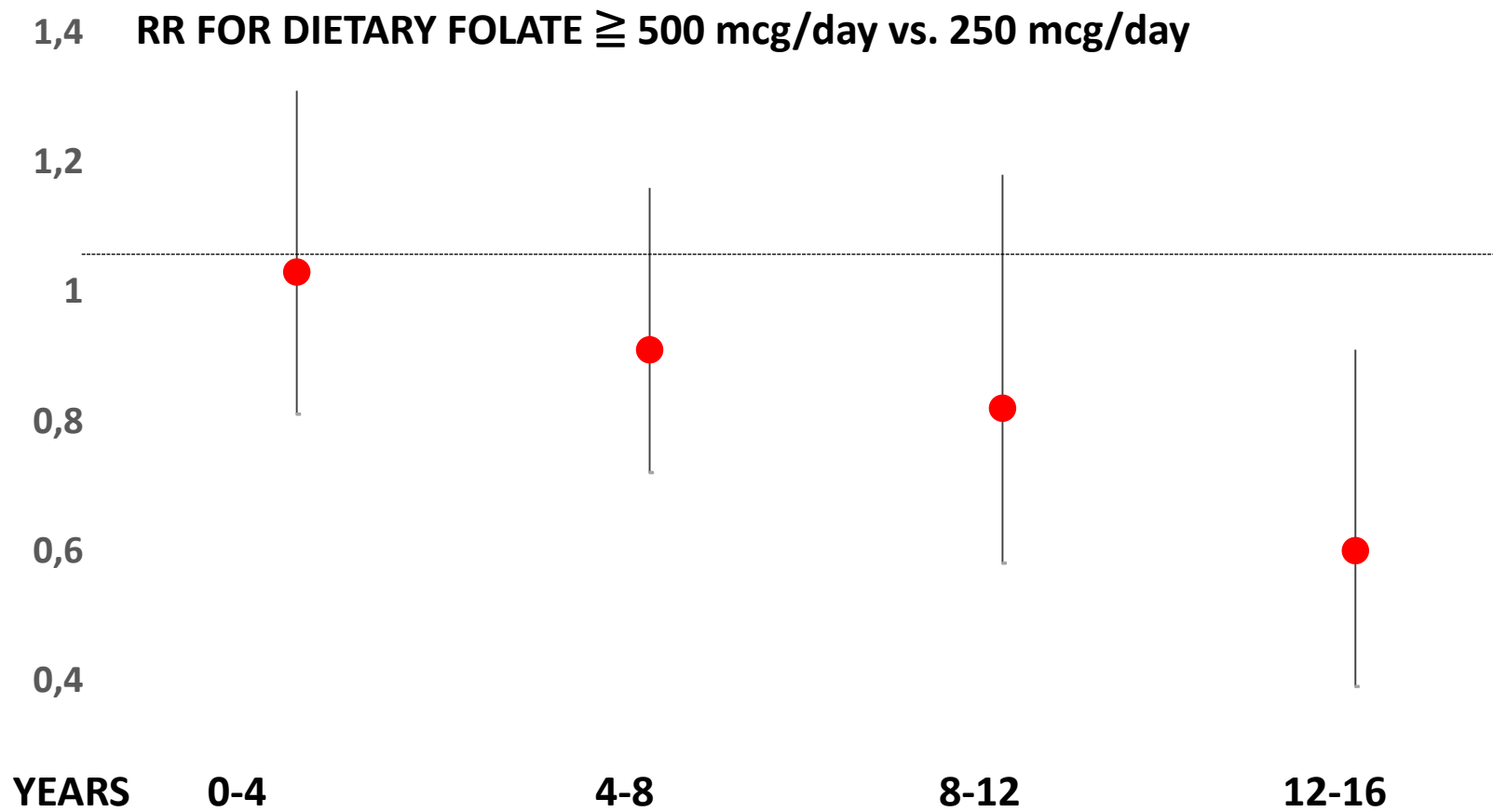


Types of Fat and Total Mortality



*\*Multivariable-adjusted substitution model, comparison is total carbohydrate*

# WHEN DO YOU MEASURE THE OUTCOME?



Data Source: Nurses Health Study (1980-2004) & Health Professional Follow-up (1986-2004)



