

International Chair
for Advanced Studies
on Hydration



Cátedra Internacional
de Estudios Avanzados
en Hidratación

Impact of physical activity and sedentarism on hydration status in older adults

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Departamento de Salud y Rendimiento Humano

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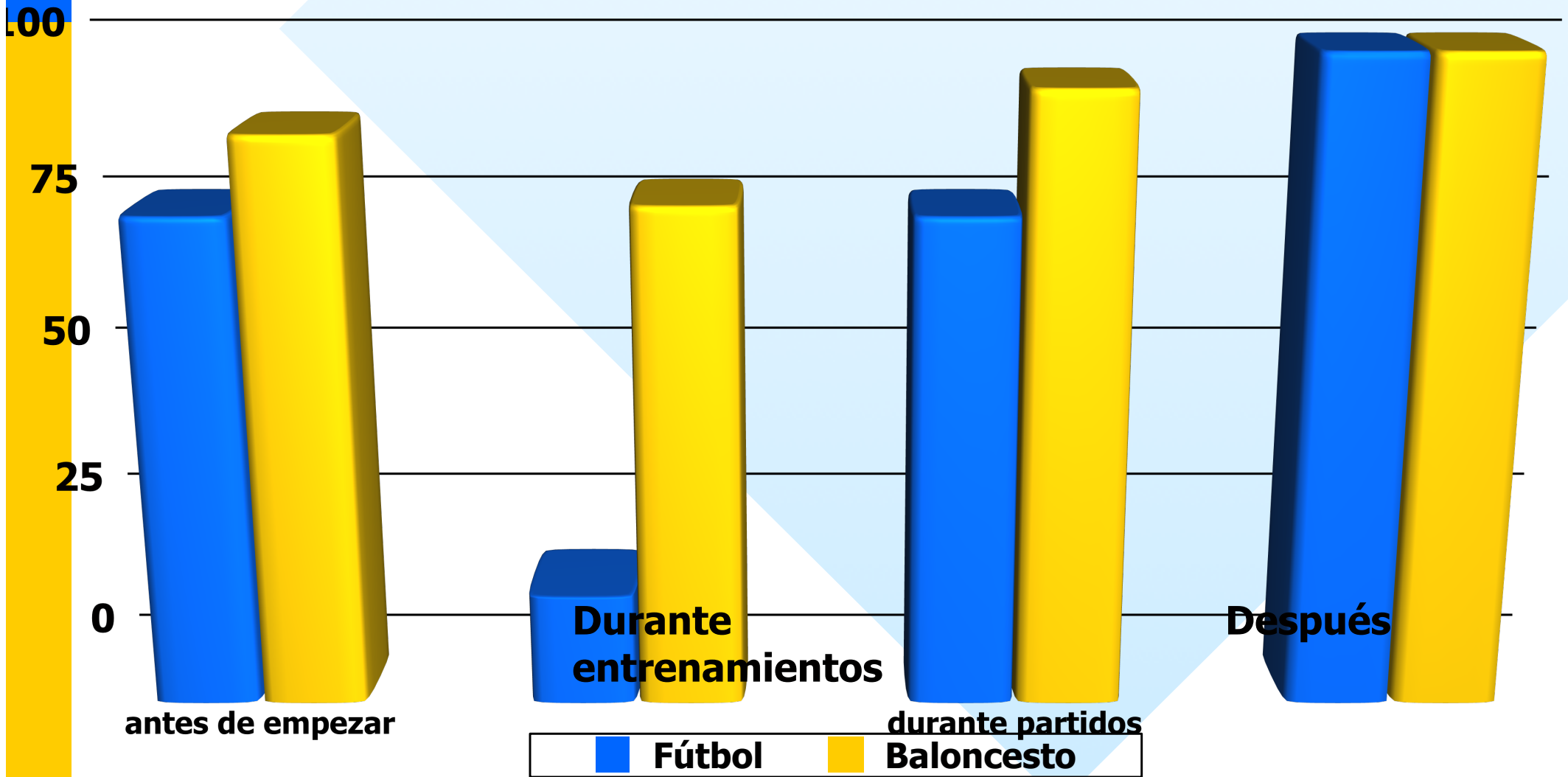
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HÁBITOS DE HIDRATACIÓN

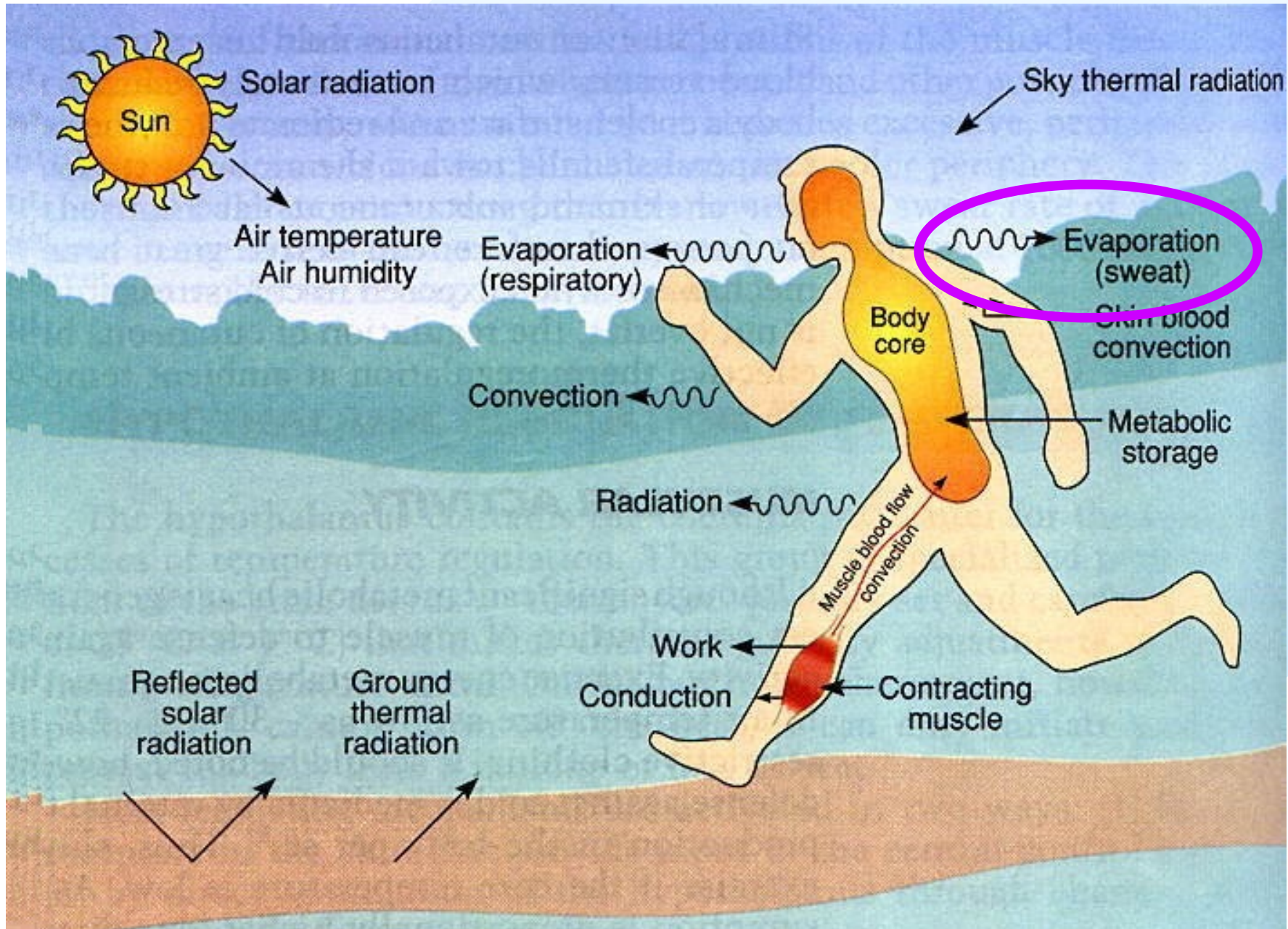
(González-Gross y col, 1998; 2003)



