

Mediterranean Diet and Health

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Characteristic eating pattern of the Mediterranean Diet

Olive oil as the main fat

Abundance of vegetable foods

Fresh fruits and vegetables

Cereals and legumes

Nuts

Frequent consumption of fish

Wine

Low consumption of red meats, dairy products and simple sugars

Frequent use of spices (lemon, garlic, herbs)

Proximal composition of the MD

- **Proteins** : **18% of total calories (TC)**
- **Carbohydrates** : **55% TC**
- **Total fat** : **27% (25 a 40%)TC**
 - **Polyunsaturated** : **7% of fat calories**
 - **Monounsaturated:** **13% of fat calories**
 - **Saturated** : **7% of fat calories**
- **Cholesterol** : **270 mg/day**
- **Fiber** : **40 - 50 g/day**

Mediterranean Diet in Chile



Chile is a Mediterranean country

Why?

Chile is a Mediterranean country

1. Climate

2. Agriculture

3. Health

4. Diet

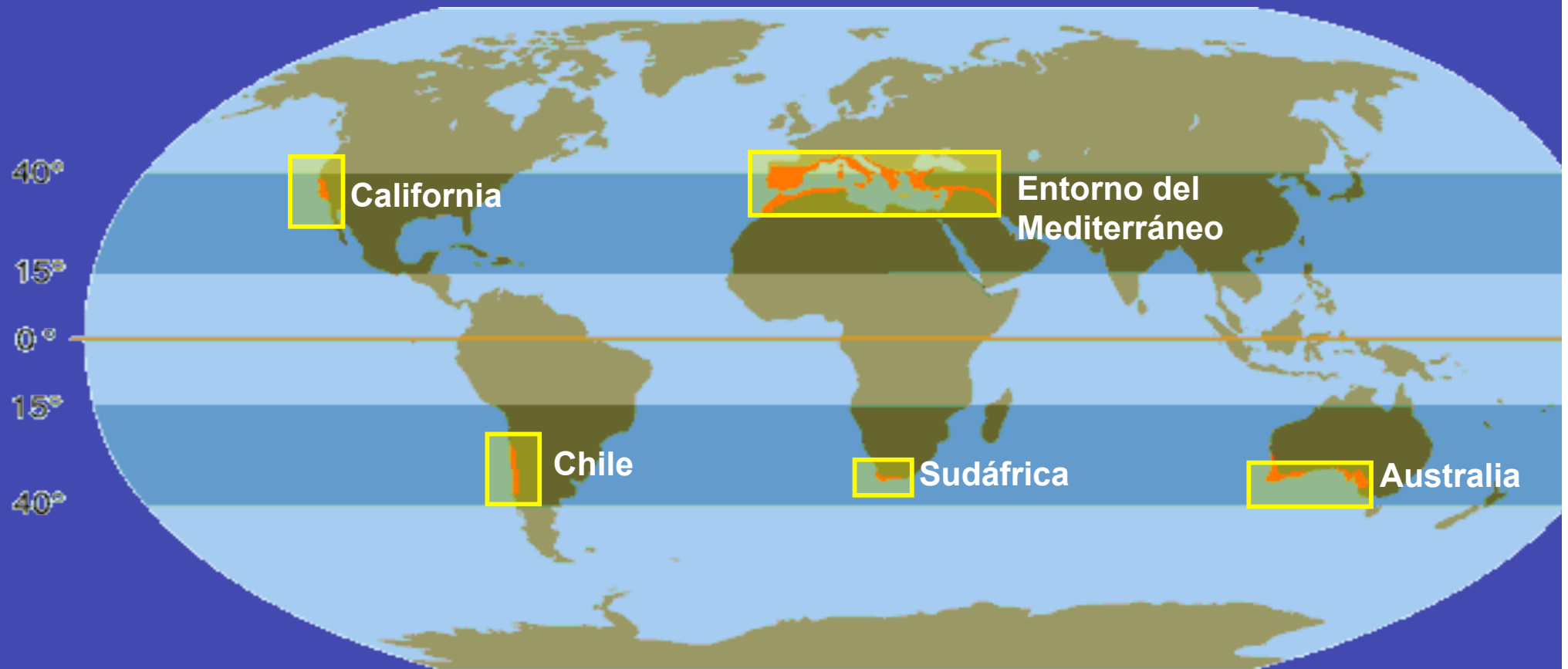


CLIMATE

1. Climate

- **Dry summer and relatively humid winter**
- **30° - 45° latitud**
- **Chile is one of the 5 regions in the world that have a mediterranean climate:**
 - **Mediterranean area in Europe and Africa**
 - **Central California in USA**
 - **Central Chile in South America**
 - **Area of Cape Town in South Africa**
 - **Southwest Australia**

1. Mediterranean Climate



Fuente: *Presentación Inaugural Seminario “Chile Potencia Agroalimentaria”, Alberto Montanari, Octubre 2004*

2. MEDITERRANEAN AGRICULTURE



2. MEDITERRANEAN AGRICULTURE

- **It is not specific of countries around the Mediterranean Sea**
- **It is the result of geographic, climatic, demographic and cultural conditions**