***HOW?***



# ***SELF-REPORTING IS NOT SO BAD***

	No of studies	No of participants	No of deaths	Underweight (15 to <18.5)	Normal weight (18.5 to <25)	Overweight (25 to <30)	Obesity Grade I (30 to <35)	Obesity Grade II (35 to <40)	Obesity Grade III (40 to <60)
<b>All geographic regions</b>									
Measured BMI	153	1,743,551	129,028	1.52 (1.41, 1.64)	1.00 (0.97, 1.03)	1.09 (1.09, 1.10)	1.44 (1.40, 1.49)	1.92 (1.81, 2.04)	2.79 (2.56, 3.04)
Self-reported BMI	36	2,207,904	256,851	1.38 (1.28, 1.48)	1.00 (0.98, 1.02)	1.13 (1.11, 1.14)	1.47 (1.42, 1.51)	2.00 (1.90, 2.12)	2.68 (2.42, 2.96)
p-values for heterogeneity				0.304		0.054	0.340	0.370	0.819

# ***NORMAL DIET CHANGES***

	PROTEIN	CARBOHYDRATES	FAT	SFA	MFA	PFA
<b>MEN</b>						
SUBJECTS	13.7%	31.3%	20.8%	23.2%	19.8%	16.4%
SEQUENCE	0	0	0.5	0	0	1.7
INTERVIEWER	0.30%	0	0	0	0	0.8%
DAYS OF WEEK	0	0	0	0	0	0
RESIDUAL	86.0%	68.7%	78.7%	76.8%	80.2%	81.1%
<b>WOMEN</b>						
SUBJECTS	18.5%	37.2%	30.0%	33.9%	24.7%	8.8%
SEQUENCE	0	0	0	0	2.1%	1.7%
INTERVIEWER	0	0.7%	1.3%	0	2.2%	0.0%
DAYS OF WEEK	0	0	0	0	0.4	0
RESIDUAL	81.5%	62.1%	68.7%	66.1%	73.1%	88.8%

# ***DIETARY ASSESSMENT***

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## REGISTRIES (Prospective)

Food Dairy

Direct Observation

By Weight

## QUESTIONNAIRE (Retrospective)

24 hours recall

Food Frequency

Food History

# R24H

Hora	Minuta	Ingredientes	Medida casera	gr/ml	Observaciones
7:30	Leche con pan	Leche natural líquida descremada	1 tazón	300	Marca colun
		Marraqueta	1 unidad	84	Sin miga
		Jamón de pavo	2 láminas	60	
		Queso gauda	1 lámina	30	NRM
11:00	Bebida	Coca cola zero	1 vaso	250	
14:30	Arroz con vienasas y naranja	Arroz blanco cocido	¾ tazas	115	Marca Tucapel
		Vienasas cocidas	2 unidades	100	NRM
		Ketchup	1 cda sopera	22	Marca JB
		Naranja	1 unidad	125	

# FOOD FREQUENCY QUESTIONNAIRE (FFQ)

- Questionnaire based on the frequency of food or food groups consumption during a fixed amount of time (week, month, year)

102. FIDEOS TALLARINES, SPAGUETTI, CORBATITAS, ESPIRALES (SIN SALSA)	<input type="text" value="CONSUME 1 VEZ A LA SEMANA"/>
* must provide value	
103. CEREALES DE DESAYUNO (CON AZUCAR)	<input type="text" value="NUNCA LO CONSUME"/>
* must provide value	
104. AVENA	<input type="text" value="NUNCA LO CONSUME"/>
* must provide value	
105. CHOCLO	<input type="text" value="CONSUME 1 A 3 VECES AL MES"/>
* must provide value	
200 TUBERCULOS	
201. PAPA COCIDA	<input type="text" value="CONSUME 1 A 3 VECES AL MES"/>
* must provide value	
202. PURE DE PAPAS	<input type="text" value="NUNCA LO CONSUME"/>
* must provide value	
203. PAPAS FRITAS	<input type="text" value="CONSUME 1 A 3 VECES AL MES"/>
* must provide value	
300 PANADERIA Y PASTERIA	
301. PAN MARRAQUETA	<input type="text" value="CONSUME 1 A 3 VECES AL MES"/>
* must provide value	
301.A COMO CONSUME EL PAN MARRAQUETA	<input type="radio" value="CON MIGA"/> CON MIGA <input checked="" type="radio" value="SIN MIGA"/> SIN MIGA
302. PAN HALLULLA, PAN DOBLADITA	<input type="text" value="CONSUME 5 A 6 VECES A LA SEMANA"/>
* must provide value	
303. PAN DE MOLDE BLANCO O INTEGRAL	<input type="text" value="CONSUME 1 VEZ A LA SEMANA"/>
* must provide value	
304. PAN AMASADO, PAN DULCE	<input type="text" value="NO CONSUMIO EN EL ULTIMO MES"/>
* must provide value	
305. PAN LENGUA, PAN FRICA	<input type="text" value="CONSUME 1 A 3 VECES AL MES"/>
* must provide value	