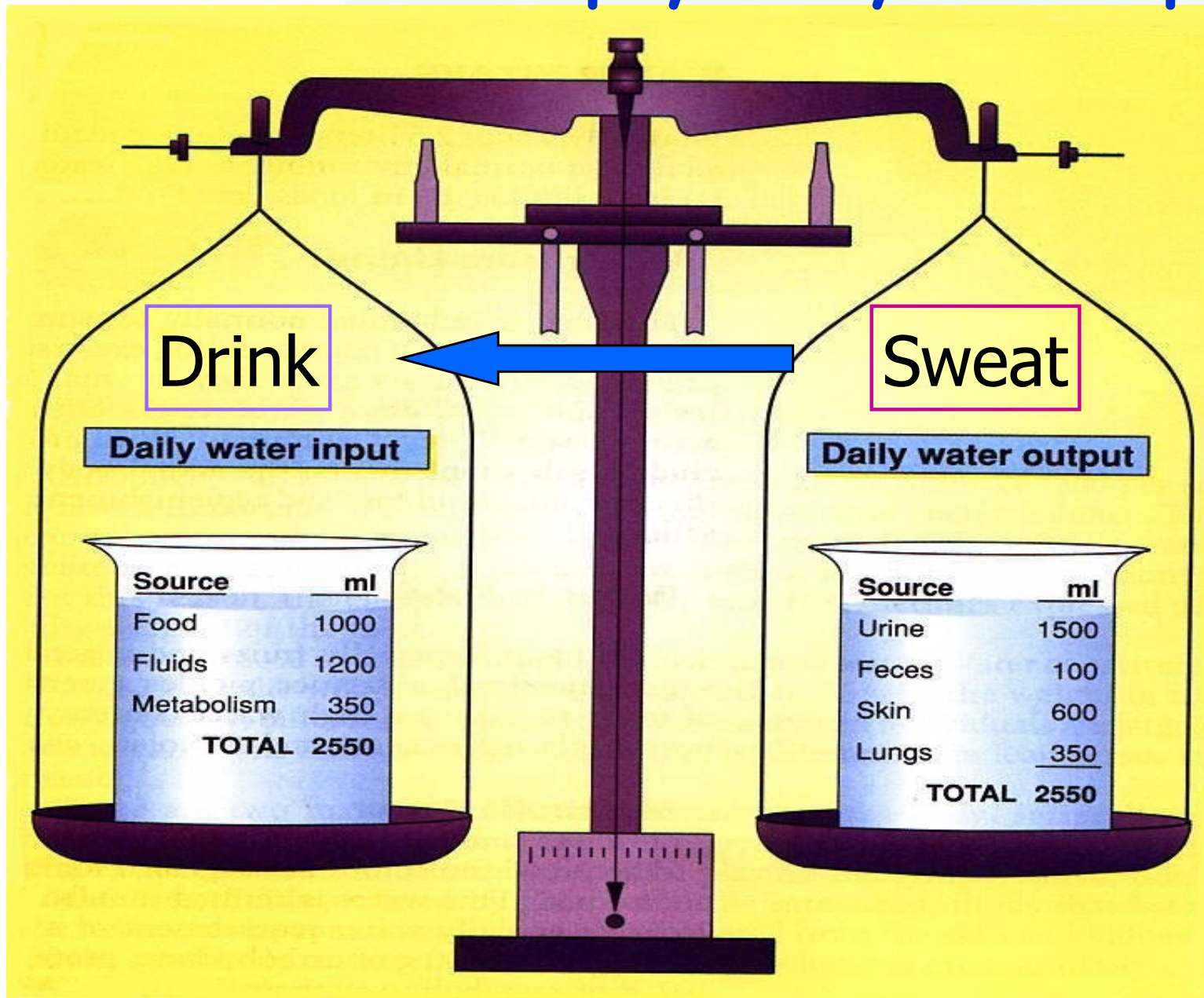


Pirámide nutricional adaptada para deportistas
González-Gross y col, 2001. Arch. Latinoam. Nutr.

Thermoregulation during exercise



Water balance in physically active people



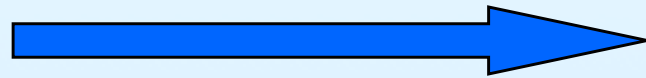
González-Gross 2008. Modified from: McArdle, Katch & Katch, 1991

Efecto de la edad sobre estado de hidratación: hill walking

9 varones 24±3 años



10 días



10-35 km (x 21 km)

800 - 2540 m (x 1160 m)

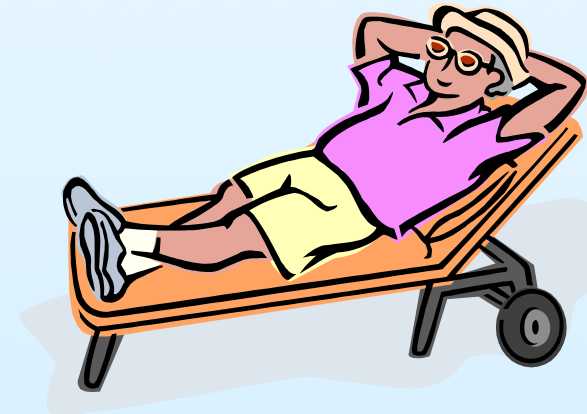
Batería de test complem.

H_1

H_6

H_{11}

Totalmente hidratados



8 varones 56±3 años

- ↑ * deshidratación d6 y d11 respecto a d1
- ↓ percepción sed
- Influencia deshidrat test

Fluid intake and recommendations in older adults: More data are needed

R. Scherer^{*,†,a}, B. Maroto-Sánchez^{*,a}, G. Palacios^{*,†,a} and M. González-Gross^{*,†,a}

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Table 1 Summary of recommended water intake for adults (including elderly) from different authorities and organisations

Countries	Sources	Water intake recommendations
UK	FSA 2010	1200 ml from beverages
France	AFSSA (PNNS) 2001 [*]	25–35 ml/kg/day
Germany, Austria and Switzerland	DACH 2008 [*]	2250 ml/day (1310 ml from beverages) [†]
Europe	EFSA 2010 [*]	2500 ml/day (~80% from beverages) for males 2000 ml/day (~80% from beverages) for females
Canada and US	IOM 2005 [*]	3700 ml/day for males (80% from beverages) 2700 ml/day for females (80% from beverages)
Australia and New Zealand	NHMRC 2006	3400 ml/day (2600 ml from beverages) for males 2800 ml/day (2100 ml from beverages) for females
Worldwide	WHO 2005 [*]	2900 ml/day for males (two-thirds from beverages) 2200 ml/day for females (two-thirds from beverages)

^{*}Reported in EFSA (2010).

[†]Recommendation specifically for people aged ≥65 years.

AFSSA, L'Agence française de sécurité sanitaire des aliments; EFSA, European Food Safety Authority; FSA, Food Standards Agency; PNNS, Programme National Nutrition Santé; IOM, Institute of Medicine; NHMRC, National Health and Medical Research Council; WHO, World Health Organization.

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Nutrition Bulletin 2016; 41:167-174

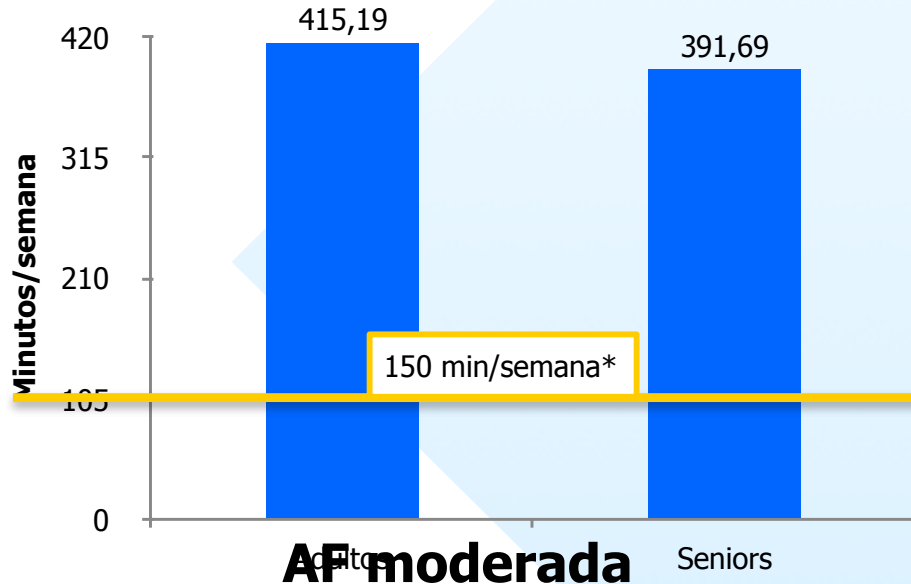
Table 2 Overview of findings from studies included in the review