2. MEDITERRANEAN AGRICULTURE

Fruits and vegetables

Cereals

Legumes and nuts

Wine

Olive oil

2. Mediterranean Agriculture

Countries where olives are grown

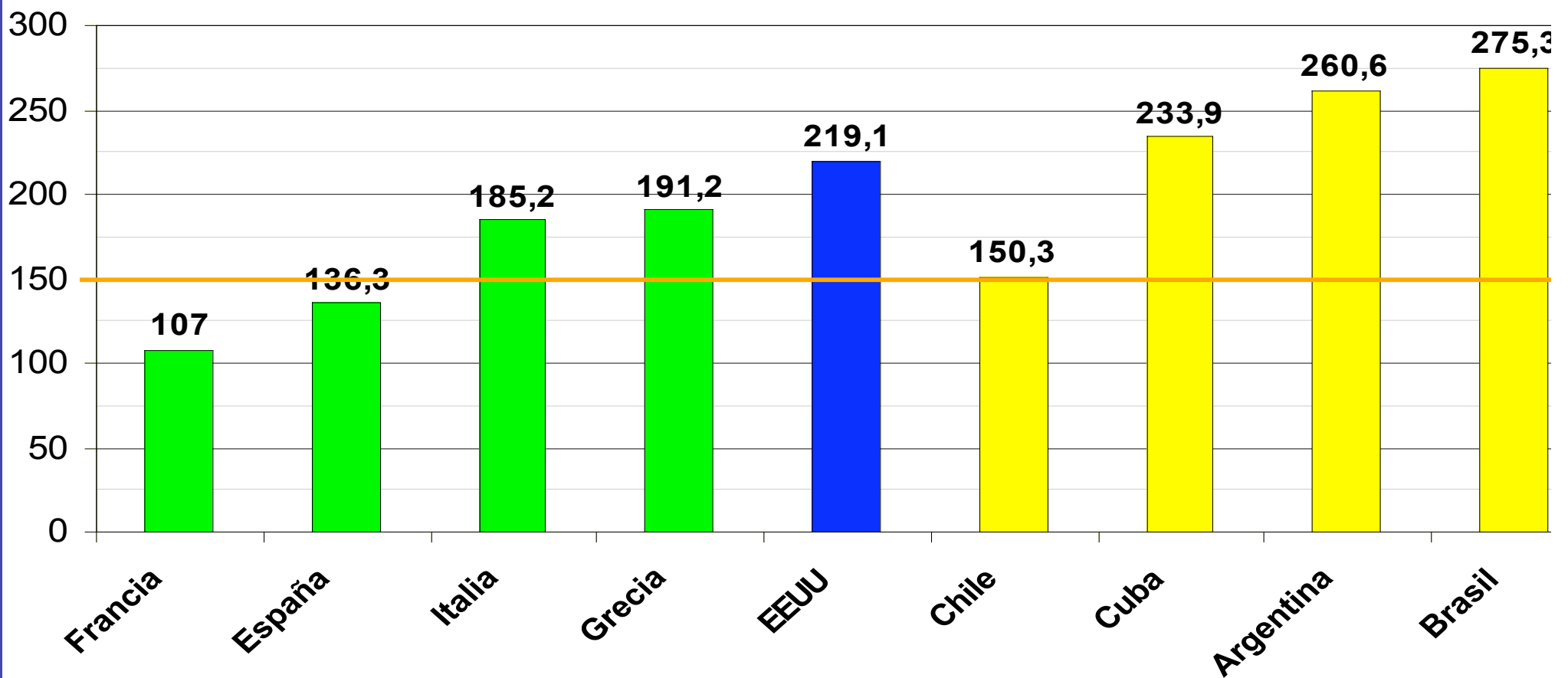


3. MEDITERRANEAN HEALTH



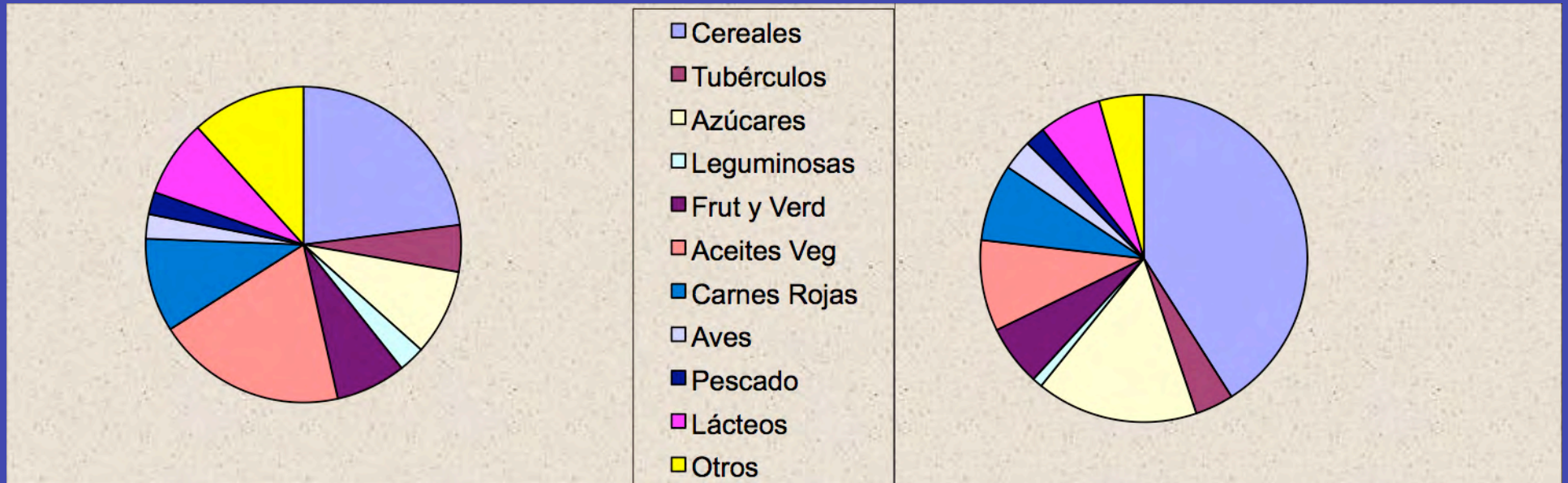
3. Mediterranean Health

Adjusted Mortality Rate Due to Coronary Heart Disease (deaths/100.000)



4. DIET

Food Contributions to Caloric Intake



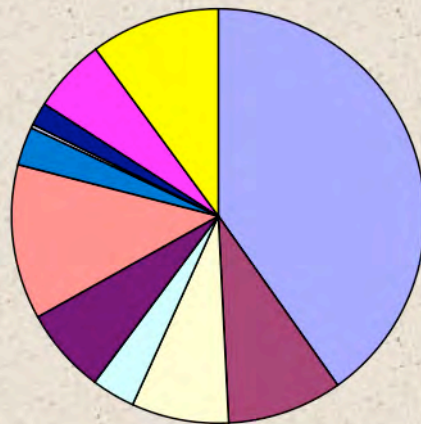
España

Chile

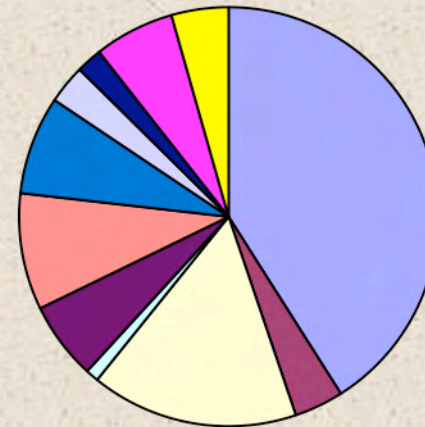
1993-1995

Source: FAO Balance Sheets

Foods Contributions to Caloric Intake



- Cereales
- Tubérculos
- Azúcares
- Leguminosas
- Frut y Verd
- Aceites Veg
- Carnes Rojas
- Aves
- Pescado
- Lácteos
- Otros



España
1961

Chile
1993-1995

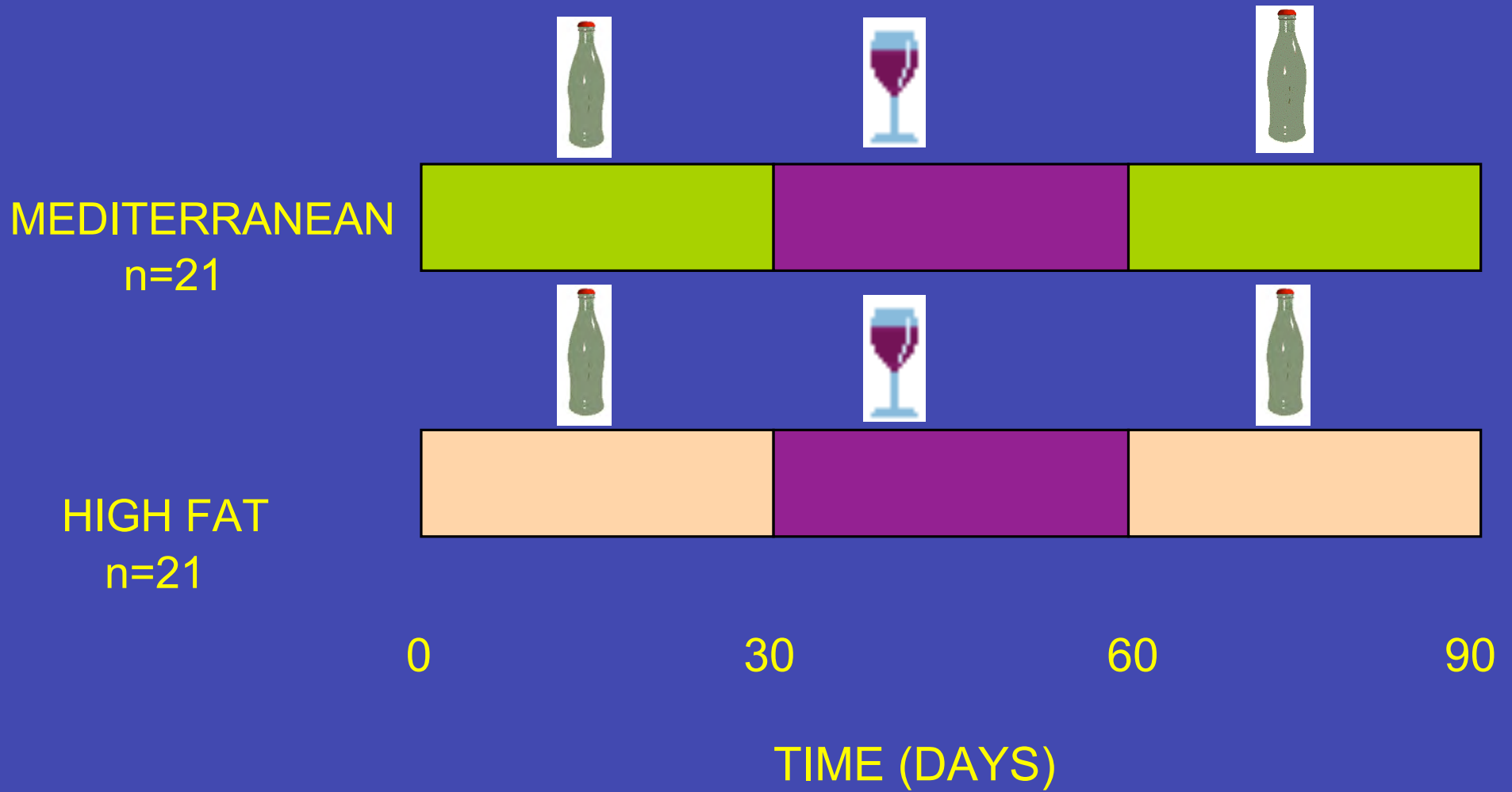
Source: FAO Balance Sheets

Intervention Studies using Mediterranean diet and Wine

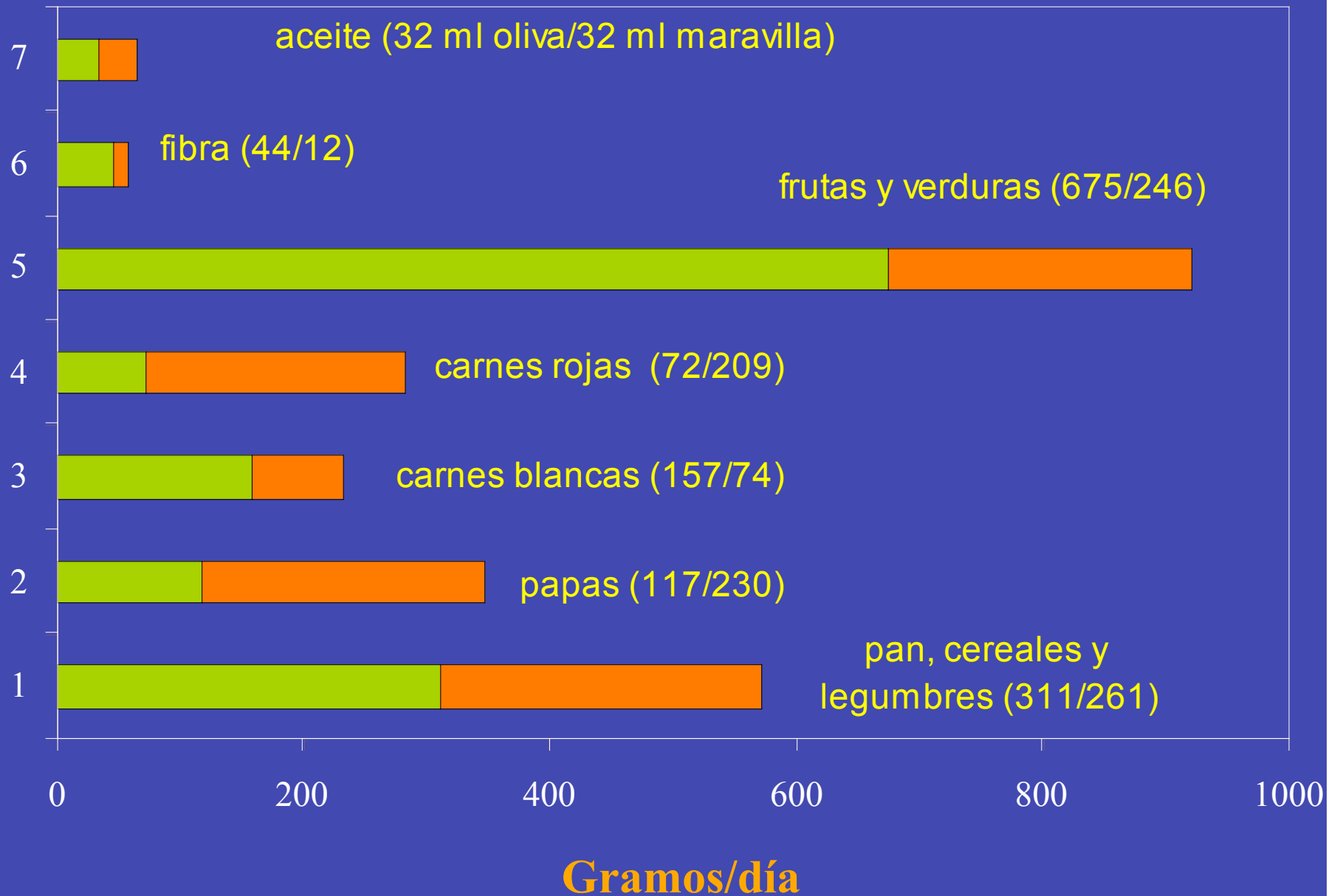
- 1998 Western Diet, Mediterranean diet in young students**
- 1999 Western MUFA or PUFA in young students**
- 2000 Mediterranean diet, 51-70 years old**
- 2008 Mediterranean diet by cafeteria modification**



