Agua para el futuro: enfoques desde la limnología, ingeniería, medicina y economía.

ANCiU – Academia Nacional de Ciencias del Uruguay
Academia Nacional de Economía
Academia Nacional de Ingeniería Uruguay
Academia Nacional de Medicina Uruguay

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Centro de Nefrología – Hospital de Clínicas

Facultad de Medicina - UdelaR

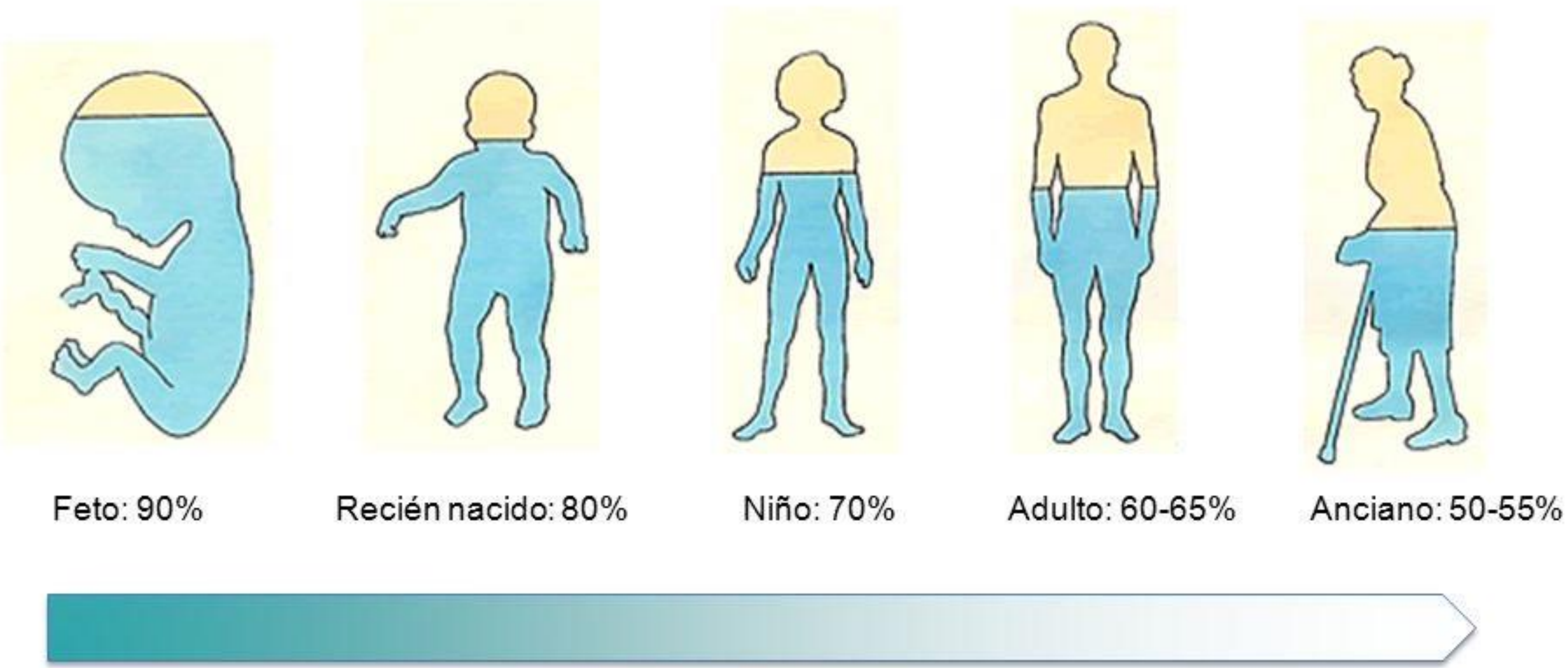
HOSPITAL DE CLINICAS

Hoja de ruta

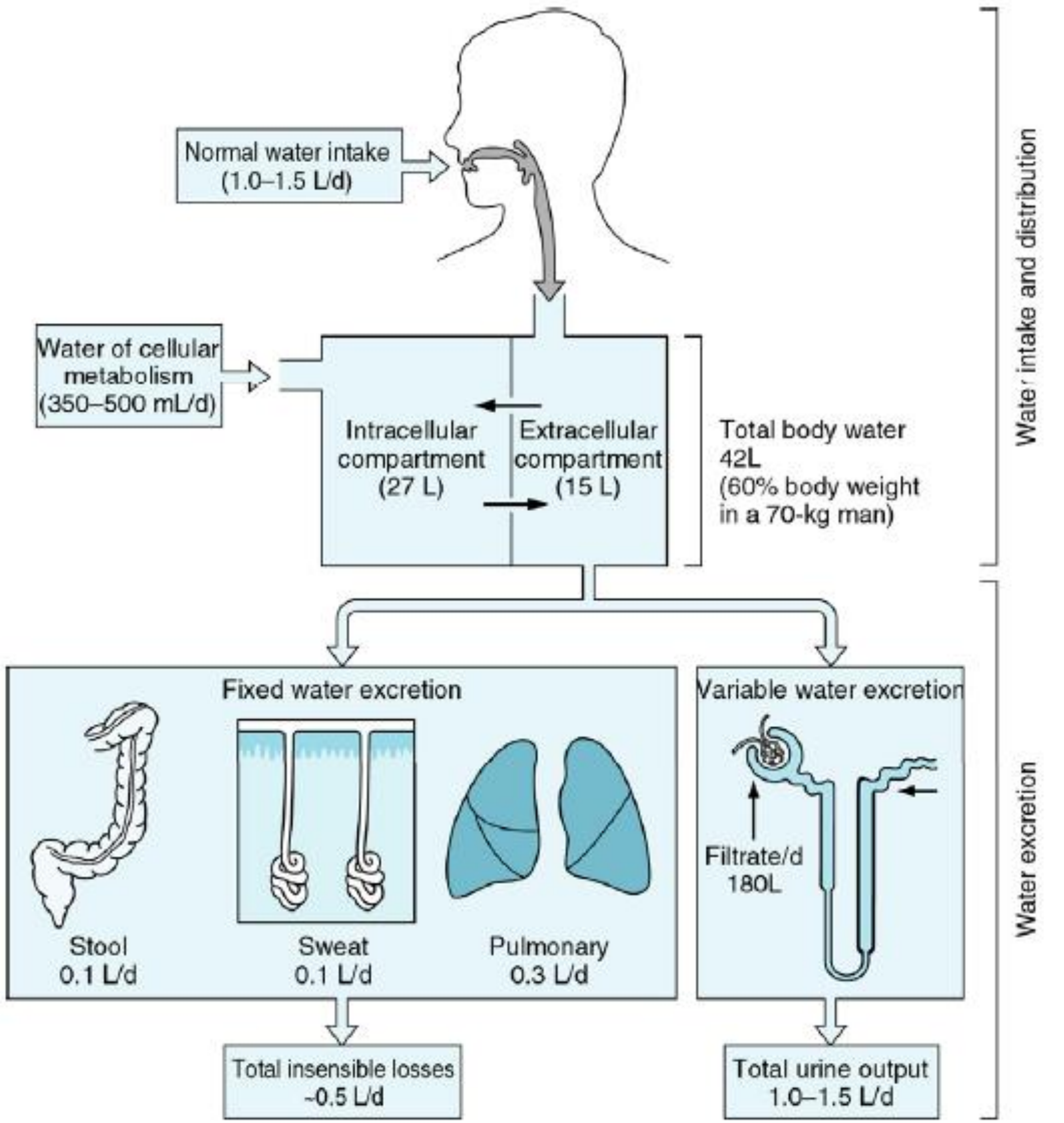
- Agua corporal
  - Distribución
  - Presión arterial media
  - Sodio corporal
- Sanitización
  - Niveles aceptables
- Ingesta diaria de sodio
- Hipertensión Arterial
- Mortalidad
- Grupos de riesgo
- Recomendaciones