Authors (year of publication)	Country	Participants (survey name)	Year of study	Fluid description	Age (years)	Sex	n	Mean fluid intake in ml (SD) per day		
Haveman-Nies et al. (1997)	Europe	Free-living (SBNECA)	1993	Drinking water and beverages	75–86	M	629	2065*		
						F	696	1892*		
Chidester and Spangler (1997)	US	Nursing home	–	Total water from meals	65–85	M + F	16	1274*		
					86–100	M + F	24	1193*		
					Total water from non-meal feedings	65–85	M + F	16	508*	
					86–100	M + F	24	337*		
Volkert et al. (2004)	Germany	Free-living	1997–1998	Drinking water and beverages	65–74	M + F	171	8% <1000†		
					75–84	M + F	124	15% <1000†		
					>84	M + F	66	27% <1000†		
					Total water	65–85	M + F	16	1783 (545)	
Jones et al. (2006)	Canada	Free-living	2001–2002	Drinking water	86–100	M + F	24	1530 (580)		
					65–75	M	110	662*		
Ribas-Barba et al. (2007)	Spain	Free-living (ENCAT)	1992–1993	Drinking water and beverages	65–75	M	110	662*		
						F	154	592*		
Zizza et al. (2009)	US	Free-living (NHANES)	1999–2002	Total water	65–75	M	122	761*		
						F	122	768*		
					65–74	M + F	1105	2906.8 (39.5)‡		
					75–85	M + F	746	2573.4 (44.1)‡		
Toffanello et al. (2010)	Italy	Free-living (CCAF)	1988	Beverages	70–75	M	34	295.0 (250.4)		
						F	44	511.0 (288.4)		
					Drinking water	70–75	M	34	1888.5 [§]	
						F	44	1540.9 [§]		
					1999	Beverages	80–55	M	34	172.4 [§]
						F	44	118.0 [§]		
Bellisle et al. (2010)	France	Free-living	2002–2003	Drinking water	80–55	M	34	1977.2 (641.3)		
						F	44	1616.8 (528.9)		
					Drinking water and beverages	≥55	M + F	443	547.9 (17.6)‡	
						M + F	443	1197.7 (20.2)‡		
Sebastian et al. (2011)	US	Free-living (WWBA) and (NHANES)	2005–2008	Drinking water	>60	M	ND	7347 [§]		
						F	ND	8295 [§]		
Goodman et al. (2013)	US	Free-living (FAB)	2007	Drinking water	≥55	M + F	1066	47% <948† 53% ≥948†		

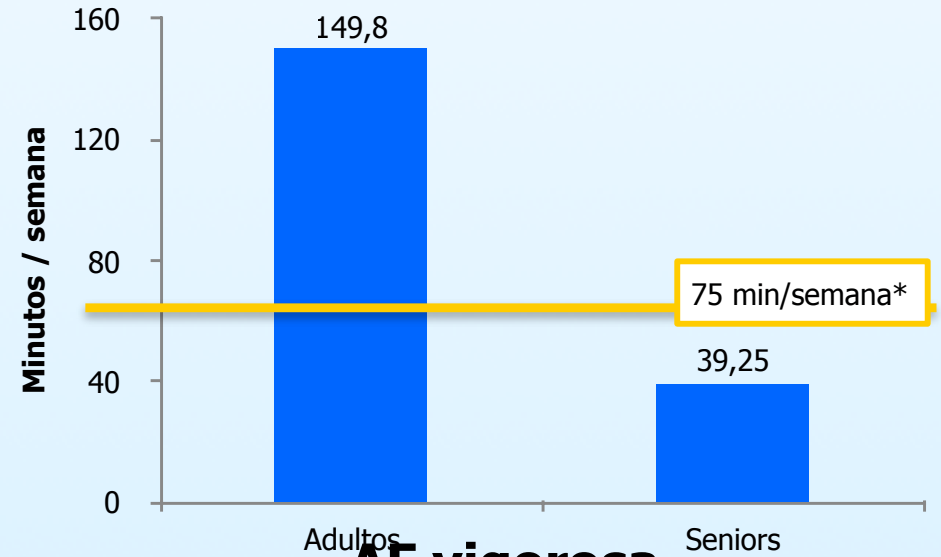


Actividad física moderada y vigorosa realizada por adultos y seniors. ANIBES Study