STUDY DESIGN

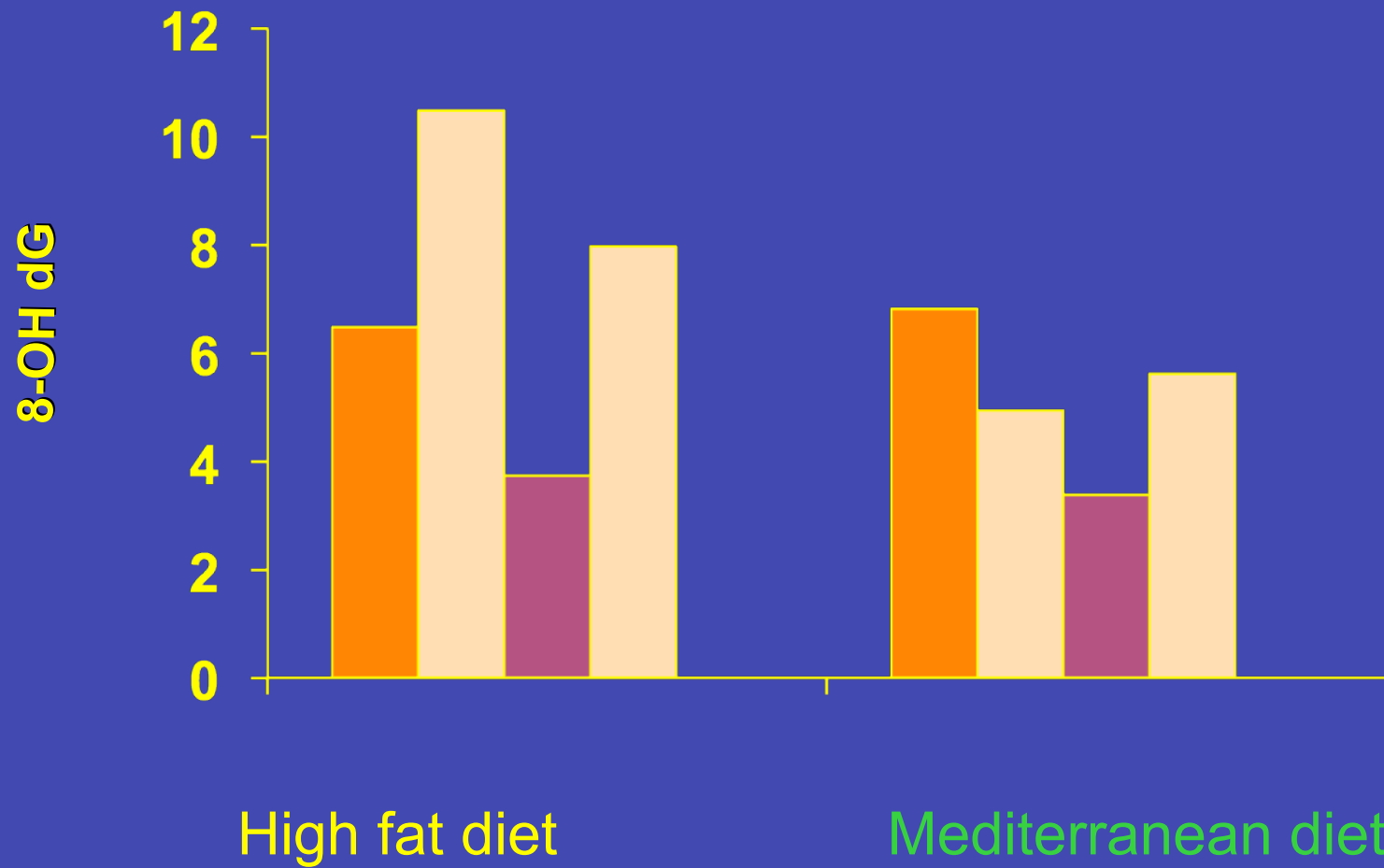


Componentes de la Dieta Experimental

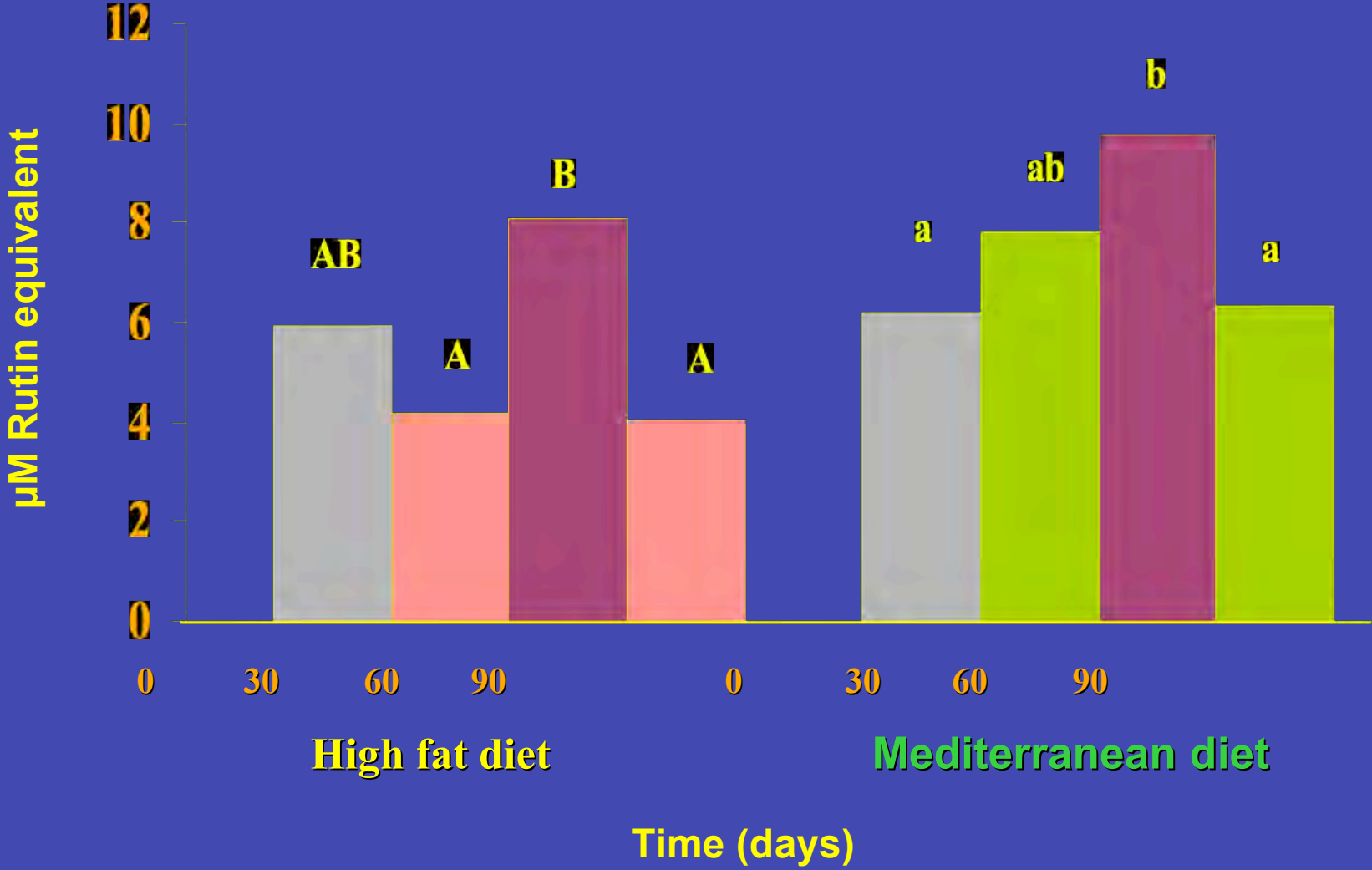


OXIDATIVE DNA DAMAGE

■ basal ■ dieta ■ dieta + vino ■ dieta

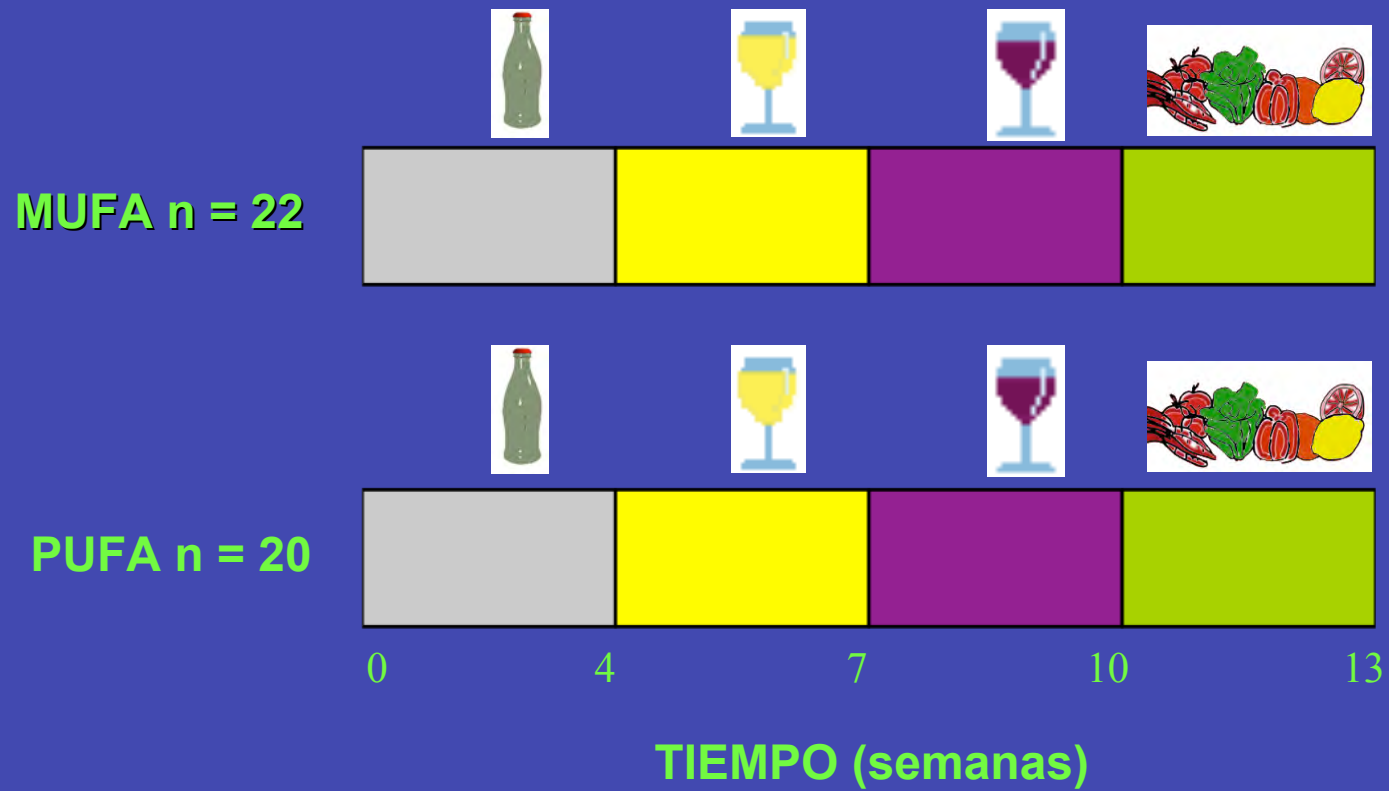


PLASMATIC POLYPHENOLS

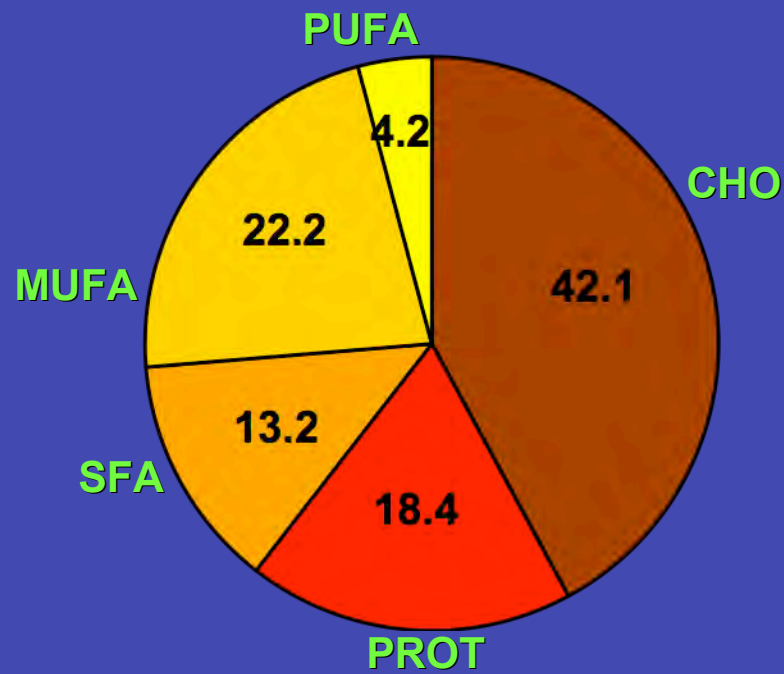




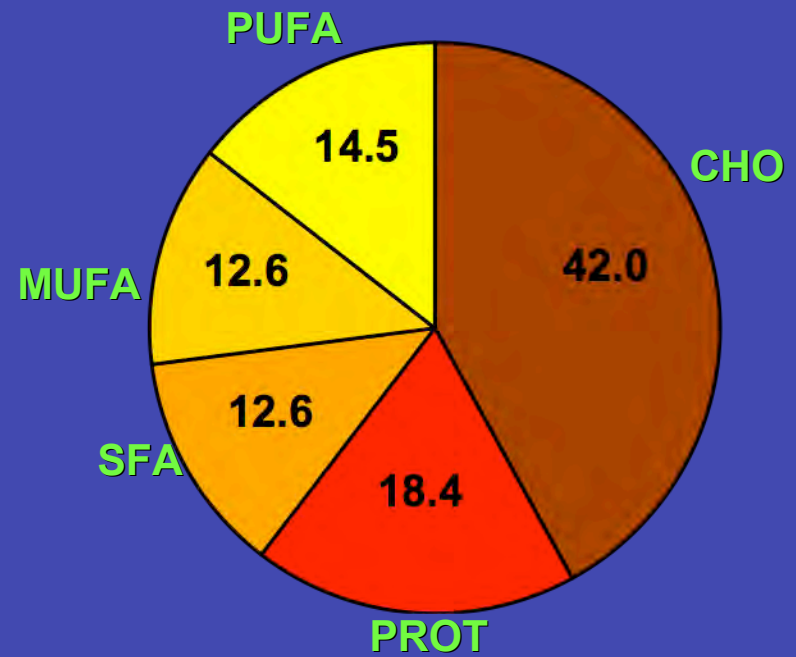
DISEÑO DEL ESTUDIO



CALORIC DISTRIBUTION

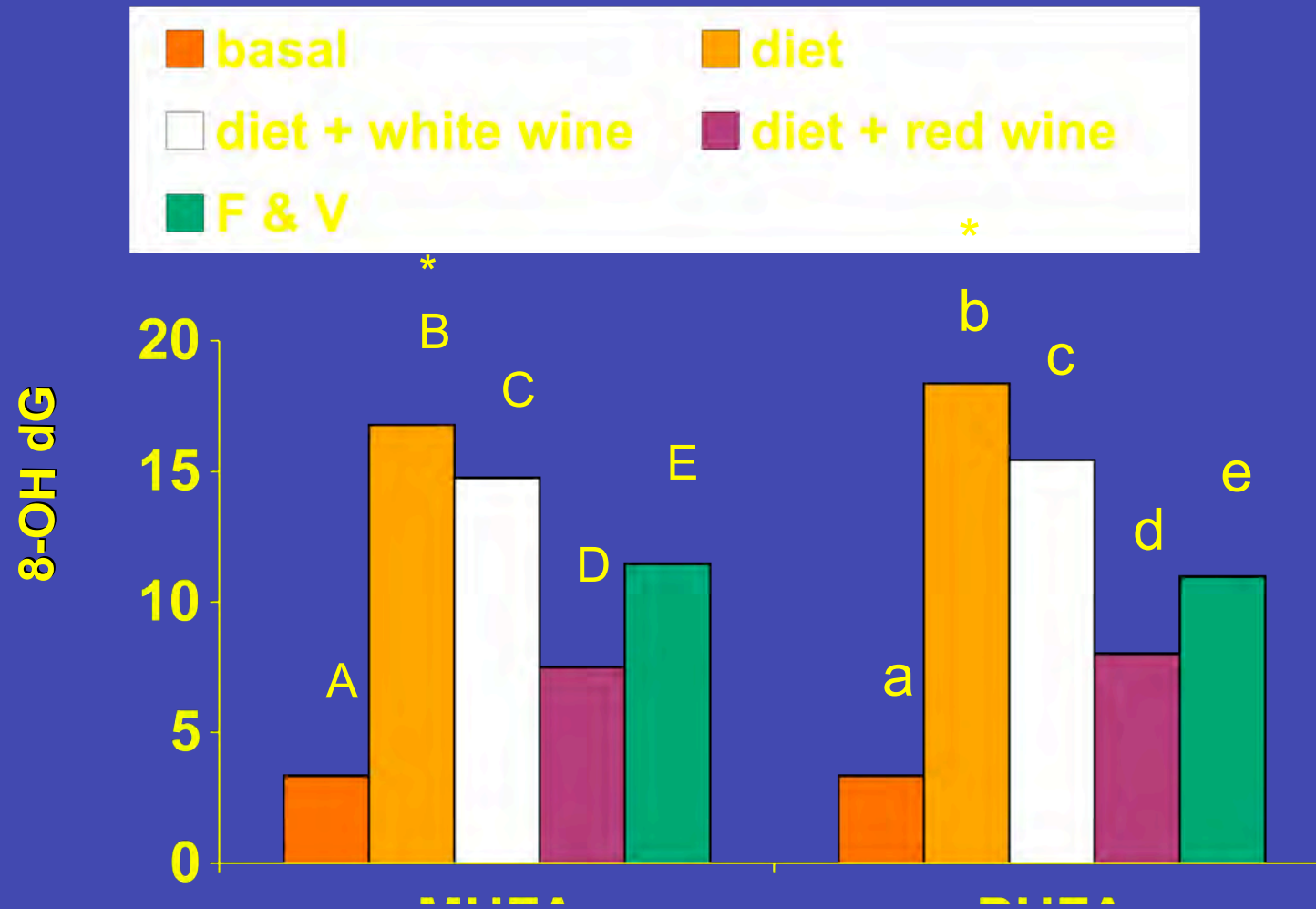


MUFA DIET



PUFA DIET

OXYDATIVE DNA DAMAGE



OBJETIVOS

Programa de Alimentación Laboral

Disminuir la incidencia de Síndrome Metabólico

Una familia, 1989

Fernando Botero