Agua y edad

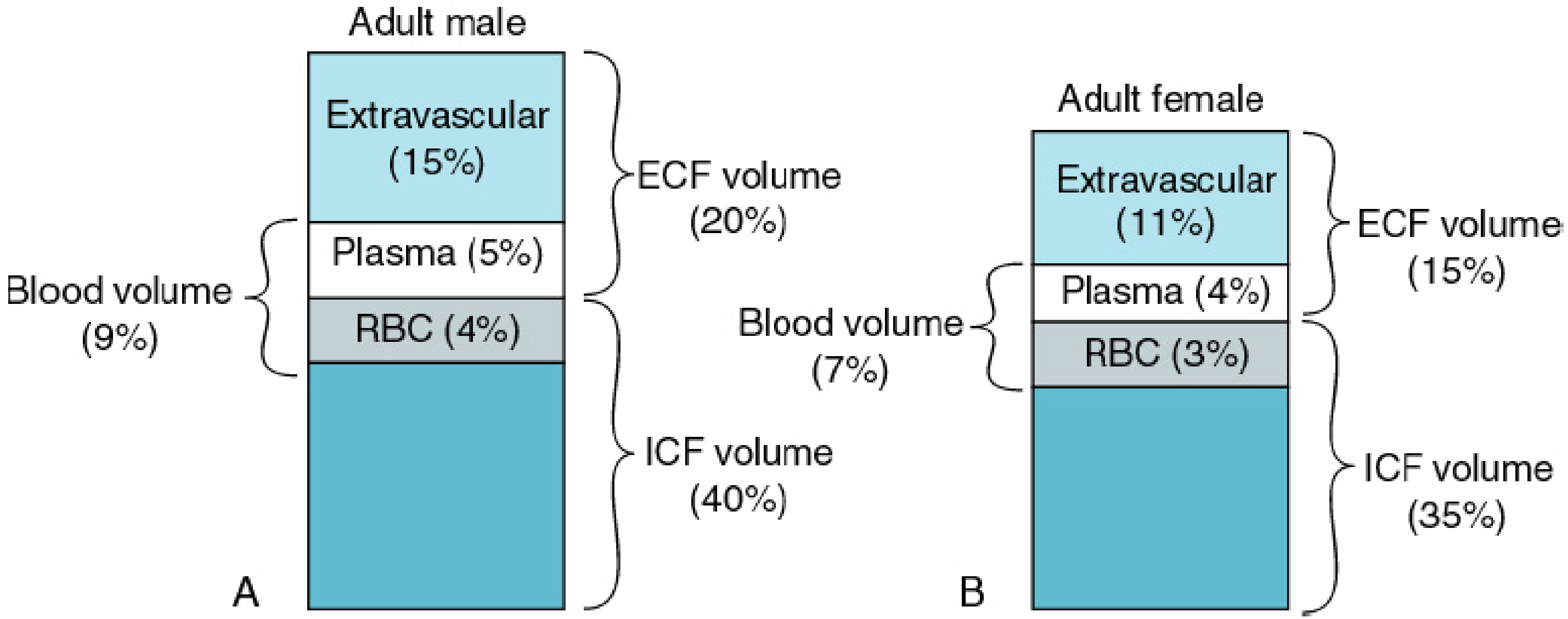
Disminución del contenido de agua corporal total a lo largo de los años



Luckey & Parsa. Arch Surg. 2003; 138(10):1055-60; Popkin, et al. Nutr Rev. 2010; 68(8):439-58.



Sumit Kumar & Tomas Berl



David H. Ellison

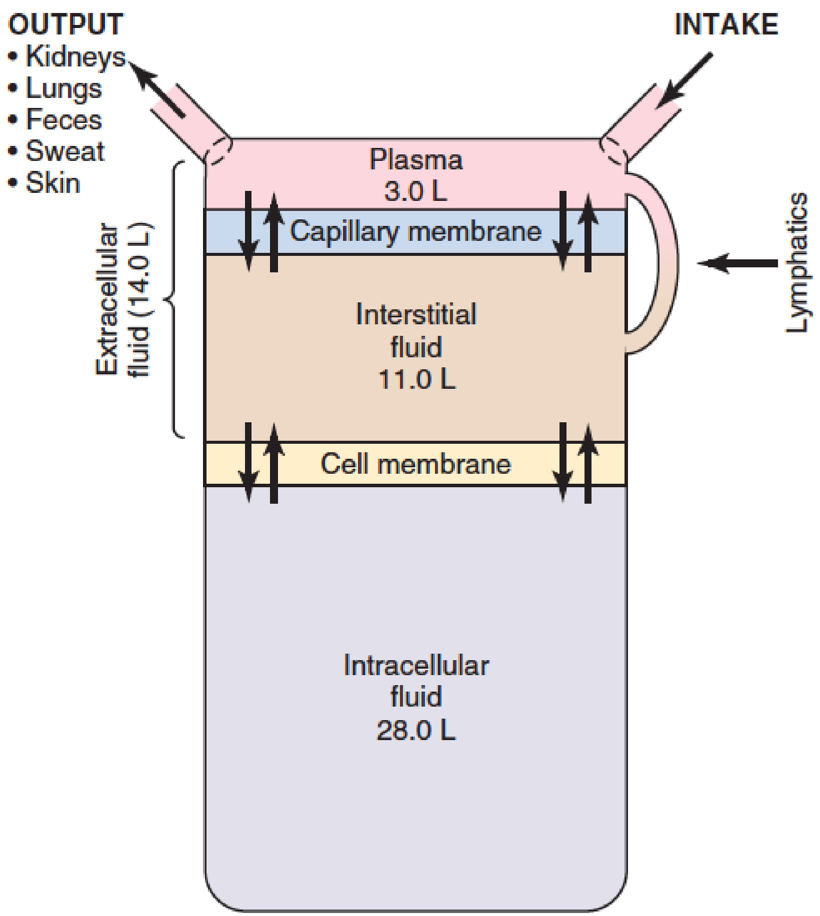


Figure 25-1. Summary of body fluid regulation, including the major body fluid compartments and the membranes that separate these compartments. The values shown are for an average 70-kilogram adult man.