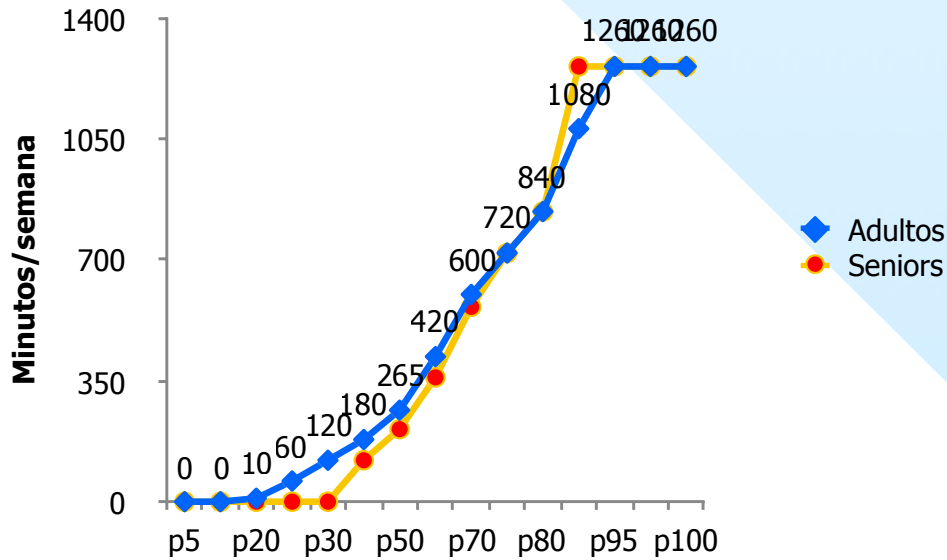
Añ moderada



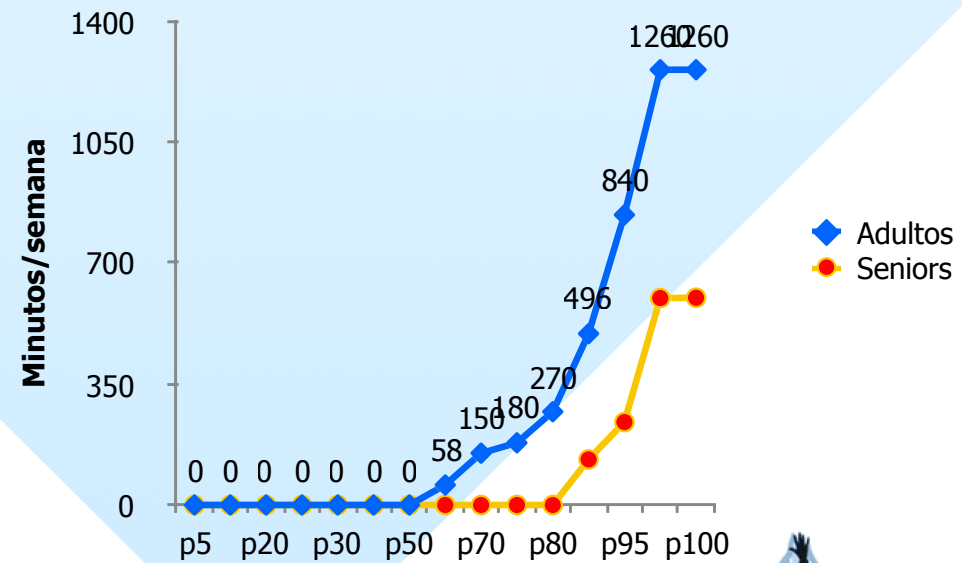
Añ vigorosa



Añ moderada



Añ vigorosa



* WHO (2010)-Global recommendations on physical activity for health



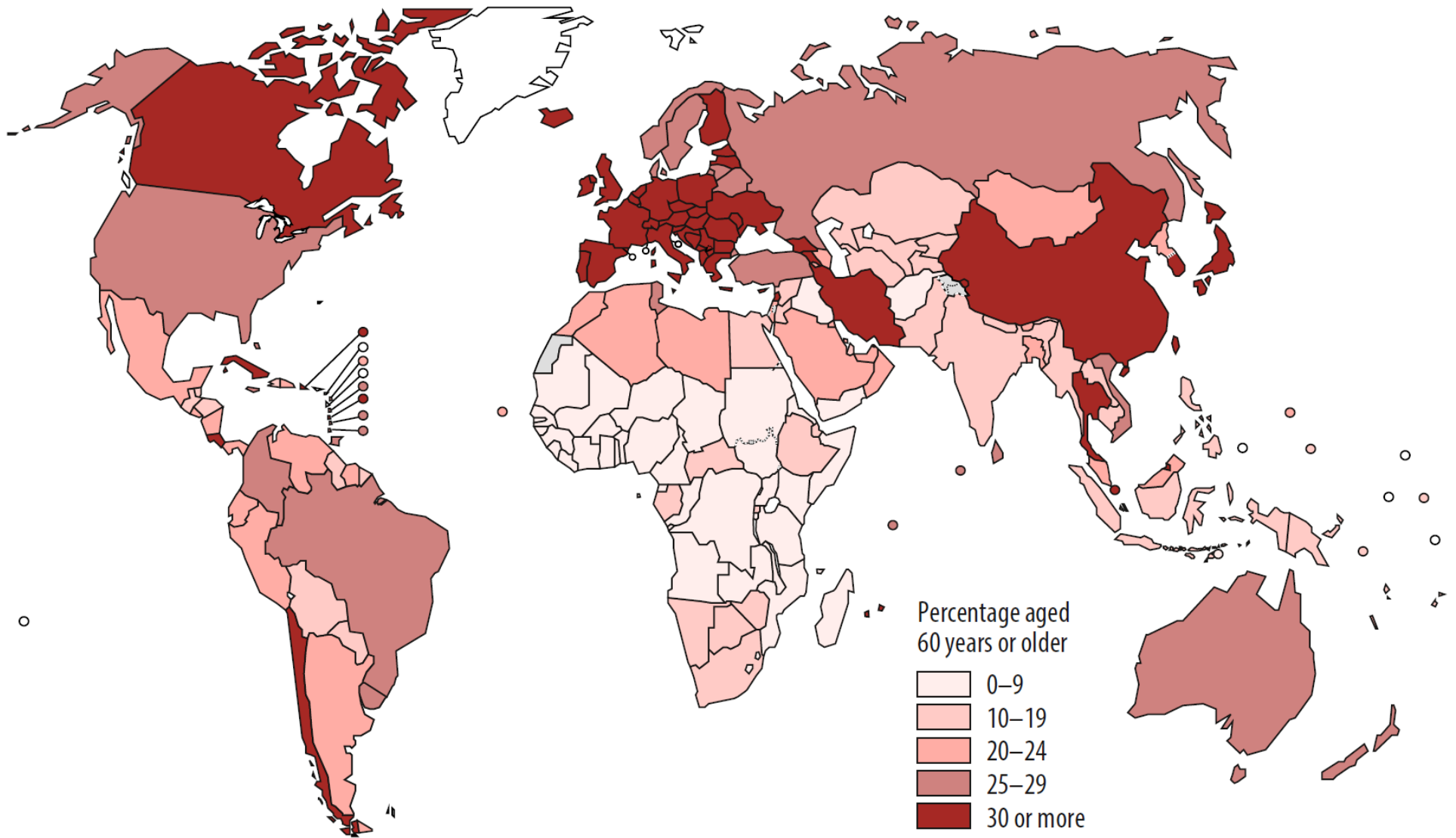


Figure 1: Proportion of population > 60 years and projected 2050 by country.



PHYSMED Study

“Cardiovascular risk determinants. Antioxidants and oxidative stress”

N=433

Supported by the Health Institute ‘Carlos III’ (PI11/01791)
and the European Hydration Institute (E131115081)

**Signed an informed
consent(CEUPM)**



Satisfy the following exclusion criteria:

- Having less than 55 years of age
- Being institutionalized
- Suffering from a physical or mental illness which would have limited the study participation
- Chronic alcoholism or drug addiction
- Sicknesses
- Take drugs for clinical research over the past year



POLITÉCNICA



imFine UPM

Grupo de Investigación
en Nutrición, Ejercicio
y Estilo de Vida Saludable



**Universitat de les
Illes Balears**

**Grupo
NUCOX**





POLITÉCNICA



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Grupo de Investigación en Nutrición, Ejercicio y Estilo de Vida Saludable



CUESTIONARIO DE HIDRATACIÓN

Número de sujeto

LUGAR

Madrid (1) Palma (2)

Fecha de la encuesta

Nombre del encuestador

Temperatura de hoy

Humedad relativa de hoy

ayer

ayer

Nombre

Apellidos

Equivalencias aproximadas:



1 vaso completo corresponde a 200 ml aproximadamente

½ vaso corresponde a 125 ml aproximadamente

5 vasos= 1 litro

1 Botellín=200ml

1 tercio/1Lata= 330ml



12 beverages

WATER (1 glass = 200ml ; 1/2 glass = 125ml)



Yesterday:	<input type="text"/>	ml total
Tap water	<input type="text"/>	ml
Mineral water	<input type="text"/>	ml
Brand (text)	<input type="text"/>	
Weekly consumption:		
Total water per day	<input type="text"/>	ml daily
Days per week	<input type="text"/>	
ml total per week	<input type="text" value="0"/>	ml
Tap water	<input type="text"/>	ml total
Mineral water	<input type="text"/>	ml total
Brand (text)	<input type="text"/>	

JUICE (1 glass = 200ml; 1/2 glass = 125ml)



Yesterday:	<input type="text"/>	ml
Natural juice	<input type="text"/>	ml
Bottled juice	<input type="text"/>	ml
Brand (text)	<input type="text"/>	
Weekly consumption:		
Total per day	<input type="text"/>	ml daily
Days per week	<input type="text"/>	
ml total per week	<input type="text" value="0"/>	ml
Natural juice	<input type="text"/>	ml
Bottled juice	<input type="text"/>	ml
Brand (text)	<input type="text"/>	

TEA OR INFUSIONS (1 glass=200ml)

Yesterday:	<input type="text"/>	ml
With sugar	<input type="text"/>	Yes(1)/No(0) How much (g) <input type="text"/>
Sweetener	<input type="text"/>	Yes(1)/No(0) Type <input type="text"/>
Type of tea	<input type="text"/>	
Weekly consumption:		
Total per day	<input type="text"/>	ml daily
Days per week	<input type="text"/>	
ml total per week	<input type="text" value="0"/>	ml
With sugar	<input type="text"/>	Yes (1)/No(0) How much(g) <input type="text"/>
Sweetener	<input type="text"/>	Yes(1)/No(0) Type <input type="text"/>
Type of tea	<input type="text"/>	

COFFEE (Espresso) = 50ml; 1/2 Glass= 125ml)



Sweetener:
 Saccharin (1)
 Aspartame (2)
 AcesulfamoK (3)
 Stevia (4)
 Honey (5)

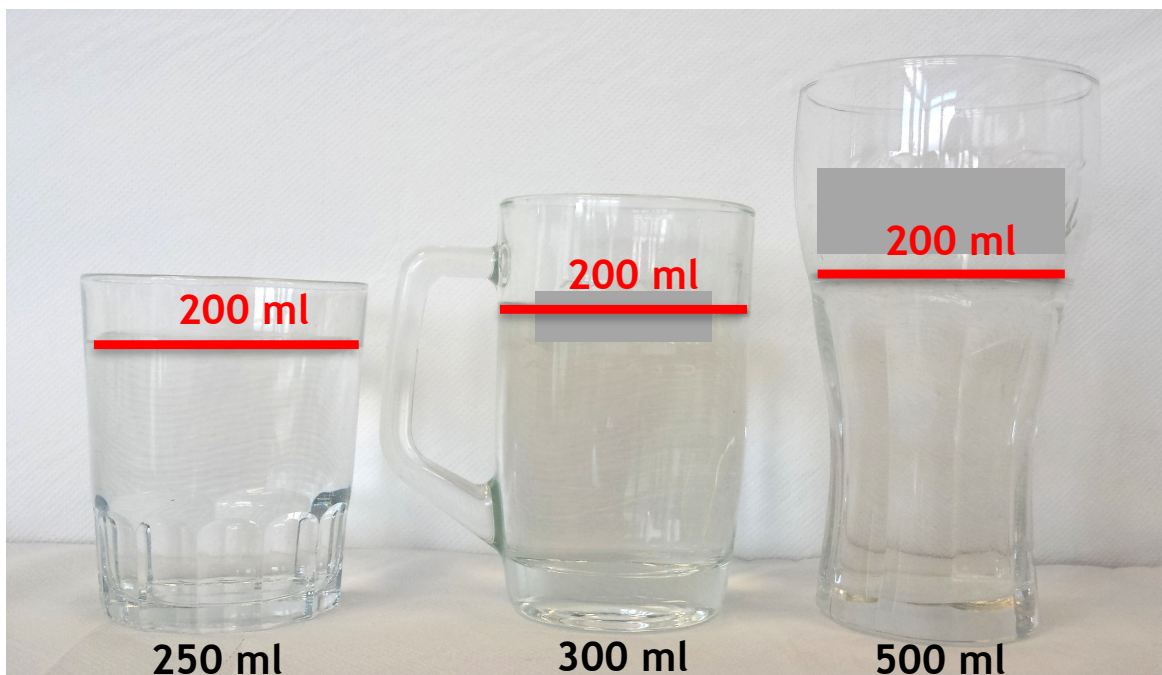
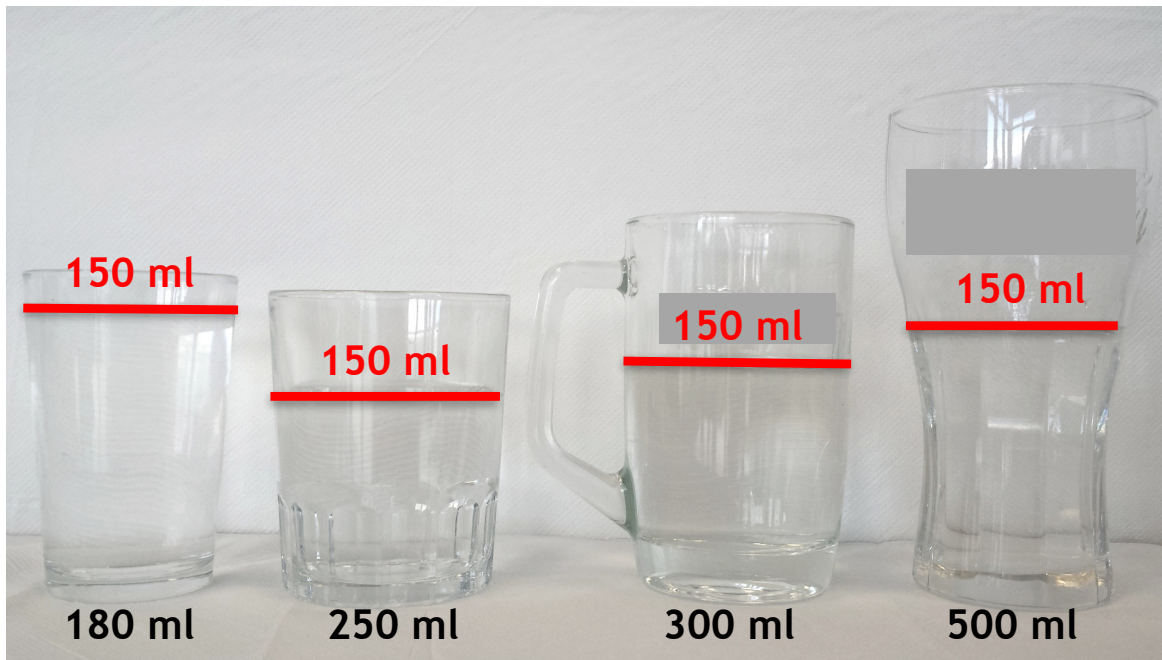
Yesterday:	<input type="text"/>	ml
With milk	<input type="text"/>	Yes (1)/No (0)
With sugar	<input type="text"/>	Yes(1)/No(0) How much (g) <input type="text"/>
Sweetener	<input type="text"/>	Yes(1)/No(0) Type <input type="text"/>
Decaffeinated	<input type="text"/>	Yes(1)/No(0) How much (ml) <input type="text"/>
		Instant coffee Yes(1)/No(0) <input type="text"/>
Weekly consumption:		How much (g) soluble <input type="text"/>
Total per day	<input type="text"/>	ml daily
Days per week	<input type="text"/>	
ml total per week	<input type="text" value="0"/>	ml total Instant coffee <input type="text"/>
With milk	<input type="text"/>	Yes (1)/No (0) How much (g) <input type="text"/>
With sugar	<input type="text"/>	Yes (1)/No (0) How much(g) <input type="text"/>
Sweetener	<input type="text"/>	Yes (1)/No (0) Type <input type="text"/>
Decaffeinated	<input type="text"/>	Yes (1)/No(0)How much (ml) <input type="text"/>