# SER-24 INTA-U CHILE



## SER-24H

Encuestas Alimentos Recetas Reporte Administracion

SER-24H / Software Encuestas Recordatorio 24 Horas

Sistema de Administración e Interfaz de Software para encuestas implementadas con el Método de Recordatorio.  
Diseñado para la recogida y análisis de los recordatorios de 24 horas considerando los alimentos y preparación.

Creado por el equipo del Centro de Prevención de Obesidad y Enfermedades crónicas Asociadas a la Nutrición, de la Universidad de Chile.  
La información nutricional es basada en la tabla de composición nutricional de la USDA (National Nutrient Database).

Última Actualización: 22-12-2016  
Actualización Base USDA: Release 28

Dirección: Dra. Marcela Reyes J.  
Contacto: mreyes@inta.uchile.cl

Supervisión Encuestas Alimentos Recetas Reporte Administracion

Encuestas - Administración » Encuestas - Añadir

Encuestas - Añadir

Supervisión Encuestas Alimentos Recetas Reporte Administracion

Encuestas - Administración » Encuestas - Editar » Comida - Añadir

Comida - Añadir

Supervisión Encuestas Alimentos Recetas Reporte Administracion

Encuestas - Administración » Encuestas - Editar » Comida - Editar » Detalle de Alimentos - Añadir

Detalle de Alimentos - Añadir

Minuta: Pan con palta y té

Alimento: \* CEREALES/ MASAS Y PANES / PANES Y PRODUCTOS DE PANADERÍA / PANES / HALLULLA / BLANCO / NORMAL/TRADICIONAL /  
[Seleccionar Nuevo](#)

Procedencia: \* PRESENTES EN EL HOGAR(COMPRA SUPERMERCADO /FERIA) [Editar Nuevo](#)

Equivalencia de Medida: \* Medida: 24C3 - gr/ml: 98.00 [Editar Nuevo](#)