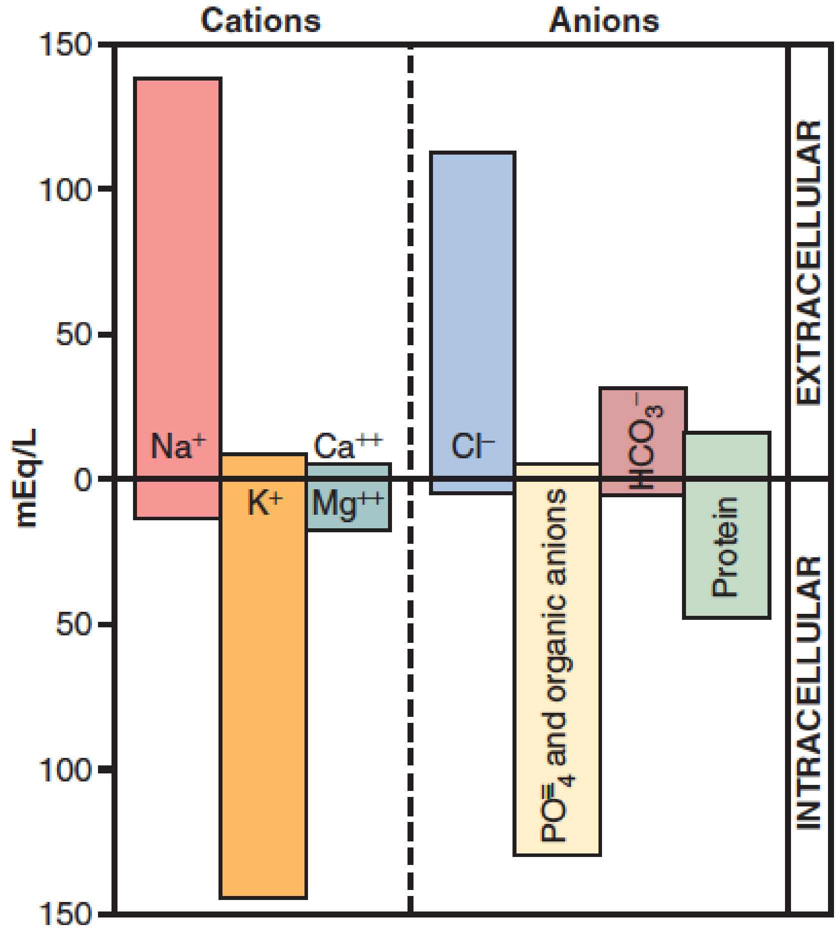


Figure 25-2. Major cations and anions of the intracellular and extracellular fluids. The concentrations of Ca^{++} and Mg^{++} represent the sum of these two ions. The concentrations shown represent the total of free ions and complexed ions.