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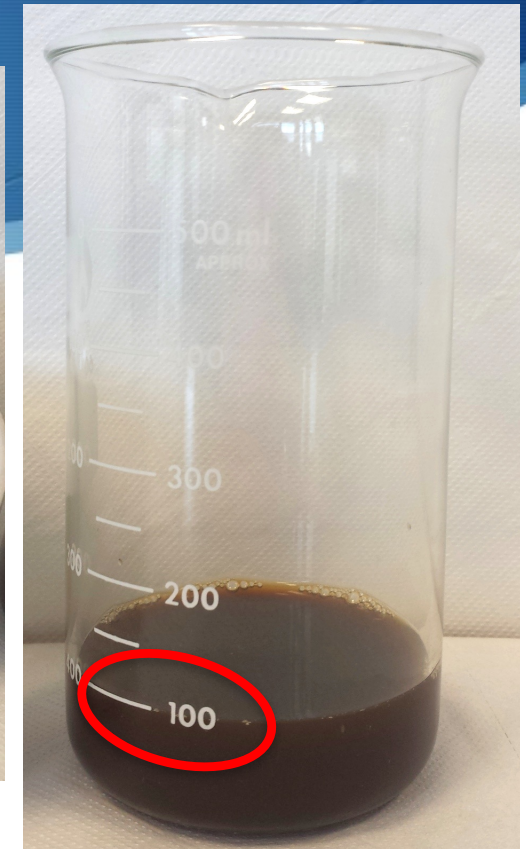
Beverages visual guide®



WATER

Capacity glass: black color

Amount of liquid: red color



COFFEE

Capacity glass: black color

Amount of liquid: red color



Nutrición Hospitalaria



Impact of physical activity and sedentarism on hydration status and liquid intake in Spanish older adults. The PHYSMED study

Raquel Aparicio-Ugarriza¹, Raquel Luzardo-Socorro¹, Gonzalo Palacios^{1,2}, María del Mar Bibiloni^{2,3}, Alicia Julibert^{2,3}, Josep Antoni Tur^{2,3} and Marcela González-Gross^{1,2}

¹ImFINE Research Group, Spain. Faculty of Physical Activity and Sport Sciences (INEF). Technical University of Madrid. Madrid, Spain. ²CIBEROBN (Physiopathology of Obesity and Nutrition CB12/03/30038). Madrid, Spain. ³Research Group on Community Nutrition and Oxidative Stress (NUCOX). University of the Balearic Islands. Palma, Balearic Islands. Spain



Table 1. Descriptive characteristics of daily beverage consumption split by sex.

	Male	Female	
	Mean ± DS	Mean ± DS	p value
Total water (mL/day)	1097.2±590.6	1067.2±572.3	N.S
Total liquid without alcohol (mL/day)	1607.0±644.5	1577.0±607.9	N.S
Total liquid with alcohol (mL/day)	1858.5±634.5	1669.8±611.9	N.S
Juice (mL/day)	179.8±142.9	142.2±90.6	<0.05
Soft drink (mL/day)	190.1±237.0	86.5±85.6	<0.05
Light soft drink (mL/day)	329.1±358.9	180.5±229.9	N.S
Milk (mL/day)	182.7±126.8	205.8± 125.7	N.S
Shake (mL/day)	112.4±81.8	58.5±31.9	<0.05
Coffee (mL/day)	97.1±57.3	96.8±75.4	N.S
Tea (mL/day)	200.1±181.1	256.3±260.7	N.S
Sport drink (mL/day)	180.3±200.7	98.1±44.0	N.S
Beer (mL/day)	169.6±175.6	86.3±124.4	<0.01
Wine (mL/day)	200.4±194.6	128.4±107.6	<0.01
Distilled drink (mL/day)	20.7±24.3	12.0±9.1	N.S.