Cantidad: 1|

Cancelar Guardar y siguiente Guardar

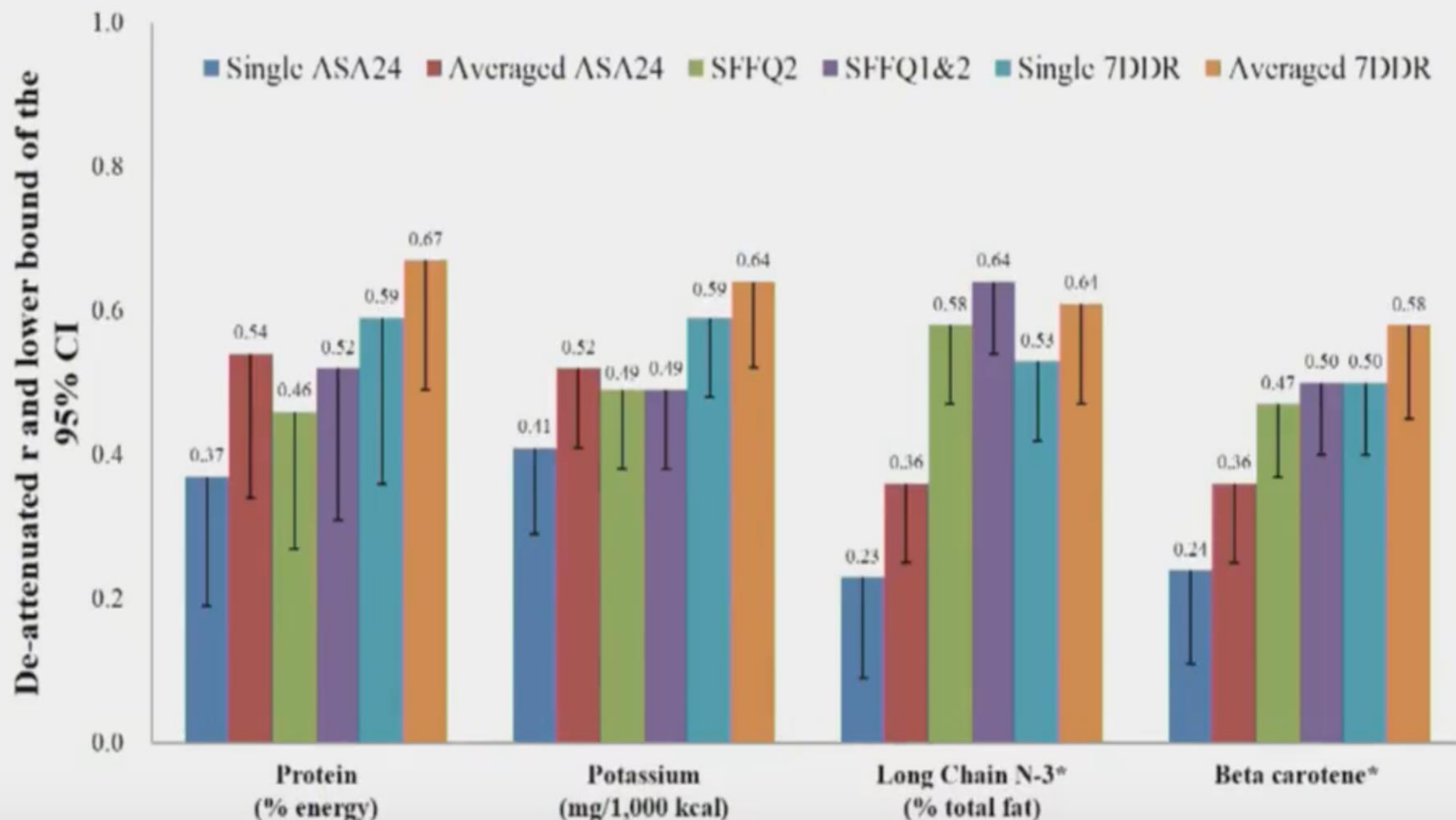








**Deattenuated Spearman correlation coefficients (and lower bound of the 95% CI)  
between diet assessed by FFQ's, 24-hour recalls, and 1-week diet records and biomarkers  
of diet (n = 627 U.S. female nurses aged 45-80 years)**



\*Subgroups of women who didn't take supplements for this nutrient (N= 363 for long chain N 3 fatty acids, and 335 for beta carotene)

# ***HOW TO USE IT?***

You don't need to do all that hard work, Grandad. These days you can get all of your vegetables this way



# HI

## International food composition table/database directory

# TS

=737)