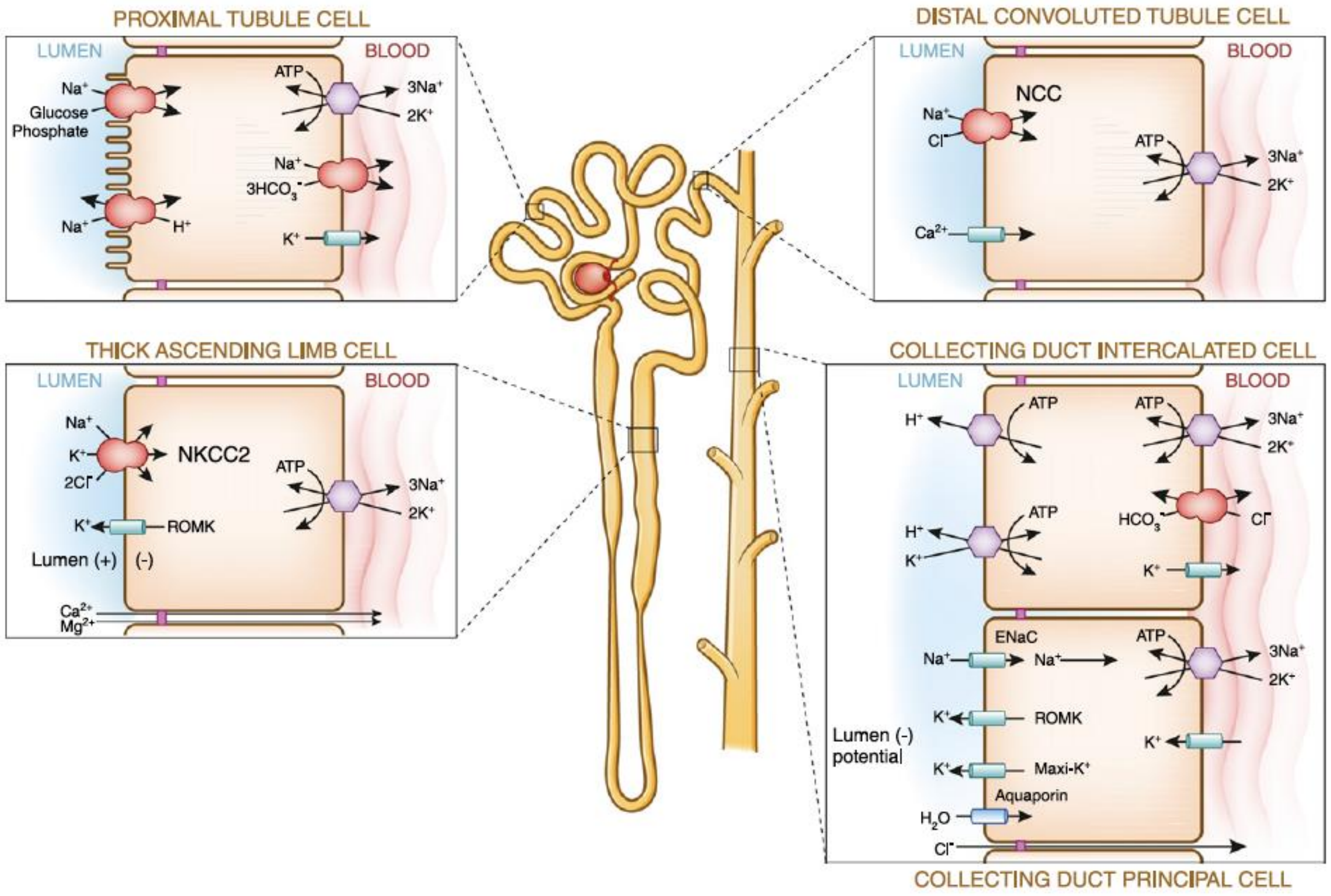


Figure 5. | The unique transporters and cell structure of each segment of the nephron work in concert to maintain homeostasis. ENaC, epithelial sodium channel; NKCC2, Na^{+}-K^{+}-2Cl cotransporter; ROMK, renal outer medullary potassium.

Clin J Am Soc Nephrol 9: 1272–1281, July, 2014

Homeostasis and the Nephron, Hoenig and Zeidel

X

Presión arterial Media = Gasto Cardiaco x Resistencias periféricas

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Sanitización del agua para consumo humano John Snow 1854

- Cólera
- Disentería
  - Norovirus
  - Campilobacter
  - Giardia
- Fiebre tifoidea
- Hepatitis A
- amebiasis

- Desinfección
  - Ozono
  - Luz ultravioleta
  - Cloro
  - Dióxido de cloro (ClO_2)
  - Monocloraminas (NH_2Cl)
- Sub productos de Desinfección (DBPs)
  - Trihalometanos

	colitotales	E. Coli	aeruginosa	cloruro	hierro con purga	plomo sin purga	plomo con purga	ph
VMP[(a)]	ausencia (<1 en caso de recuento)	ausencia (<1 en caso de recuento)	ausencia	250	0.3	0.03	0.03	6,5-8,5
Unidades	* NMP en 100 mL **UFC en 100 mL	* NMP en 100 mL **UFC en 100 mL	en 10 mL	mg/L	mg/L	mg/L	mg/L	-

	bromoformo	cloroformo	bromodicloro metano	dibromoclor ometano	Índice THM
VMP[(a)]	100	150	60	100	1
Unidades	µg/L	µg/L	µg/L	µg/L	

	dureza	turbiedad	aluminio	cloro	conductividad	Microcistina LR	Sodio	sólidos totales disueltos	Manganeso
VMP[(a)]	500	3 (1 en salida tratamiento)	0.2	2.5	2000	1	200	1000	0.1
Unidades	mg/L	NTU	mg/L	mg/L	µS/cm	µg/L	mg/L	mg/L	mg/L

URSEA - Vigilancia de la calidad del agua potable
Resultados de los monitoreos realizados en área metropolitana por URSEA
Período enero - mayo 2023
Nota: Todos los resultados presentados corresponden a valores puntuales de los parámetros

(a) VMP: Valor Máximo Permitido de acuerdo al decreto 375/11.

La Ordenanza del MSP Nº 1076 del 04/05/2023 autorizó valores de cloruros hasta 720mg/l, sodio hasta 440mg/l, sólidos totales disueltos hasta 1626mg/l y conductividad hasta 2981µs/cm.

Disinfection by-products in drinking water: Occurrence, toxicity and abatement☆

Arun Lal Srivastav, Ph.D., Post Dcotorate [a,*], Naveen Patel [b], Vinod Kumar Chaudhary [c]

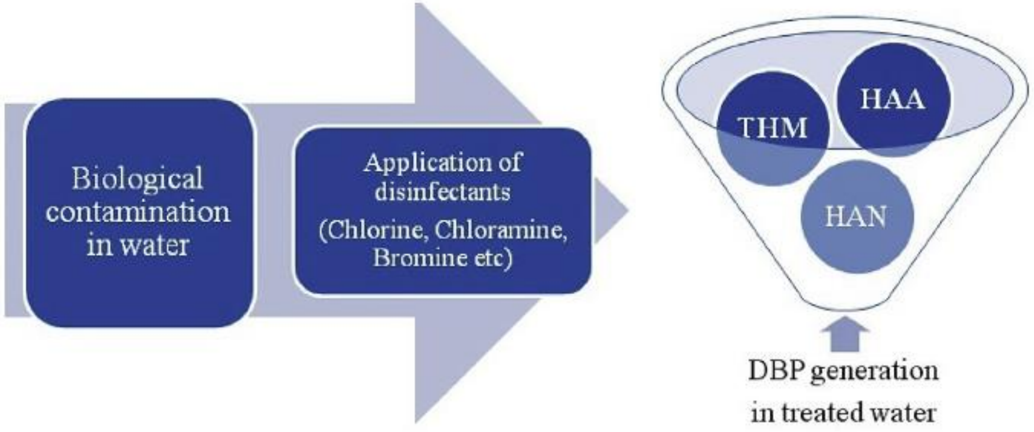


Fig. 2. Route of DBPs generation in water.

Table 1
Common DBP classes, human health disorders and treatment options.

DBP class	Detection techniques	Guideline values (μg/L)			Human health problems	Treatment options	References
		WHO (2015)	U. S. Environmental Protection Agency (USEPA, U. S. Environmental Protection Agency (USEPA).Method 552.2. 1995. Dalapon in Drinking Water by Ion Exchange Liquid–Solid Extraction, Derivatization and Gas Chromatography with Electron Capture Detector, Cincinnati, OH, Environmental Monitoring and System Laboratory. United States Environmental Protection Agency (USEPA).	BIS (2012)			
THM	GC-MS; GC-ECD; GC[63]-NiECD; Hach THM Plus method; P&T/GC-PID-ELCD	200	80 (as TTHM)	100 (as TTHM)	Carcinogenicity, Disorders of liver, kidney and reproductive system, Nervous failures; Cytotoxicity and genotoxicity; birth defects	Filtration; Ion exchange; Combined approaches	Gopal et al. (2007); Cantor et al. (2010); Mishra et al. (2014); U. S. Environmental Protection Agency (USEPA, U. S. Environmental Protection Agency (USEPA).Method 552.2. 1995. Dalapon in Drinking Water by Ion Exchange Liquid –Solid Extraction, Derivatization and Gas Chromatography with Electron Capture Detector, Cincinnati, OH, Environmental Monitoring and System Laboratory. United States Environmental Protection Agency (USEPA).; Zainudin et al. (2017); Chhipi-Shrestha et al. (2018); De Castro Medeiros et al. (2019); Ali et al. (2019); Kwarciak-Kozłowska (2020)
HAA	GC-ECD; Hach THM Plus method; IC-ESI-MS/MS, IC-CD	–	60	60	Carcinogenicity, reproductory disorders, disorders of liver, kidney, spleen and growth retardation; Cytotoxicity and genotoxicity	Filtration	Gopal et al. (2007); Cantor et al. (2010); Mishra et al. (2014); Bond et al. (2012) U. S. Environmental Protection Agency (USEPA, U. S. Environmental Protection Agency (USEPA).Method 552.2. 1995. Dalapon in Drinking Water by Ion Exchange Liquid–Solid Extraction, Derivatization and Gas Chromatography with Electron Capture Detector, Cincinnati, OH, Environmental Monitoring and System Laboratory. United States Environmental Protection Agency (USEPA).; Zainudin et al. (2017); Chhipi-Shrestha et al. (2018); Ali et al. (2019)
HAN	GC-ECD	90	–	–	Carcinogenicity, mutagenacity and clastogenic effects	–	Gopal et al. (2007); Chhipi-Shrestha et al. (2018); Kwarciak-Kozłowska (2020)