Results: Fluid intake

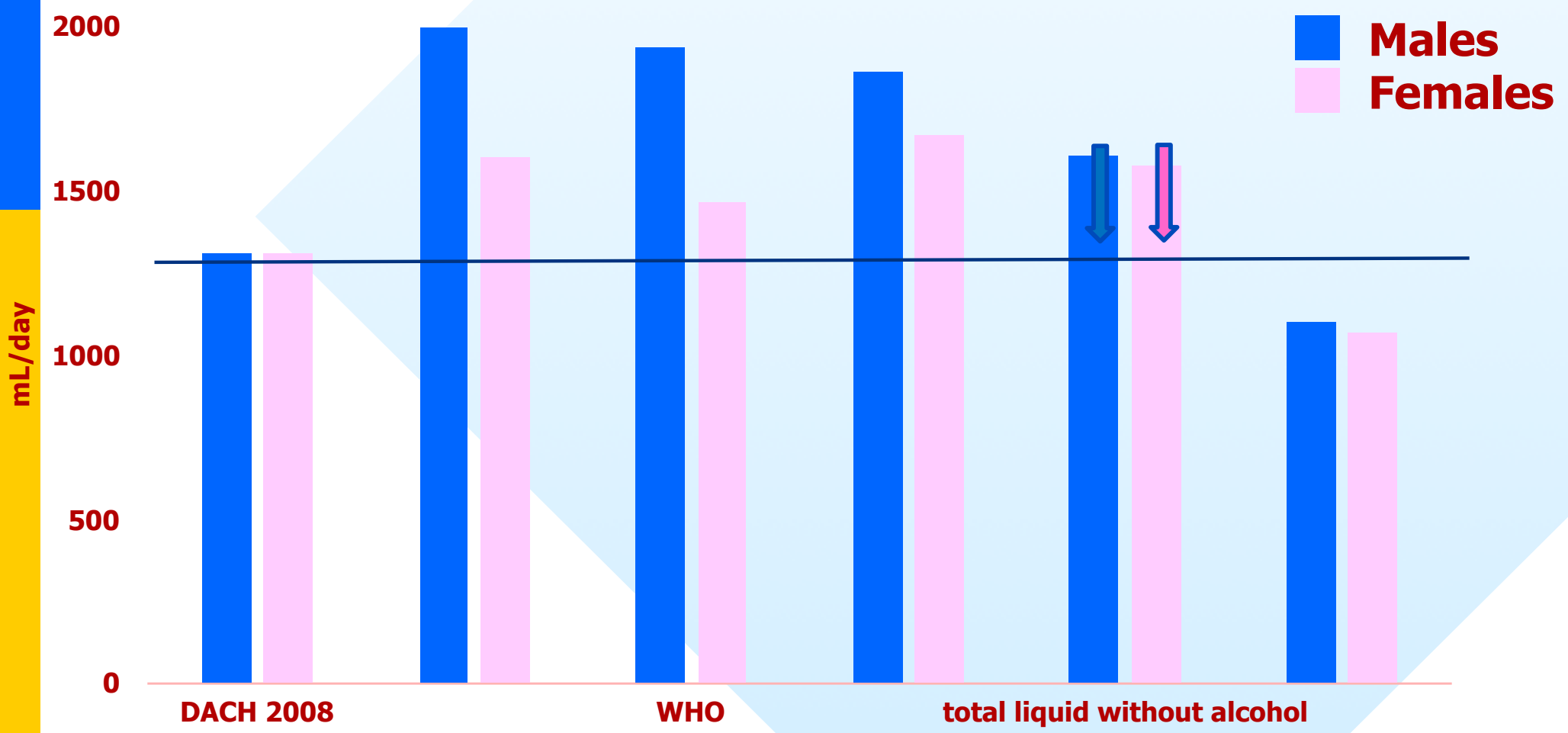
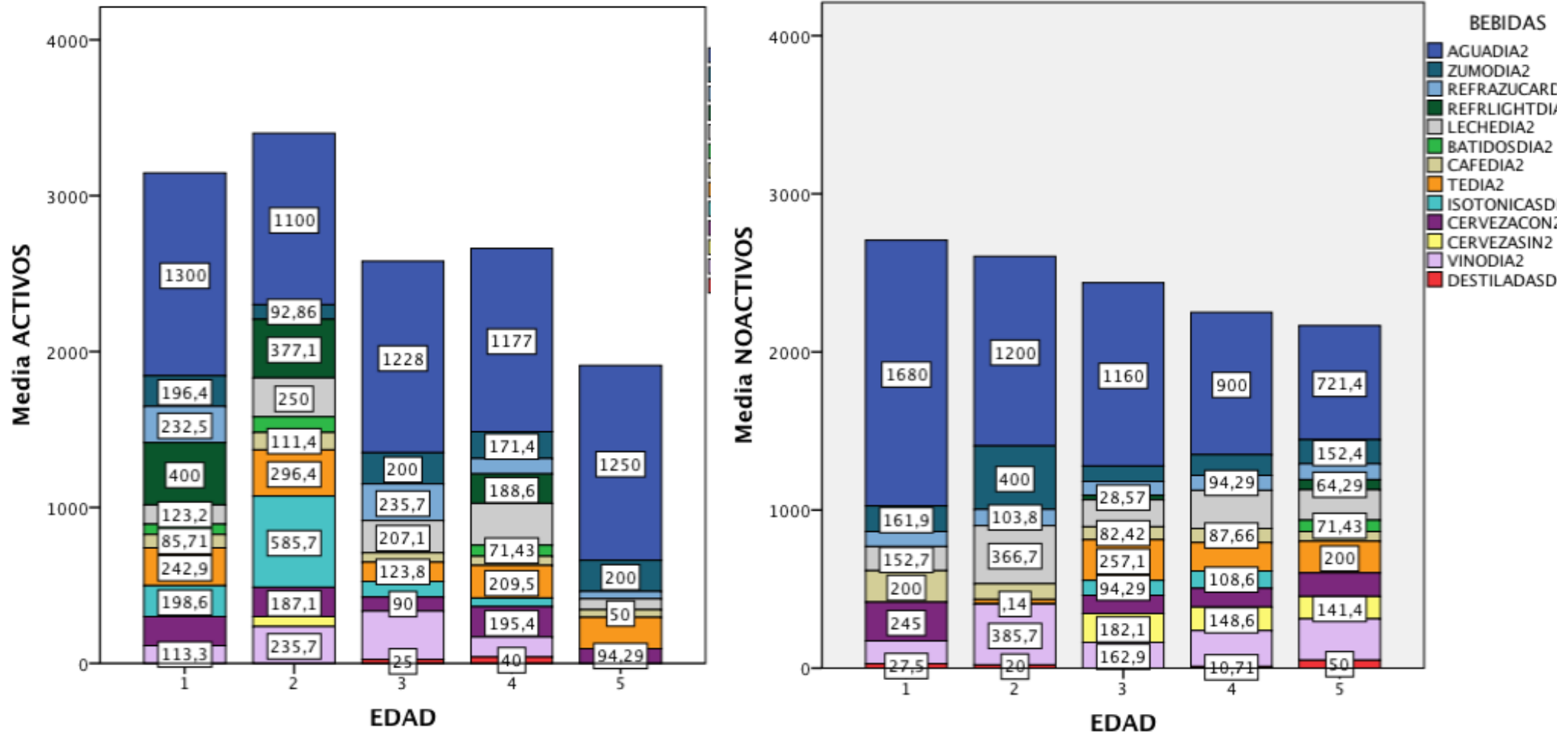


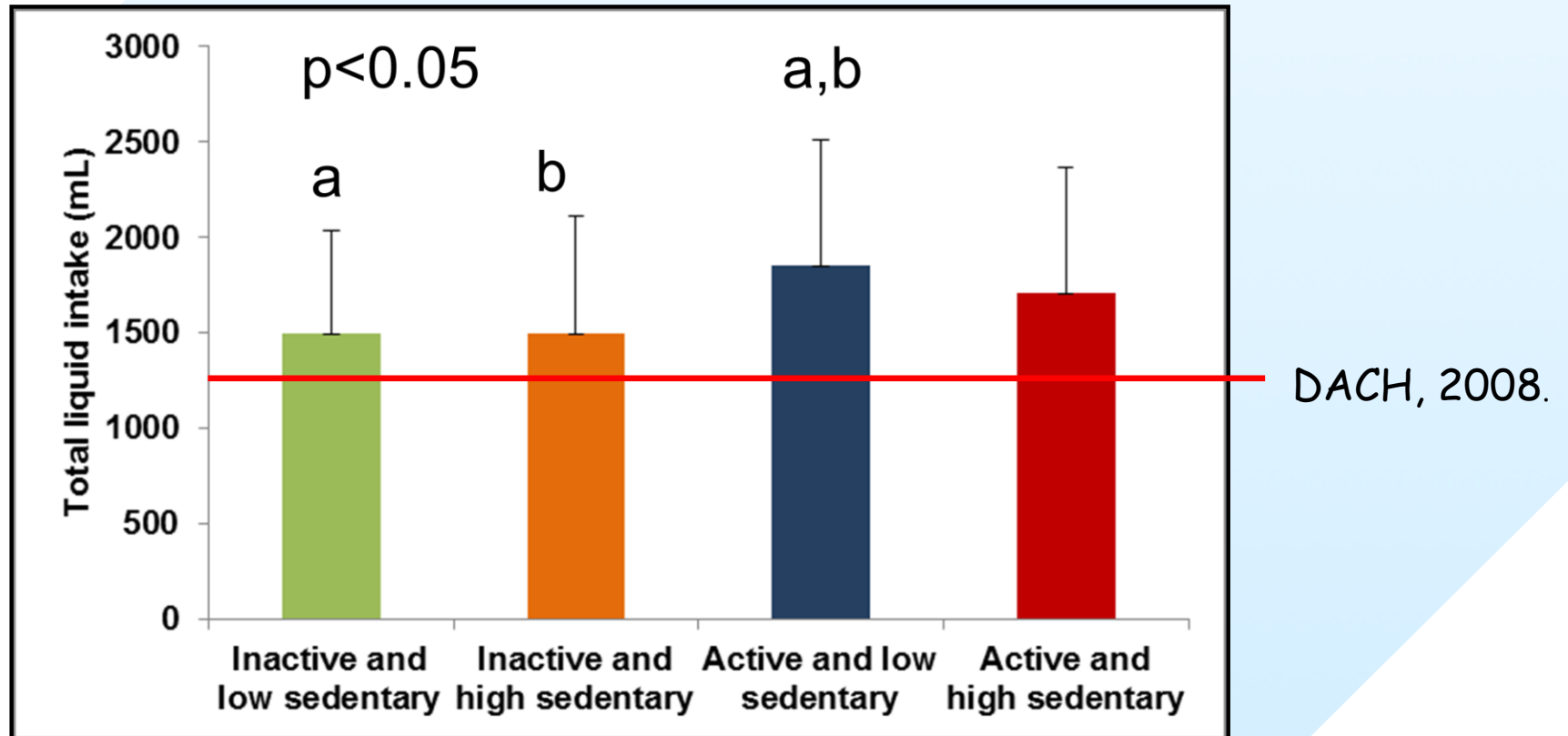
Figure 7: Fluid intake by participants and different organizations split by sex.