# CHILI



### Nutrition Facts

Serving Size 1 cup (236ml)  
Servings Per Container 1

Amount Per Serving

**Calories** 80      Calories from Fat 0

% Daily Value\*

**Total Fat** 0g      0%

Saturated Fat 0g      0%

Trans Fat 0g

**Cholesterol** Less than 5mg      0%

**Sodium** 120mg      5%

**Total Carbohydrate** 11g      4%

Dietary Fiber 0g      0%

Sugars 11g

**Protein** 9g      17%

Vitamin A 10% • Vitamin C 4%

Calcium 30% • Iron 0% • Vitamin D 25%

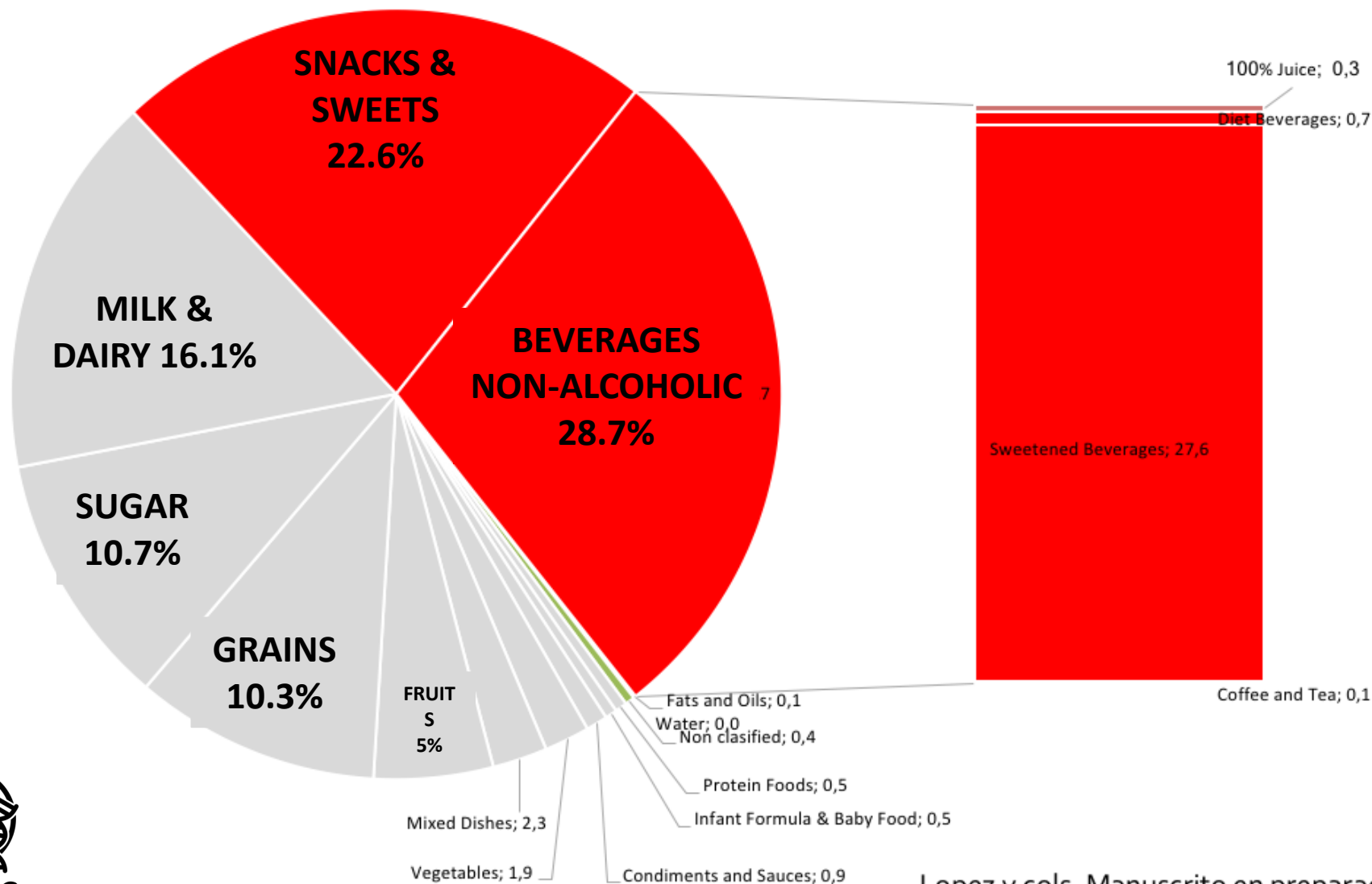
\*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Total Sugars >10%	Total Sugars >20%	Total Fat >30% n (%)	Saturated Fats >10% n (%)
<b>PRESCHOOLERS</b>				
All (n= 895)	87%		<b>373 (41.7)</b>	<b>334 (37.3)</b>
Females (n= 467)	45%		195 (41.8)	180 (38.5)
Males (n= 428)	42%		178 (41.6)	154 (36.0)
<b>ADOLESCENTS</b>				
All (n= 737)	68%		<b>417 (56.6)</b>	<b>269 (36.5)</b>
Females (n= 366)	34%		209 (57.1)	137 (37.4)
Males (n= 371)	34%		208 (56.1)	132 (35.6)