AHA SCIENTIFIC STATEMENT

Contaminant Metals as Cardiovascular Risk Factors: A Scientific Statement From the American Heart Association

Gervasio A. Lamas, MD, FAHA, Chair; Aruni Bhatnagar, PhD, FAHA; Miranda R. Jones, MHS, PhD; Koren K. Mann, PhD; Khurram Nasir, MD, MPH, FAHA; Maria Tellez-Plaza, MD, PhD; Francisco Ujueta, MD, MS; Ana Navas-Acien, MD, PhD, Vice Chair; on behalf of the American Heart Association Council on Epidemiology and Prevention; Council on Cardiovascular and Stroke Nursing; Council on Lifestyle and Cardiometabolic Health; Council on Peripheral Vascular Disease; and Council on the Kidney in Cardiovascular Disease

ABSTRACT: Exposure to environmental pollutants is linked to increased risk of cardiovascular disease. Beyond the extensive evidence for particulate air pollution, accumulating evidence supports that exposure to nonessential metals such as lead, cadmium, and arsenic is a significant contributor to cardiovascular disease worldwide. Humans are exposed to metals through air, water, soil, and food and extensive industrial and public use. Contaminant metals interfere with critical intracellular reactions and functions leading to oxidative stress and chronic inflammation that result in endothelial dysfunction, hypertension, epigenetic dysregulation, dyslipidemia, and changes in myocardial excitation and contractile function. Lead, cadmium, and arsenic have been linked to subclinical atherosclerosis, coronary artery stenosis, and calcification as well as to increased risk of ischemic heart disease and stroke, left ventricular hypertrophy and heart failure, and peripheral artery disease. Epidemiological studies show that exposure to lead, cadmium, or arsenic is associated with cardiovascular death mostly attributable to ischemic heart disease.

Originally published12 Jun 2023
https://doi.org/10.1161/JAHA.123.029852Journal of the American Heart Association. 2023;0:e029852

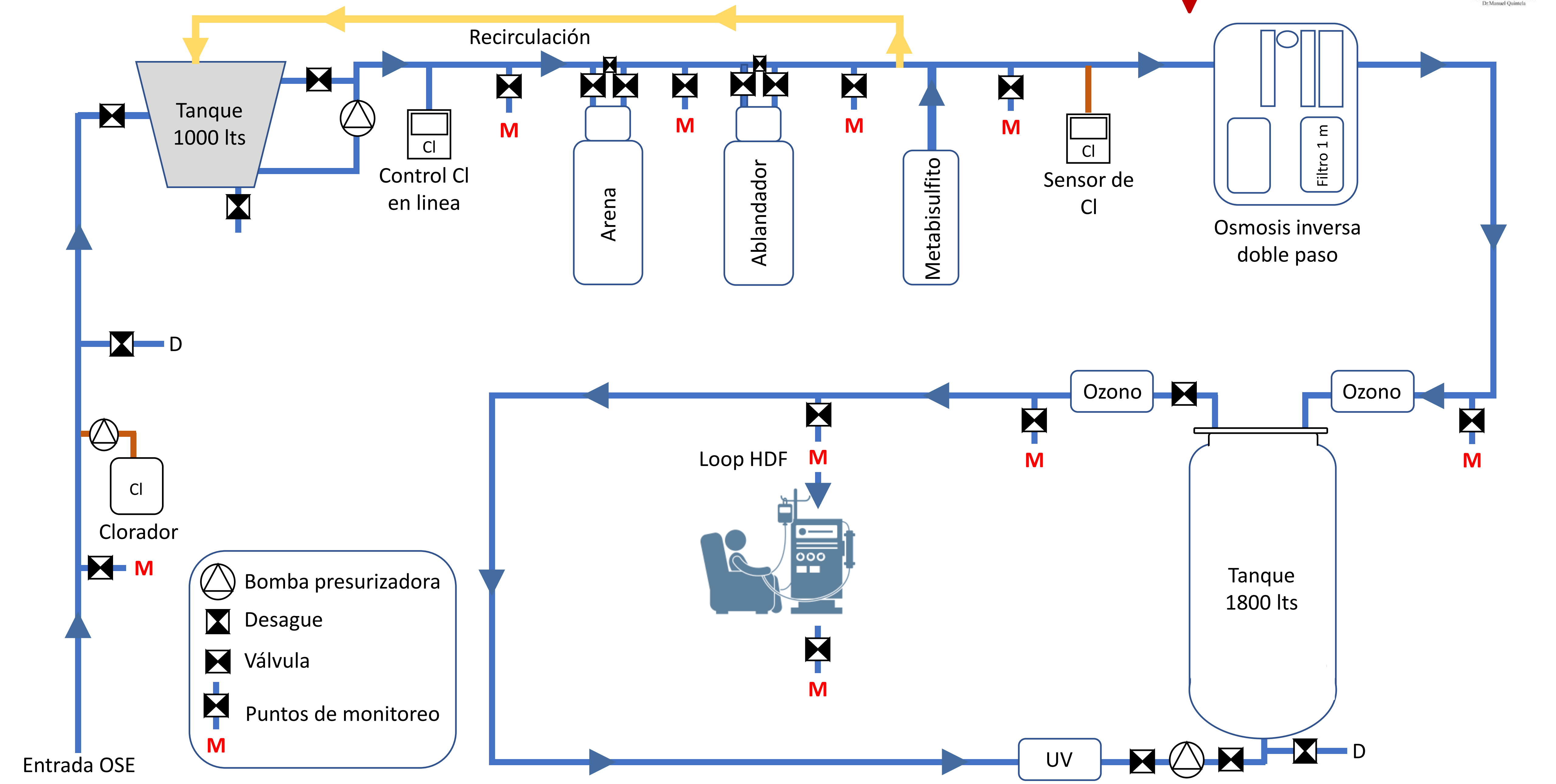
Salinización

- 440 mg/l de Na   equivale a 1.12 gs por litro de agua.
  - Consumo habitual 2lt
  - Consumo en preparación de alimentos