Ingesta de bebidas en mayores de 55 años activos y no activos



•Maroto & González-Gross, 2014

Figure 2. Mean (\pm SD) total liquid intake/day (mL) according to PA groups.



Impact of physical activity and sedentarism on hydration status and liquid intake in Spanish older adults. The PHYSMED study

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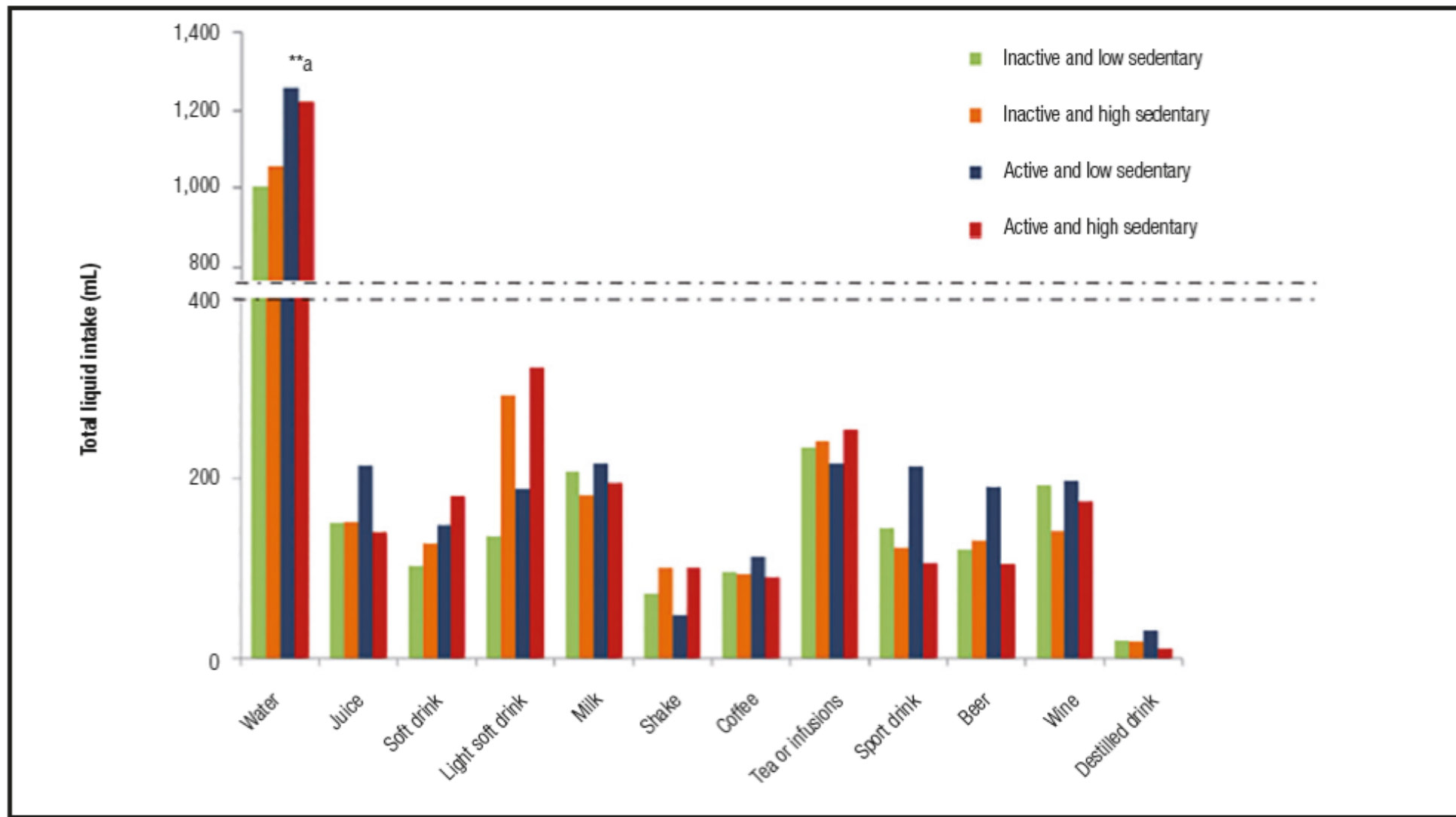


Figure 3.

Mean beverage consumptions/day divided by PA groups. **Significant differences ($p < 0.01$) between PA groups for water.

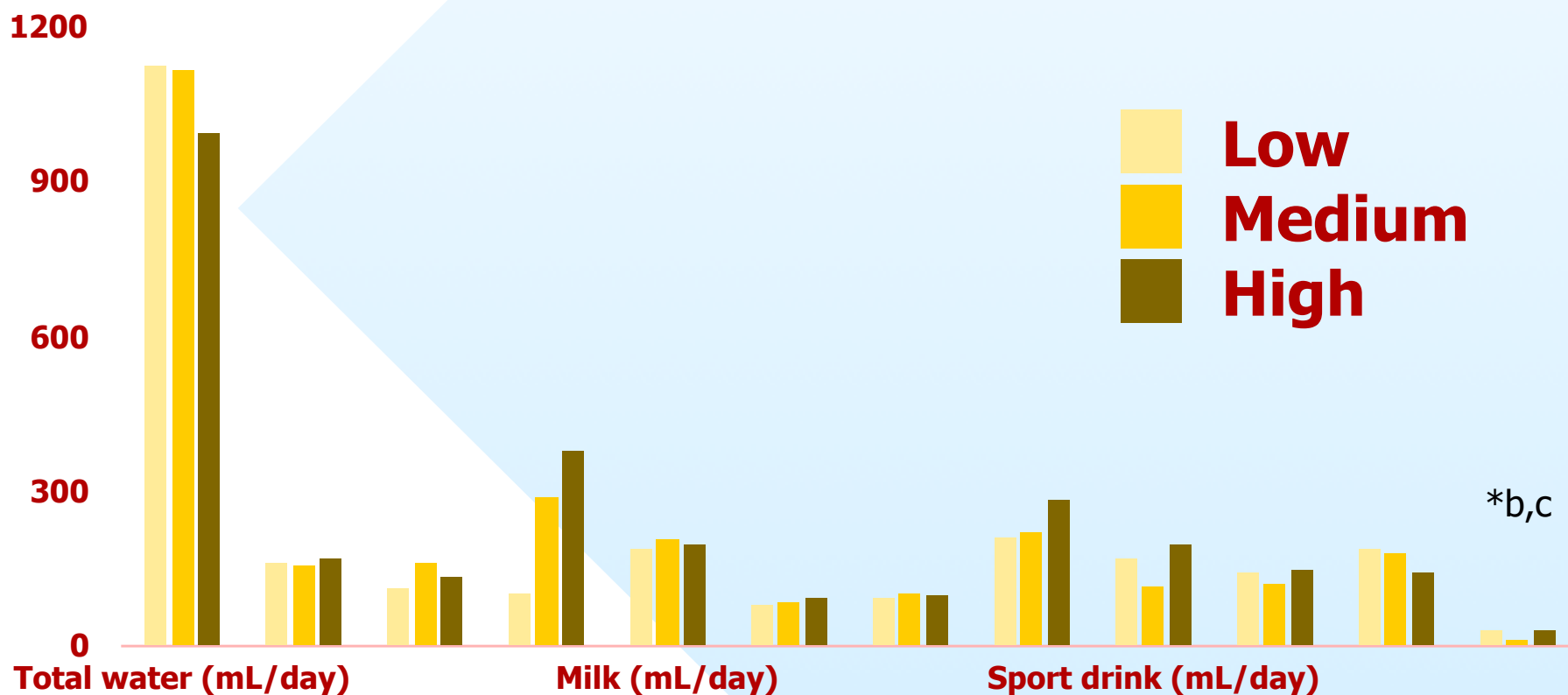
[Nutr Hosp 2016;33(Supl. 3):4-8]

Table 2. Anthropometric measurements divided by PA groups.