2. SÍNDROME METABÓLICO

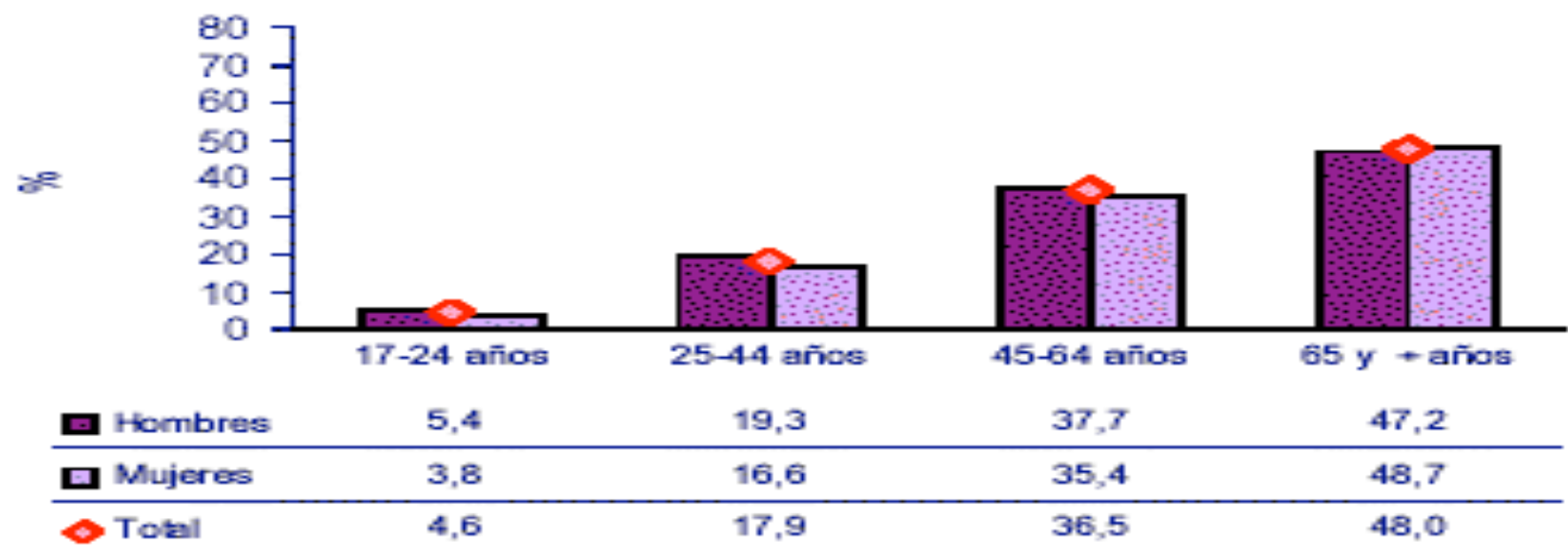
ENCUESTA NACIONAL DE SALUD (ENS 2003)

(Directora, Dra. Catterina Ferreccio, DSP, FM, UC)



Síndrome Metabólico

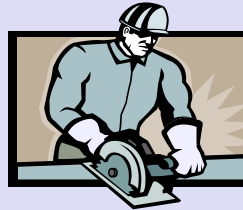
Prevalencia de síndrome metabólico según edad y sexo.



PAL (Food at Work Program)

Canteen intervention strategy:

• Workers



- Mediterranean Diet
(on a freedom to choose basis)



- Metabolic Syndrome





DESIGN OF THE INTERVENTION:

- **All workers** that use the industry canteen (lunch) are **invited** to participate
- The **physical-architecture distribution** of food stands at the canteen is modified. Also the food offer is modified.