- Dilución

- Osmosis Inversa

Hemodiafiltración en línea – Experiencia del Hospital de Clínicas



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- Recomendaciones

INTERSALT Study Findings

Public Health and Medical Care Implications

Jeremiah Stamler, Geoffrey Rose, Rose Stamler, Paul Elliott, Alan Dyer, and Michael Marmot

Main INTERSALT Results

Qualitative Findings

1. Sodium excretion was significantly and independently related to the systolic blood pressure (SBP) of individuals. Across populations, the level of sodium excretion correlated with the slope (increase) of blood pressure with age. In four remote populations, sodium excretion was very low, and blood pressure was low at all ages.
2. Potassium had a significant independent inverse association with blood pressure of individuals.
3. Sodium/potassium ratio was significantly related to the blood pressure of individuals.
4. Body mass index (BMI) and high alcohol intake were also significantly and independently related to blood pressure of individuals.

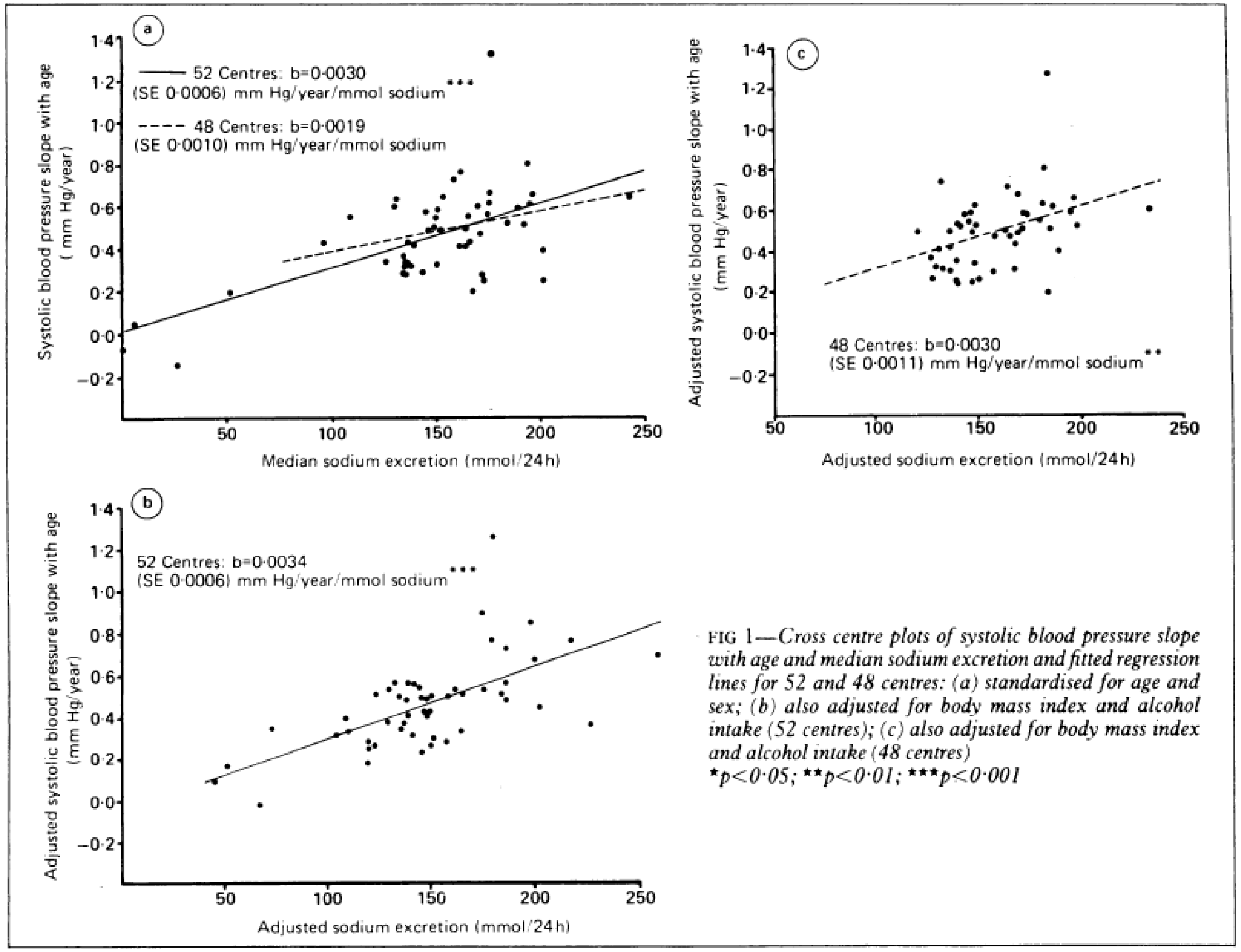
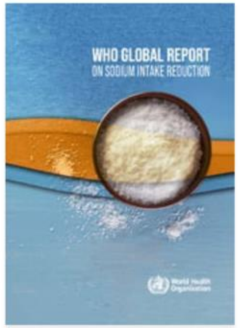


FIG 1—*Cross centre plots of systolic blood pressure slope with age and median sodium excretion and fitted regression lines for 52 and 48 centres: (a) standardised for age and sex; (b) also adjusted for body mass index and alcohol intake (52 centres); (c) also adjusted for body mass index and alcohol intake (48 centres)*
**p<0·05; **p<0·01; ***p<0·001*

WHO global report on sodium intake reduction

9 March 2023 | Global report



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Overview

The World Health Organization (WHO) has developed this report to monitor progress and identify areas for action in the implementation of sodium reduction policies and other measures within Member States and across WHO regions and World Bank income groups. For the first time, a Sodium Country Score from 1 (the lowest level) to 4 (the highest level) is allocated to each Member State based on the level of implementation of sodium reduction policies and other measures. The Sodium Country Score is used to estimate the impact of policy progress on population dietary sodium intake and cardiovascular disease.