	Inactive and high sedentary			Inactive and low sedentary			Active and high sedentary			Active and low sedentary		
	n	Mean ± DS	p value	n	Mean ± DS	p value	n	Mean ± DS	p value	n	Mean ± DS	P value
Weight (kg)	195	74.20±12.88	<0.01	99	68.65±11.02	<0.01	75	72.23±13.77	N.S.	62	67.50±11.77	<0.01
FFM (Kg)	194	49.95±10.60	<0.01	99	45.72±8.76	<0.01	75	49.91±10.78	N.S.	62	47.41±9.16	<0.01
FM (kg)	194	24.28±6.87	<0.01	99	22.94±6.36	N.S.	75	22.33±7.41	N.S.	62	20.10±7.77	<0.01 ^a
TBW (kg)	194	36.57±7.76	<0.05	99	33.47±6.41	<0.05	75	36.54±7.89	<0.05 ^b	62	34.71±6.70	N.S.
BMI (kg)	195	27.63±3.73	<0.05	99	26.78±3.65	N.S.	75	26.96±4.11	N.S.	62	26.00±3.79	<0.05

FFM, fat free mass; FM, fat mass; TBW, total body water; BMI, body mass index.

Beverage intake according to PF cluster



* Significant differences ($p < 0.05$) between PA groups in distilled drink.

Figure 10: Mean beverage consumptions/day divided by PF groups.

Figure 4. Median serum osmolarity divided by PA groups.

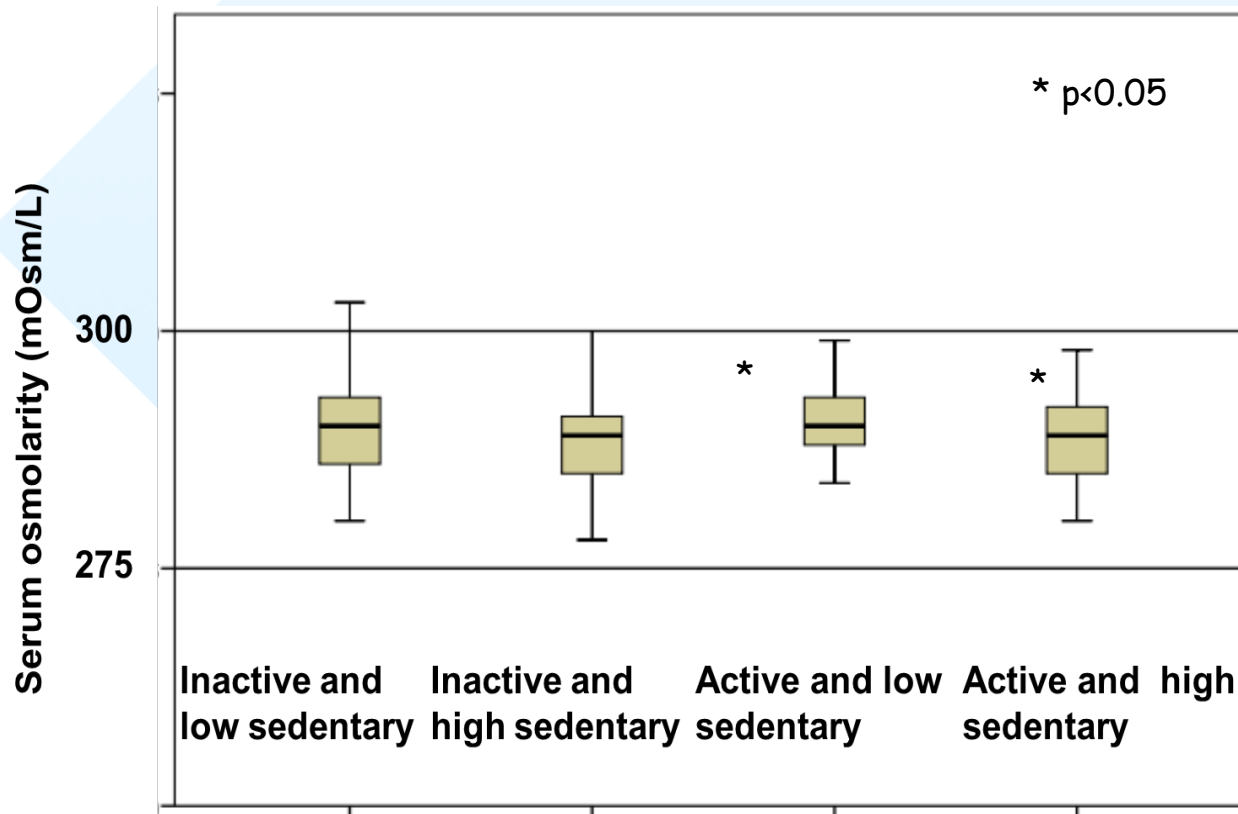


Figure 4 shows serum osmolarity according to PA groups. All subjects were within reference ranges of serum osmolarity and significant differences were found between PA groups ($p < 0.01$). After Bonferroni's adjustment, there was a significant difference between IHS and ALS ($p < 0.05$). The mean higher serum osmolarity was obtained for ALS group (290.97 mOsm/L).

Aim

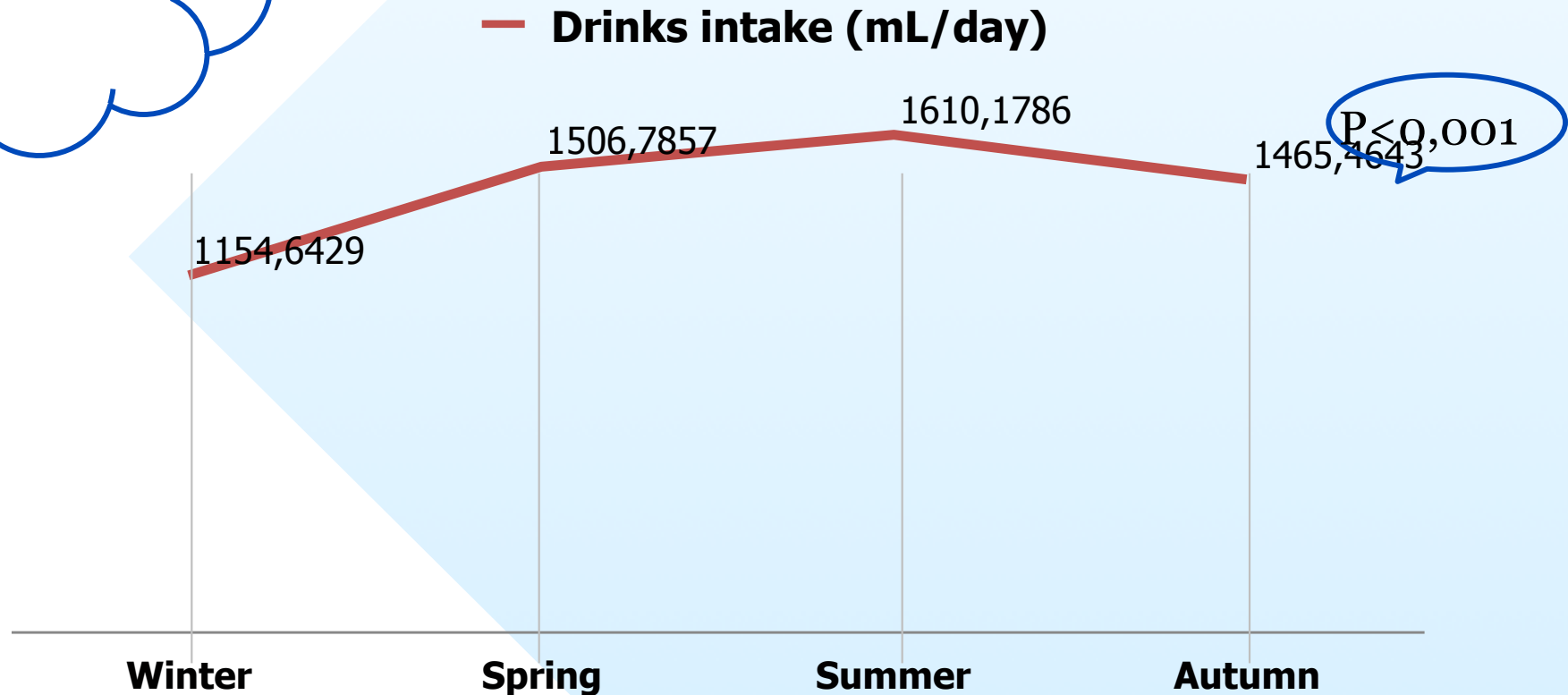


Identify seasonal changes on fluid intake in Spanish elderly people.



Results

Kepping out milk
and natural fruit
Juices



This may be related to high water loss as a function of high temperatures and increased physical activity (Westerterp et al.).



Main conclusions



- 1 Spanish elderly meet the DACH liquid intake recommendations in the mean independently of their physical activity and sedentarism.
- 2 All subjects are within reference ranges of serum osmolarity.
- 3 Active and low sedentary group consumed more fluids.
- 4 The distribution of liquid intake depends on the PA + sedentarism. This is an important factor to take into account for future studies.



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Grupo de Investigación ImFINE



Los individuos marcan goles, pero los equipos ganan partidos. Zig Ziglar



GRACIAS
POR SU
ATENCIÓN