- **Educational talks** (4 per year) plus printed material and a **book specifically designed** for the workers
- Supported by a multidisciplinary team

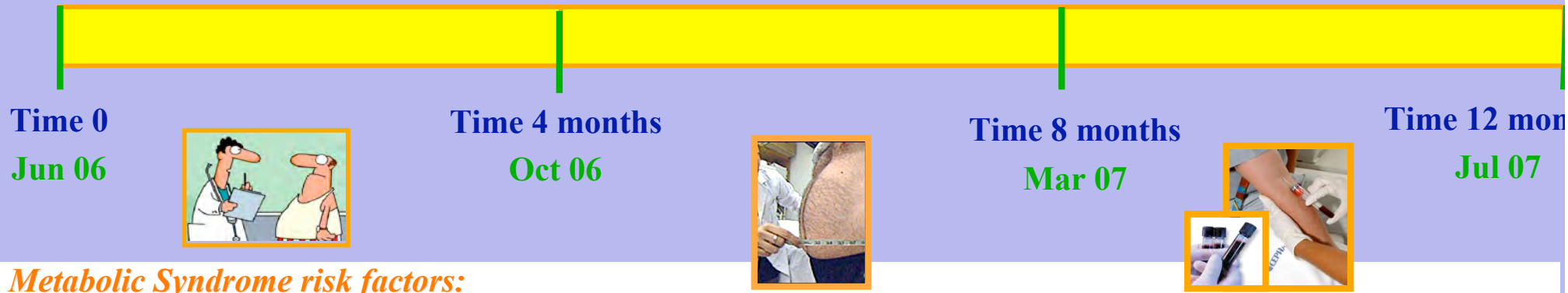
INTERVENTION STUDY in Maestranza Diesel

DIETARY INTERVENTION:



Food Mediterraneanization in MD canteen (free choice)

MEASUREMENTS IN VOLUNTEERS: *clinical and nutritional interview, blood samples*



Metabolic Syndrome risk factors:

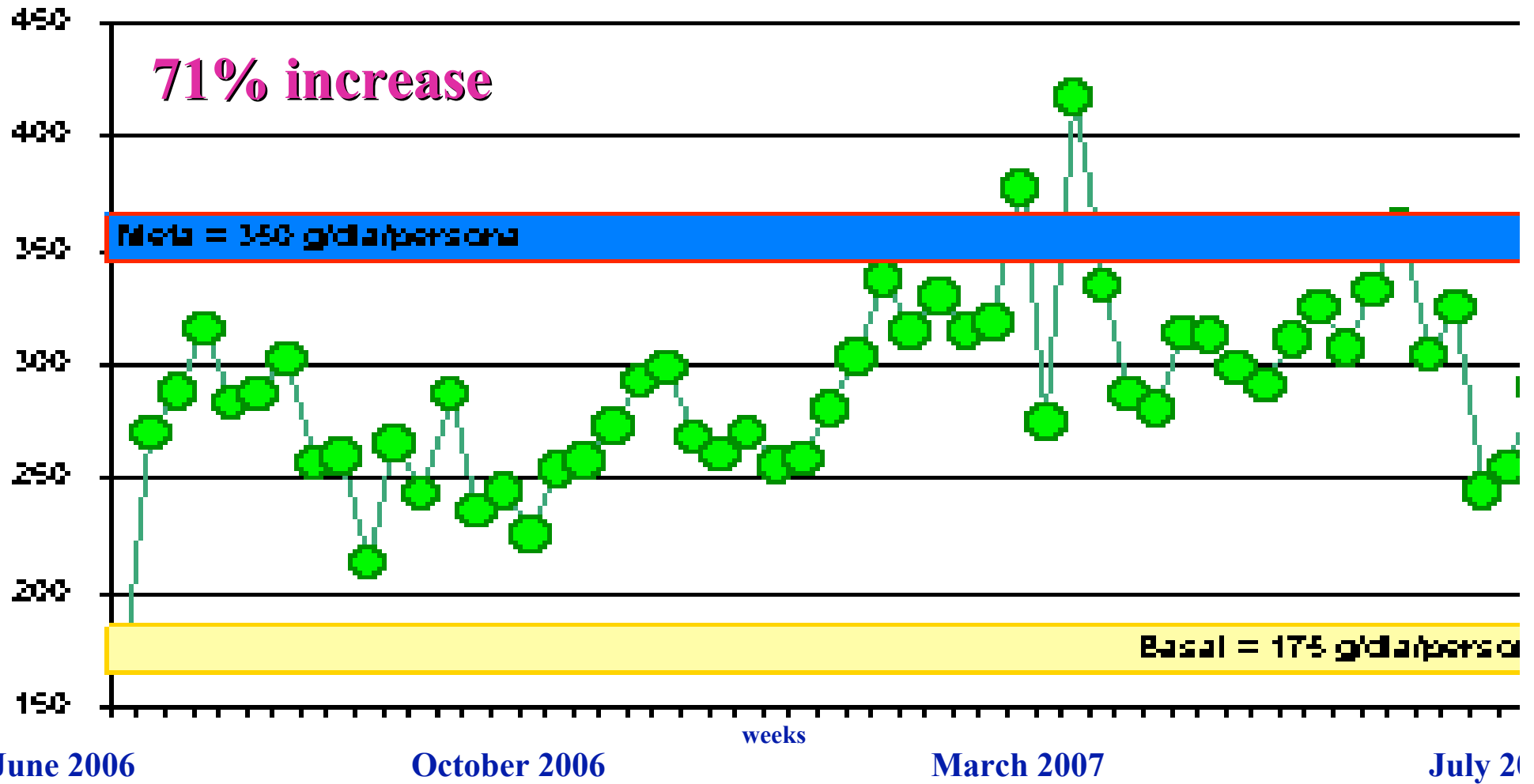
- Abdominal Obesity
- HDL-Cholesterol
- Blood Pressure
- Triglycerides
- Fasting Glucose