s. Manuscrito en preparación

# FOOD SOURCES OF SUGARS

## CHILEAN PRESCHOOLERS (n=895)



# FOOD PATTERNS

## CHILEAN ADOLESCENTS (GOCS) *n*=835

TEA PATTERN	TRADITIONAL PATTERN	WESTERN PATTERN	FAST FOOD PATTERN
Tea (+)	Rice (+)	Cold Cuts(+)	Junk Food (+)
Sugar (+)	Potatoes (+)	Processed Meats (+)	Soft Drinks (+)
Bread (+)	Vegetables(+)	Soft Drinks(+)	Flavored Milks (+)
Margarine (+)	Dressings (+)	Cheeses (+)	Cookies (+)
Flavored Milks (-)	Pastas(-)	Margarine (+)	Yoghurts(-)
		Mixed Dishes(-)	Cereals (-)
		Milk (-)	Pasta (-)
		Juices (-)	
		Fruit (-)	

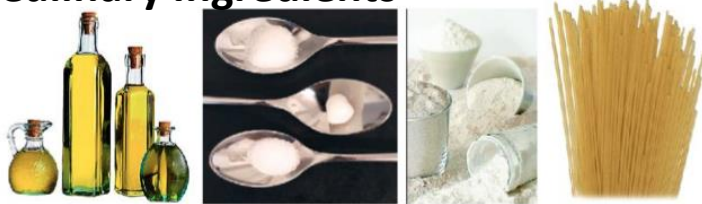


# FOOD CLASSIFICATION BASED ON EXTENT AND PURPOSE OF INDUSTRIAL FOOD PROCESSING

## Minimally Processed Foods



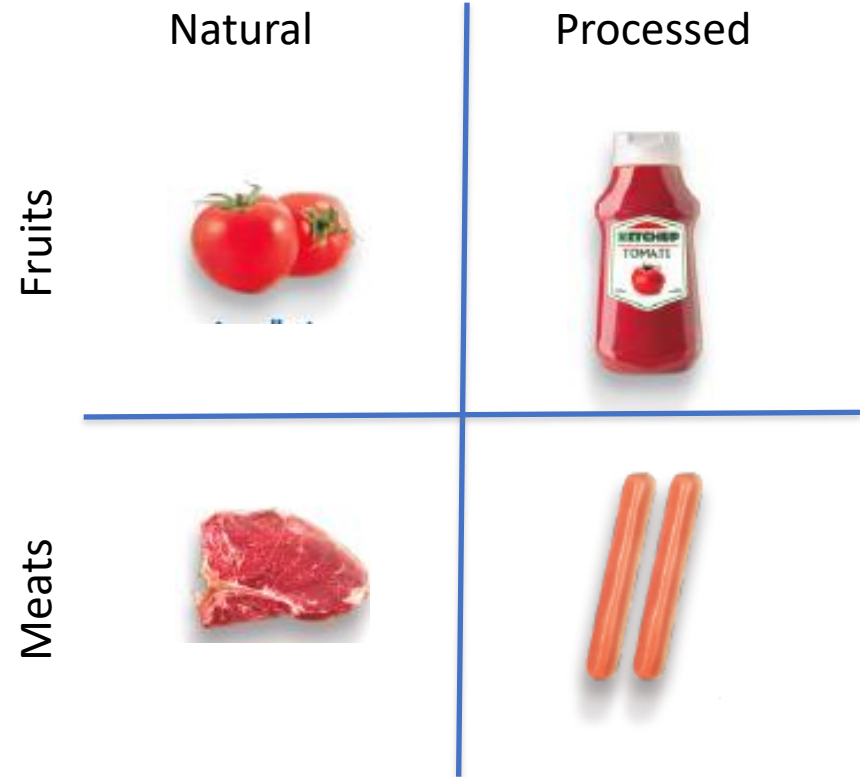
## Culinary Ingredients



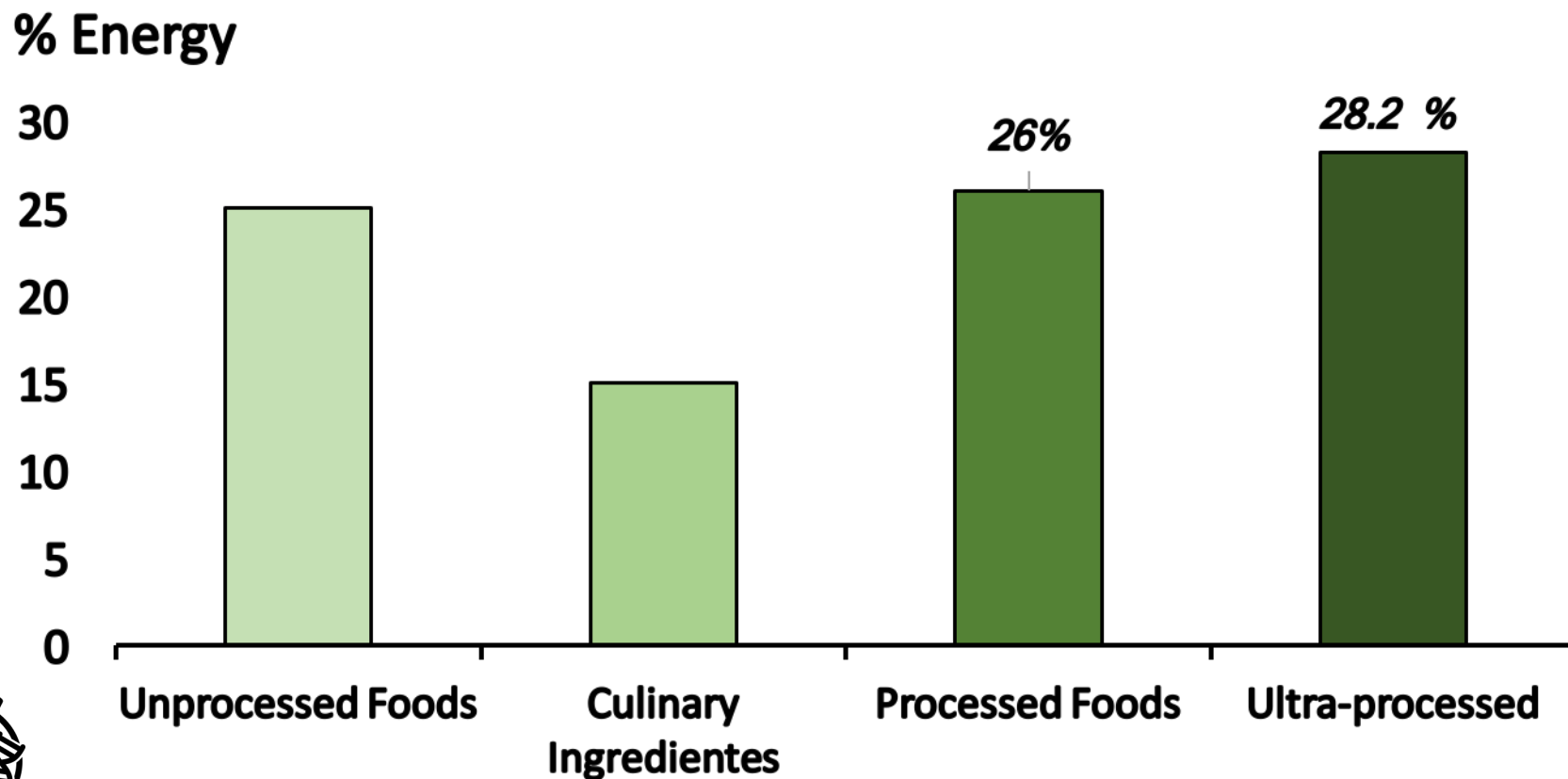