News release

Massive efforts needed to reduce salt intake and protect lives

Event

Launch of the WHO Global report on sodium intake reduction

- a reduction in sodium intake to reduce blood pressure and risk of cardiovascular disease, stroke and coronary heart disease in adults. WHO recommends a maximum intake of <2000 mg/day sodium (<5 g/day salt) in adults;
- a reduction in sodium intake to control[1] blood pressure in children. The recommended maximum intake of <2000 mg/day sodium (<5g/day salt) in adults should be adjusted downward based on the energy requirements of children relative to those of adults.

[1] "Control" for this recommendation refers to the prevention of a deleterious rise in blood pressure with age.

Organización Mundial de la Salud | Temas de salud | Países | Centro de prensa | Emergencias

Reducir el consumo de sal

29 de abril de 2020

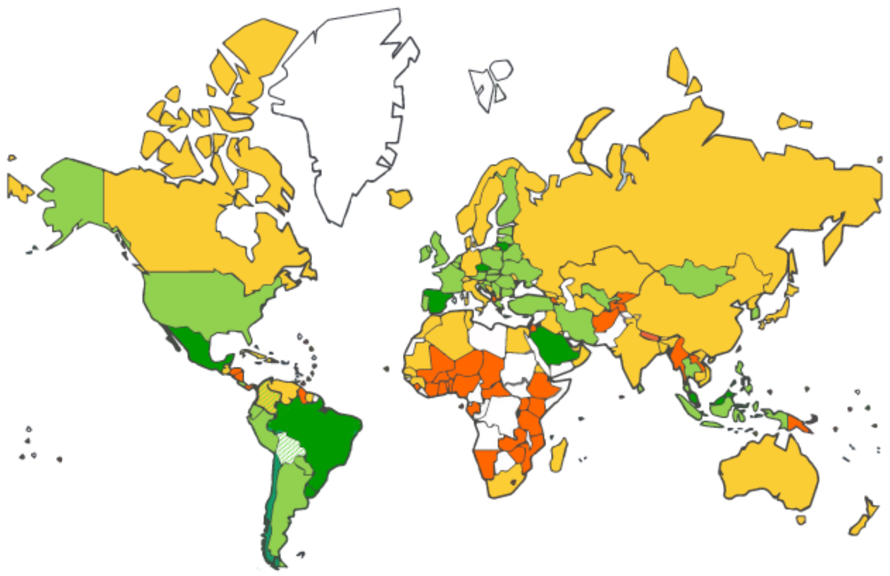
Datos y cifras

- **El elevado consumo de sodio (> 2 gramos/día, equivalente a 5 gramos de sal por día) y la absorción insuficiente de potasio (menos de 3,5 gramos por día) contribuyen a la hipertensión arterial y aumentan el riesgo de cardiopatía y accidente cerebrovascular.**
- **La sal es la principal fuente de sodio en nuestra alimentación, aunque también puede aportarlo el glutamato de sodio, un condimento utilizado en muchas partes del mundo.**
- **La mayoría de las personas consumen demasiada sal, de 9 a 12 gramos por día en promedio, es decir, dos veces la ingesta máxima recomendada.**
- **Un consumo de sal inferior a 5 gramos diarios en el adulto contribuye a disminuir la tensión arterial y el riesgo de enfermedad cardiovascular, accidente cerebrovascular e infarto de miocardio. El principal beneficio de reducir la ingesta de sal es la correspondiente disminución de la hipertensión arterial.**
- **Los Estados Miembros de la OMS han acordado reducir en un 30% el consumo de sal de la población mundial de aquí a 2025.**
- **La reducción de la ingesta de sal se considera una de las medidas más costoeficaces que los países pueden tomar para mejorar la situación sanitaria de la población. Las medidas principales de reducción generarán un año más de vida sana a un costo inferior al ingreso anual medio o al producto interno bruto por persona.**

Table 2. Sodium reduction policies and other measures implemented in the Region of the Americas

Score 1	Score 2	Score 3	Score 4
A national policy commitment	At least one voluntary policy	At least one mandatory policy + a declaration of sodium on pre-packaged food	At least two mandatory policies and all WHO sodium related best buys + a declaration of sodium on pre-packaged food
Bahamas, Belize, Dominican Republic, Grenada, Guyana, Honduras, Nicaragua, Panama, Saint Kitts and Nevis, Saint Lucia, Trinidad and Tobago	Antigua and Barbuda, Barbados, Canada, Colombia, Cuba, Guatemala, Haiti, Jamaica, Saint Vincent and the Grenadines, Suriname, Venezuela (Bolivarian Republic of)	Argentina, Costa Rica, Ecuador, El Salvador, Paraguay, Peru, United States of America	Brazil, Chile, Mexico, Uruguay
11	11	7	4

Map 1. Global sodium reduction policies and measures as of October 2022



- **1. National policy commitment to reduce sodium intake:** National policies, strategies or action plans that express a commitment to reduce sodium intake
- **2. Voluntary measures to reduce sodium:** Voluntary measures that reduce sodium in the food supply or encourage consumers to make healthier food choices about sodium
- **3. Mandatory measures adopted for sodium reduction:** Mandatory measures to reduce sodium in the food supply or encourage consumers to make healthier food choices, including mandatory declaration of sodium on all pre-packged food
- **4. Multiple mandatory measures adopted for sodium reduction, and implementation of all related WHO Best Buys for tackling NCDs:** Multiple mandatory measures, mandatory declaration of sodiu mon all pre-packged food, and all WHO sodium-related best buys
- Mandatory measures for sodium reduction adopted to bring country to Score 3 (not yet all in effect
- Missing data

Blood Pressure in relation to 24-Hour Urinary Sodium and Potassium Excretion in a Uruguayan Population Sample

Paula Moliterno,[1] Ramón Álvarez-Vaz,[2] Matias Pécora,[3]
Leonella Luzardo,[3,4] Luciana Borgarello,[5] Alicia Olascoaga,[5] Carmen Marino,[6]
Oscar Noboa,[4] Jan A. Staessen,[7,8] and José Boggia[3,4]

International Journal of Hypertension
Volume 2018, Article ID 6956078, 10 pages
https://doi.org/10.1155/2018/6956078