Other measurements:

- Nutrients in blood
- Oxidation parameters
- Inflammation, hemostasis, and others

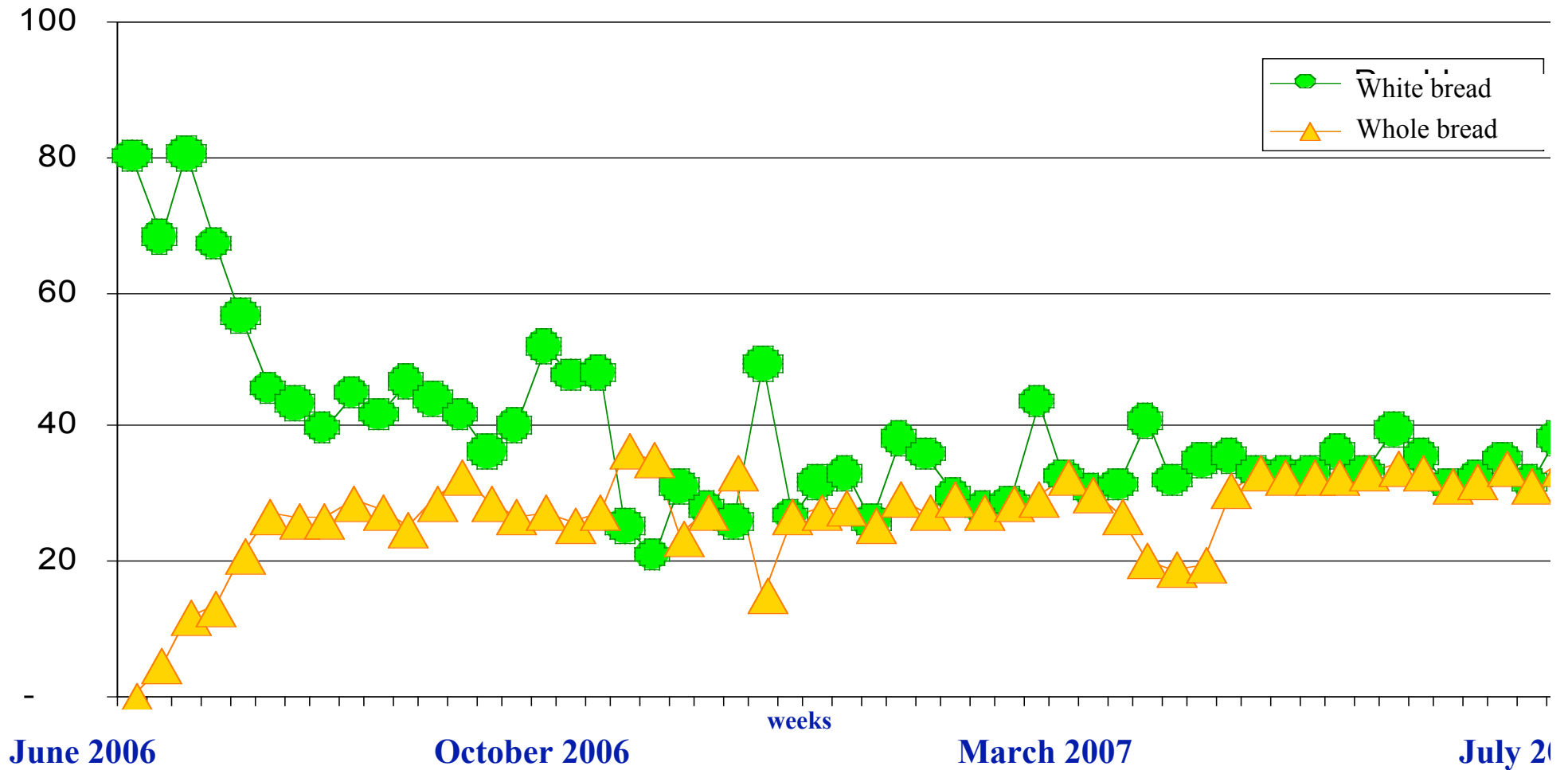
VEGETABLES, excluding potatoes

(grams daily, per person, weekly averages,
consumption at the industry canteen)



BREAD

(grams daily, per person, weekly averages,
consumption at the industry canteen)












Evolution of food composition at lunch time, average daily consumption per person at the cafeteria, along the twelve months diet mediterraneanization intervention period

Food item at lunch (grams/person)	Basal	Month 4	Month 8	Month 12	p value*
Vegetables (without potatoes)	175 ± 27	280 ± 19	330 ± 63	264 ± 19	0.001
Potatoes	87 ± 36	83 ± 50	56 ± 32	83 ± 26	0.623
Fruits	47 ± 21	93 ± 30	149 ± 5	106 ± 13	0.000
White meat	53 ± 27	43 ± 28	56 ± 25	69 ± 16	0.535
Red meat	104 ± 19	38 ± 13	32 ± 4	38 ± 13	0.000
Fish and shellfish	3 ± 1	26 ± 9	17 ± 8	21 ± 2	0.001
Legumes	13 ± 4	16 ± 6	16 ± 2	14 ± 4	0.622
Dairy products	20 ± 8	7 ± 7	9 ± 6	11 ± 5	0.075
White bread	80 ± 9	31 ± 12	34 ± 5	34 ± 3	0.000
Whole grain bread	0	31 ± 6	24 ± 5	33 ± 2	0.000
Cereals	45 ± 8	57 ± 11	49 ± 3	62 ± 15	0.154
Vegetable fat	15 ± 9	0	13 ± 10	0 ± 1	0.011
Olive oil	0	7 ± 0	7 ± 1	6 ± 0	0.000
Canola oil	0	21 ± 0	9 ± 11	21 ± 3	0.000
Eggs	12 ± 6	6 ± 4	6 ± 2	4 ± 3	0.058
Sugar	16 ± 4	8 ± 4	14 ± 1	18 ± 3	0.005
MUFA/SFA	1.1 ± 0.0	3.7 ± 0.1	3.1 ± 1.1	3.2 ± 0.4	0.000
Omega-6/omega-3	39.3 ± 6.3	2.6 ± 0.2	15.4 ± 11.9	2.7 ± 0.1	0.000

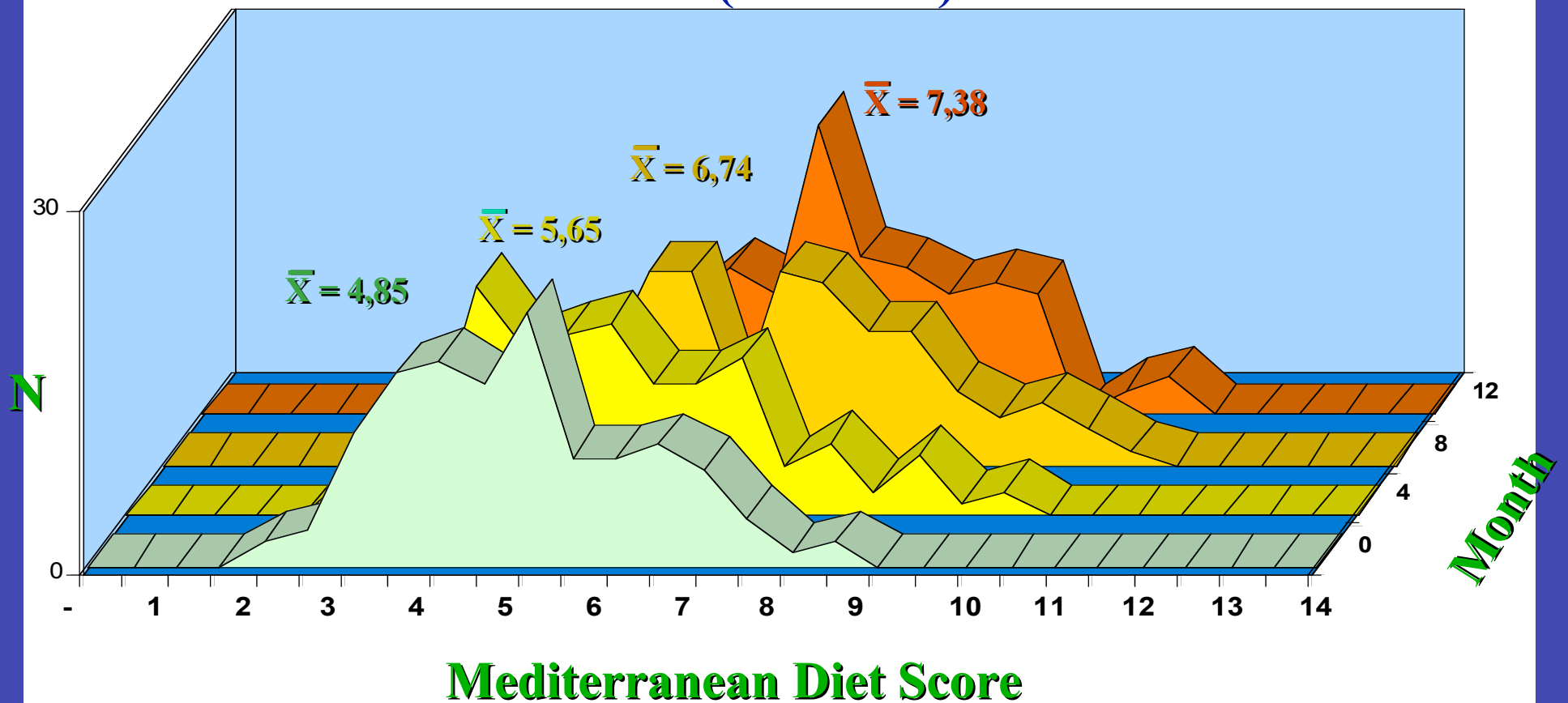
Data include all the workers that had lunch at the canteen, an average of 140, 145, 132, 155 workers per day at the basal month characterization period and at months 4, 8 and 12, respectively. * One way ANOVA of daily consumption values for each food item.