## Processed Foods



## Ultra-processed Foods



# ***PROCESSED FOODS ACCOUNT FOR MORE THAN 50% OF THE ENERGY INTAKE, CHILE 2014***



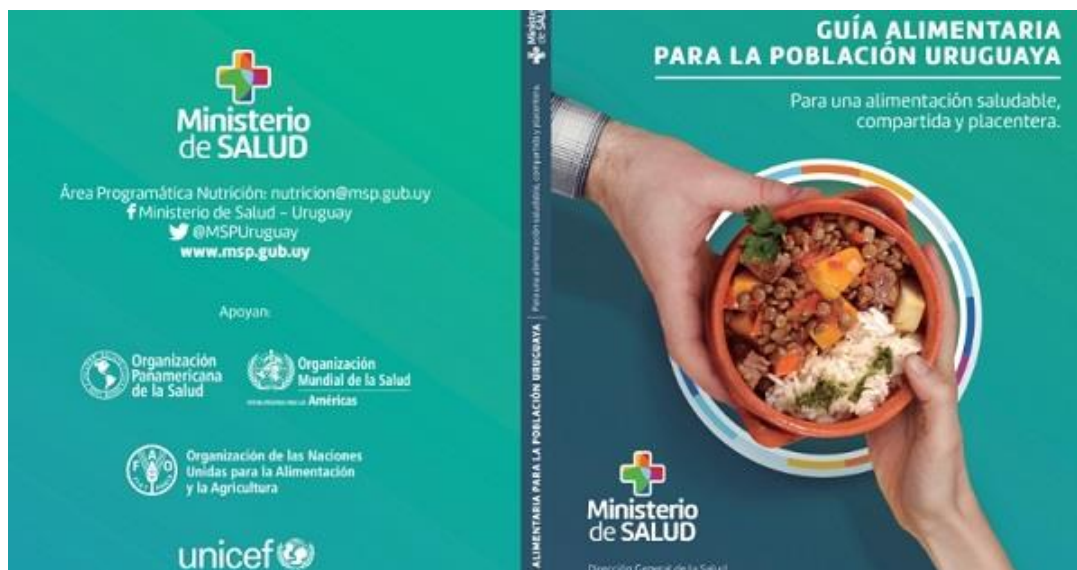
## Commentary

August 11, 2010

# Dietary Guidelines in the 21st Century—a Time for Food

Dariush Mozaffarian, MD, DrPH; David S. Ludwig, MD, PhD

JAMA. 2010;304(6):681-682. doi:10.1001/jama.2010.1116



## DIEZ PASOS PARA UNA ALIMENTACIÓN SALUDABLE

- 1 HACER DE LOS ALIMENTOS NATURALES O MÍNIMAMENTE PROCESADOS LA BASE DE LA ALIMENTACIÓN
- 2 UTILIZAR ACEITES, GRASAS, SAL Y AZÚCAR EN PEQUEÑAS CANTIDADES AL CONDIMENTAR Y COCINAR LOS ALIMENTOS Y CREAR PREPARACIONES CULINARIAS
- 3 LIMITAR EL CONSUMO DE ALIMENTOS PROCESADOS
- 5 COMER CON REGULARIDAD Y ATENCIÓN, EN AMBIENTES APROPIADOS Y, SIEMPRE QUE SEA POSIBLE, ACOMPAÑADO
- 6 HACER COMPRAS EN LUGARES QUE OFREZCAN VARIEDADES DE ALIMENTOS NATURALES O MÍNIMAMENTE PROCESADOS
- 7 DESARROLLAR, EJERCITAR Y COMPARTIR HABILIDADES CULINARIAS
- 8 PLANEAR EL USO DEL TIEMPO PARA DAR A LA ALIMENTACIÓN EL ESPACIO QUE MERECE
- 9 AL COMER FUERA DE CASA, PREFERIR LUGARES QUE SIRVAN COMIDAS HECHAS EN EL MOMENTO
- 10 SER CRÍTICO RESPECTO A LA INFORMACIÓN, ORIENTACIONES Y MENSAJES SOBRE LA ALIMENTACIÓN DIFUNDIDAS EN LA PUBLICIDAD

Guías Alimentarias Brasil 2015



# ***Conclusions***

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- We need to measure diet in longitudinal studies because diet is a major risk factor for chronic diseases
- We have to know when, how and what we will do with the data to decide the fieldwork logistics
- TICs can help us decrease measurement error
- Statistics ( such MR) can help us assessing confounding
- We need to take advantages of similarities ( i.e. food markets, street vendors, ethnic minorities, etc.) and differences ( different stages of the nutrition transition, nutrient tables, etc.) between countries in the region.



***THANKS!***