MEDITERRANEAN DIET SCORE, in elaboration (PAM-Chile)



-  **Vegetables** (without potatoes)
-  **Leguminous** (plus nuts and dried fruits)
-  **Fruits** (raw or cooked)
-  **Whole cereales** (in pasta, rice, bread, others)
-  **Lean red meat** - (beef, chicken, pork, 7 - 8% fat)
-  **Fish and seafood**
-  **Red meat** (all fat-rich meats plus ham, viscera, sausages, from pork, bovine, and ovine sources)
-  **Alcohol** (moderate and regular, versus abstinence, excess, or binge)
-  **Dairy products, low-fat, fermented**
-  **Dairy high fat non-fermented** (cream, whole milk, butter)
-  **Vegetable oil** (sunflower, soy, canola, vegetable margarines)
-  **Olive oil**
-  **Avocado**
-  **Sugar** and sugar in food

MEDITERRANEAN DIET SCORE, in elaboration (PAM-Chile)

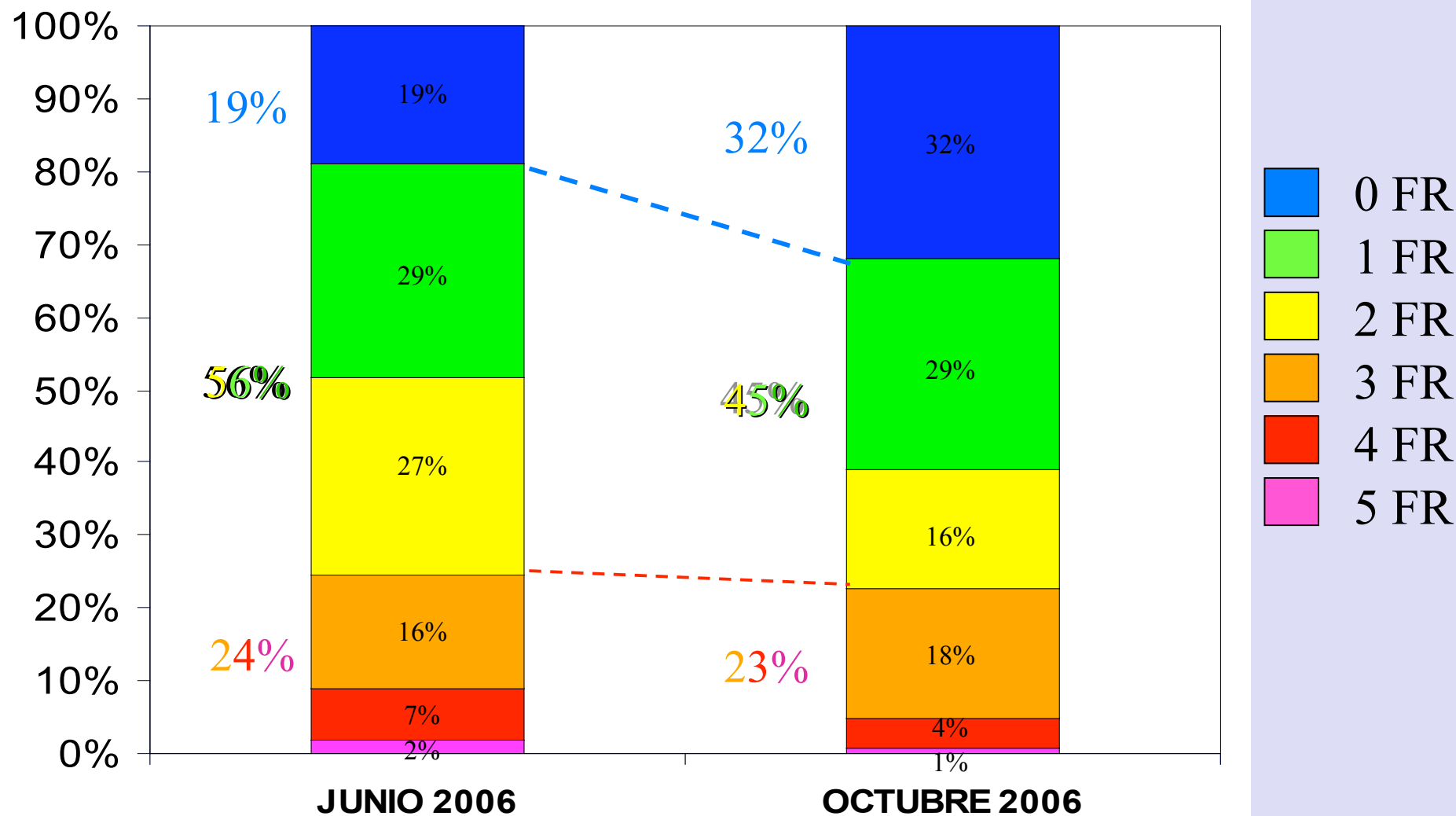


WHAT HAPPENED WITH THE PREVALENCE OF METABOLIC SYNDROME?

ESTADO DE LA SALUD

Síndrome Metabólico

Distribución en N° de factores de riesgo SM alterados



ESTADO DE LA SALUD

Síndrome Metabólico

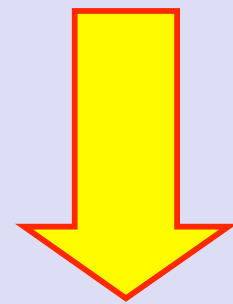
Factores de Riesgo de SM alterados

Junio 2006

1,68

Octubre 2006

1,35



$p < 0,000$

20% de disminución

Average number of Metabolic Syndrome Risk Factors per person

(n = 90 , a cohort of men that completed all controls, without medical treatment for these factors)

June 2006

1.61



July 2007

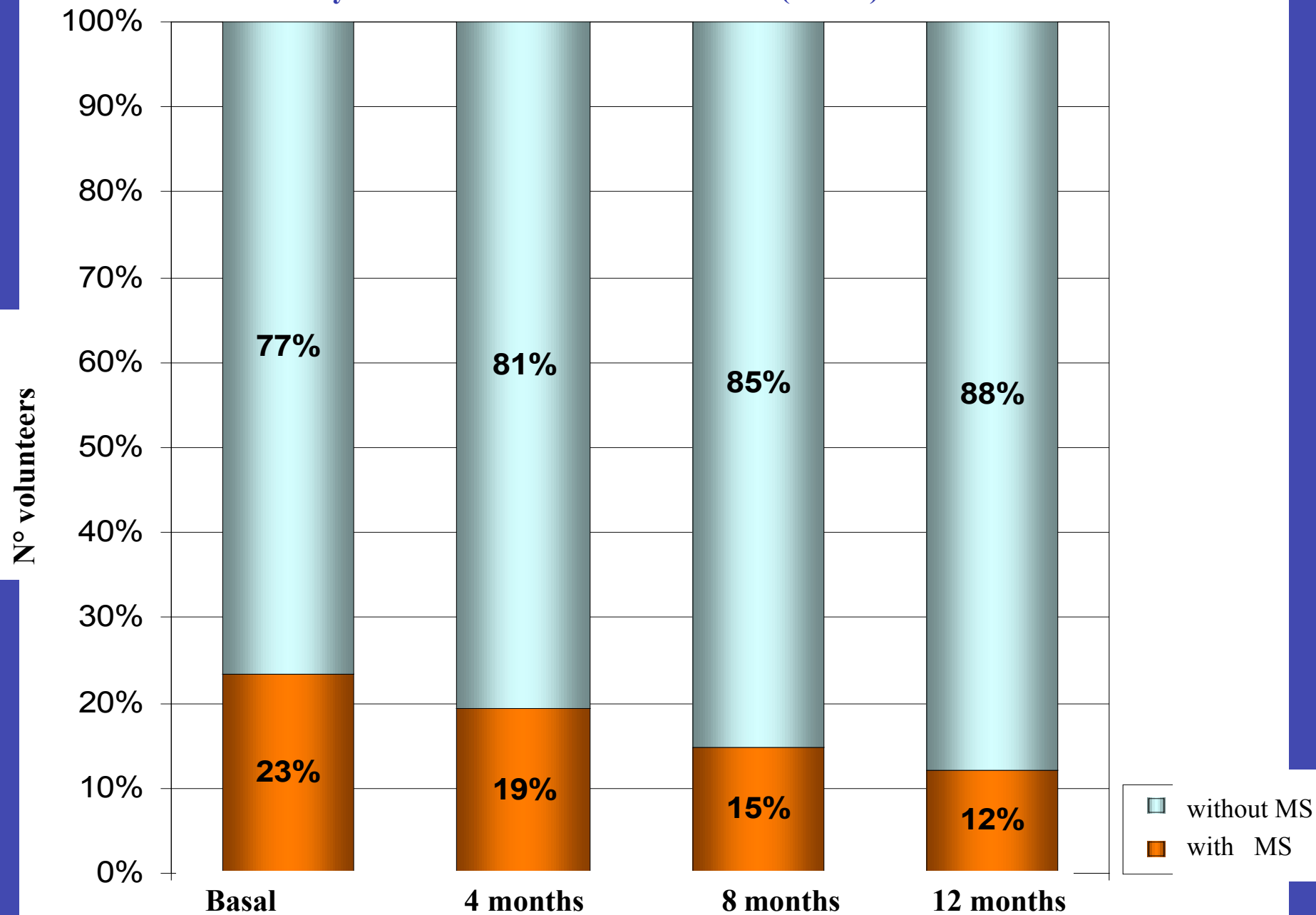
1.09



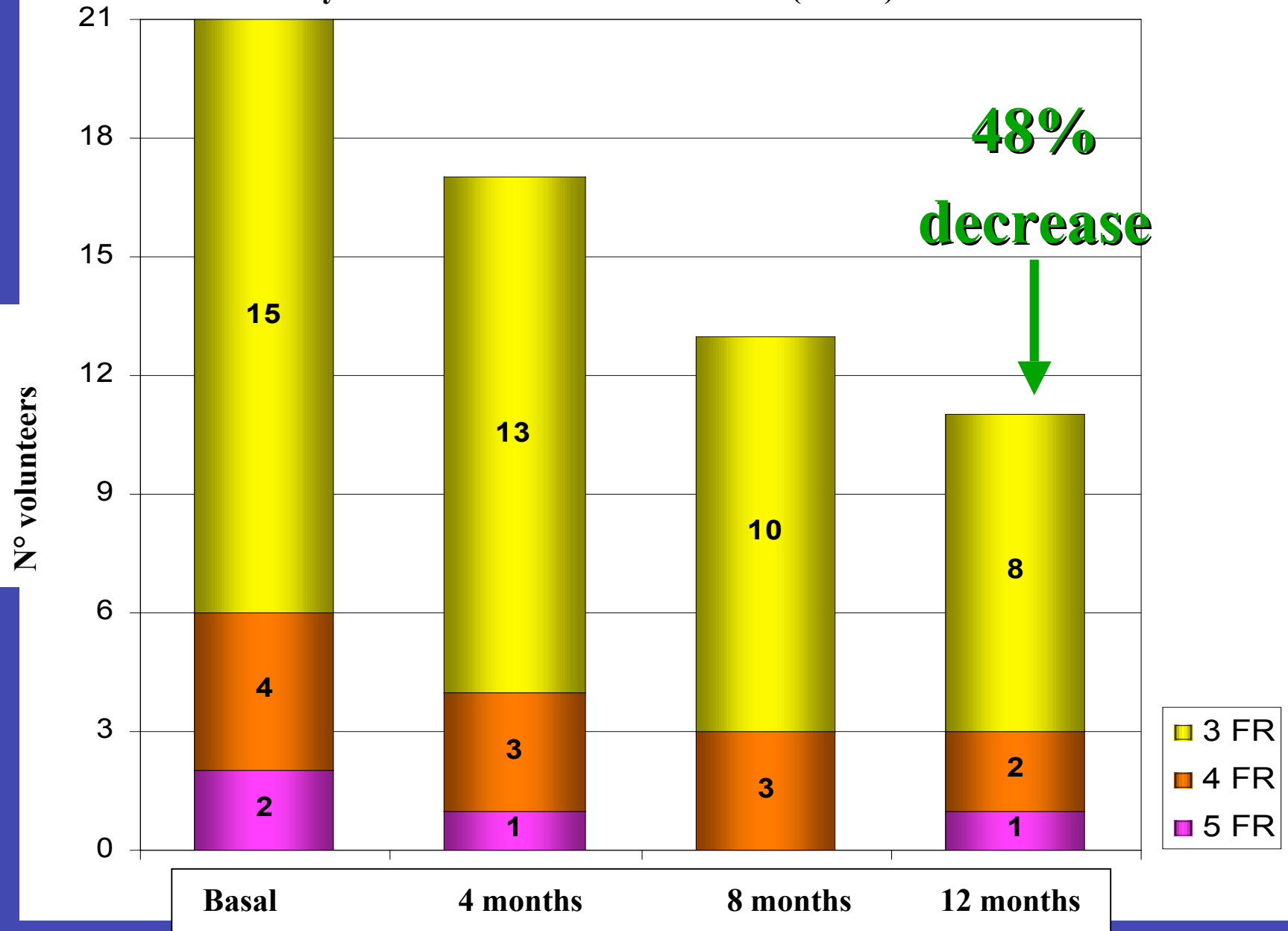
p < 0,000

32% decrease

Metabolic Syndrome and Mediterranean Diet (n = 90)



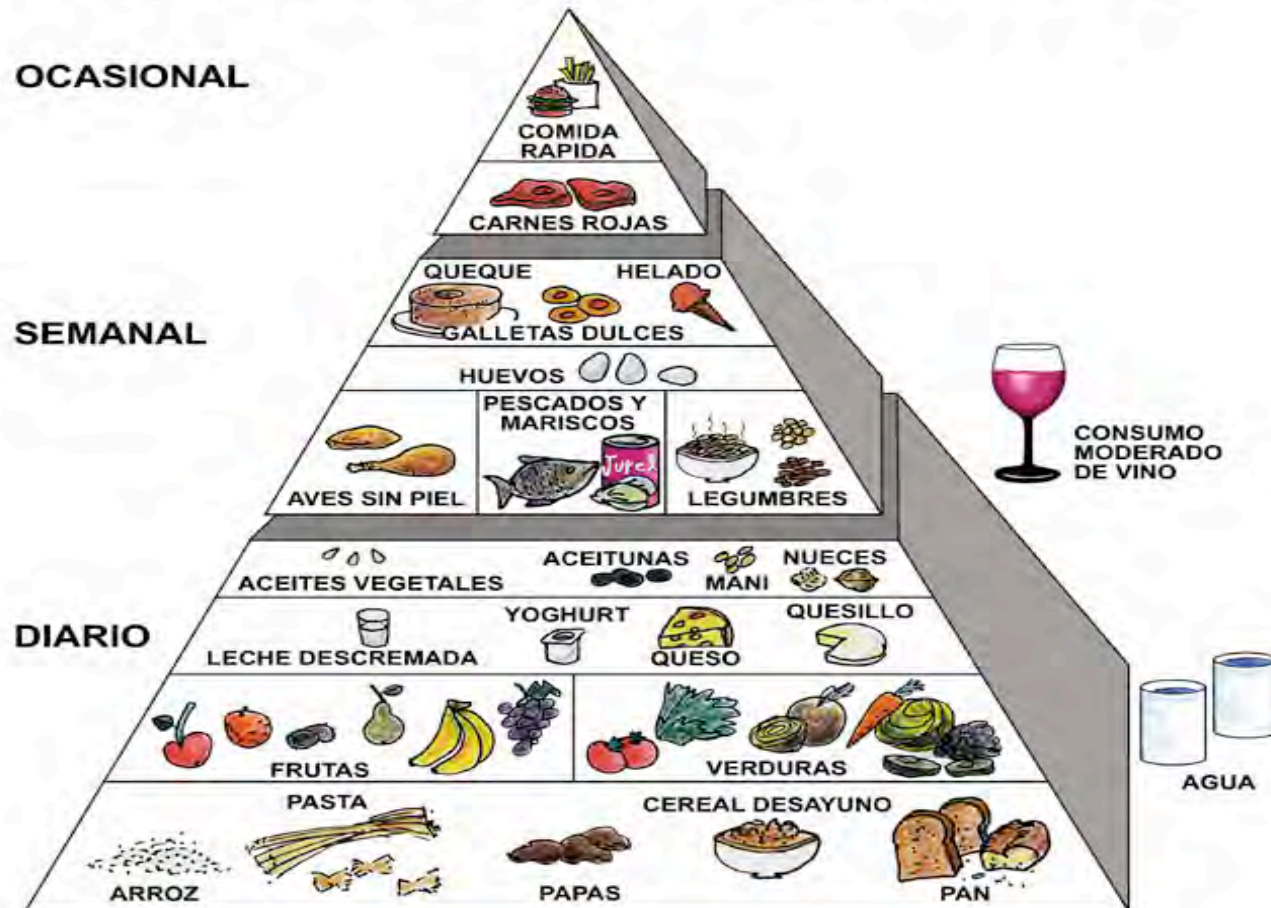
Metabolic Syndrome and Mediterranean Diet (n = 90)



CONCLUSIONS

- 1- Diet Mediterraneanization in adults is feasible. Nutrition and Gastronomy must act synergistically to promote the diet.**
- 2- Clinical, Nutritional and Biochemical parameters allow monitoring the effect of this Functional Food Diet**
- 3- Metabolic Syndrome is effectively controlled with Mediterranean Diet. A suitable Score has been developed**
- 4- Further efforts should center on functional foods, rich and enriched in:**
 - polyphenol antioxidants (gut & systemic)**
 - sirtuin agonists**
 - w3, w9 fatty acids**
 - dietary fiber**

PIRAMIDE DE LA DIETA MEDITERRANEA EN CHILE



Simposio Internacional Dietas Mediterráneas
26 y 27 de octubre 2001, Universidad Católica de Chile

PARTICIPANTS

**PONTIFICIA UNIVERSIDAD CATOLICA DE
CHILE**

Faculty of Biological Sciences

Faculty of Medicine

Faculty of Engineering

THANK YOU