3.2. Urinary Sodium Excretion. The overall 24-hour urinary sodium excretion was 152.9 ± 57.3 mmol/day (8.9 ± 3.4g/day of NaCl). Sodium excretion was >2.0 g/day in 89.9% of participants. On average, urinary sodium excretion was similar regardless of an individual's BP status. Nevertheless, when adjusting urinary sodium excretion by body weight, normotensive participants had higher sodium excretion levels than hypertensive participants ($P < 0.01$; Table 2). The estimated daily urinary sodium excretion was higher in men than in women with an average difference of 35.2 mmol (95% confidence interval (CI): 17.0–53.3; $P < 0.001$); however, after adjusting for body weight, this sex difference was lost ($P = 0.95$; Table 2). Sodium excretion increased with BMI ($P < 0.0001$ for trend); however, after adjusting the urinary sodium excretion for body weight, the relationship was lost ($P = 0.13$ for trend). Participants in the fourth age quartile had

PAN AMERICAN JOURNAL OF PUBLIC HEALTH

Original research

Salt-related practices and its association with 24-hour urinary sodium excretion in an Uruguayan population cohort

Paula Moliterno[1], Carmen Marino Donangelo[1], Luciana Borgarello[2], Leticia Oviedo[3], Romina Nogara[3], Alicia Olascoaga[2] and José Boggia[4]

Suggested citation Moliterno P, Donangelo CM, Borgarello L, Oviedo L, Nogara R, Olascoaga A, et al. Salt-related practices and its association with 24-hour urinary sodium excretion in an Uruguayan population cohort. Rev Panam Salud Publica. 2022;46:e180. https://doi.org/10.26633/RPSP.2022.180

TABLE 2. 24-hour urinary sodium and potassium excretion according to study variables

Variable[a]	UNa (g/day)	p[b]	UK (g/day)	p[b]
Hypertension				
Yes	3.6±1.6	0.83	2.3±0.70	0.43
No	3.6±1.7		2.1±0.86	
Diabetes				
Yes	3.6±1.3	0.97	2.4±0.75	0.40
No	3.6±1.7		2.2±0.82	
Age (years)				
< 40	4.1±2.1	0.021	2.2±1.00	0.83
≥ 40 < 57	3.6±1.4		2.1±0.75	
≥ 57	3.2±1.3		2.2±0.66	
BMI (kg/m²)				
Normal	3.0±1.4	0.010	1.9±0.71	0.055
Overweight	3.7±1.3		2.2±0.77	
Obesity	4.0±2.0		2.3±0.90	
Waist/height ratio				
High	3.8±1.7	0.0003	2.3±0.81	0.0043
Normal	2.6±0.72		1.8±0.69	
eGFR (mL/min/1.73 m²)				
≤ 60 (mL/min/1.73 m²)	3.0±1.2	0.31	2.4±1.13	0.40
> 60 (mL/min/1.73 m²)	3.7±1.7		2.2±0.80	

[a] Mean values ± SD. [b] p-value for trend using general lineal models. UNa urinary sodium excretion; UK urinary potassium excretion; Hypertension was defined as blood pressure of at least 140 mm Hg systolic or 90 mm Hg diastolic or use of antihypertensive drugs. Diabetes was defined as self-reported diagnosis, a fasting plasma glucose of 126 mg/dL or higher or use of antidiabetic drugs. BMI: body mass index (the underweight category was not considered as there were no participants with BMI < 18.5 kg/m²). High waist-to-height ratio was defined as ≥ 0.5. eGFR: Estimated glomerular filtration rate, derived from the *Chronic Kidney Disease Epidemiology Collaboration equation*.
Source: The authors based on these results and published data.

TABLE 3. Knowledge, attitudes and salt-related behavior according to sex, age categories, body mass index and education

Variable, *n* (%)	Sex			Age (years)				BMI (kg/m²)				Education		
	Women *n* = 108	Men *n* = 51	p	< 40 *n* = 52	≥ 40 < 57 *n* = 53	≥ 57 *n* = 54	p	Normal *n* = 43	Overweight *n* = 61	Obesity *n* = 55	p	≤ 9 years *n* = 93	> 9 years *n* = 66	p
Knowledge														
Maximum daily amount of salt recommended														
Less than 10 g	0	4 (7.8)	0.019	1 (1.9)	1 (1.9)	2 (3.7)	0.79	0	1 (1.6)	3 (5.5)	0.022	4 (4.3)	0	0.55
Less than 8 g	2 (1.9)	2 (3.9)		1 (1.9)	1 (1.9)	2 (3.7)		1 (2.3)	3 (4.9)	0		3 (3.2)	1 (1.5)	
Less than 5 g	9 (8.3)	1 (2.0)		4 (7.7)	3 (5.7)	3 (5.6)		3 (7.0)	6 (9.8)	1 (1.8)		6 (6.5)	4 (6.1)	
Less than 2 g	12 (11.1)	7 (13.7)		4 (7.7)	5 (9.4)	10 (18.5)		8 (18.6)	9 (14.8)	2 (3.6)		11 (11.8)	8 (12.1)	
Don't know	85 (78.7)	37 (72.6)		42 (80.8)	43 (81.1)	37 (68.5)		31 (72.1)	42 (68.9)	49 (89.1)		69 (74.2)	53 (80.3)	
Do you think that a high salt intake could cause health problems?														
Agree	95 (88.0)	45 (88.2)	0.99	48 (92.3)	48 (90.6)	44 (81.5)	0.18	40 (93.0)	48 (78.7)	52 (94.6)	0.016	80 (86.0)	60 (90.9)	0.35
Do not agree	13 (12.0)	6 (11.8)		4 (7.7)	5 (9.4)	10 (18.5)		3 (7.0)	13 (21.3)	3 (5.5)		13 (14.0)	6 (9.1)	
If yes, what problems?														
High blood pressure														
Yes	89 (93.7)	40 (88.9)	0.33	44 (91.7)	43 (89.6)	42 (95.4)	0.63	40 (100)	41 (85.4)	48 (92.3)	0.031	70 (87.5)	59 (98.3)	0.024
No	6 (6.3)	5 (11.1)		4 (8.3)	5 (10.4)	2 (4.6)		0 (0)	7 (14.6)	4 (7.7)		10 (12.5)	1 (1.7)	
Heart attacks														
Yes	11 (11.6)	5 (11.1)	0.94	2 (4.2)	8 (16.7)	6 (13.6)	0.13	5 (12.5)	5 (10.4)	6 (11.5)	0.95	13 (16.3)	3 (5.0)	0.058
No	84 (88.4)	40 (88.9)		46 (95.8)	40 (83.3)	38 (86.4)		35 (87.5)	43 (89.6)	46 (88.5)		67 (83.8)	57 (95.0)	
Osteoporosis														
Yes	31 (32.6)	15 (33.3)	0.93	10 (20.8)	21 (43.8)	15 (34.1)	0.056	13 (32.5)	16 (33.3)	17 (32.7)	0.99	27 (33.8)	19 (31.7)	0.80
No	64 (67.4)	30 (66.7)		38 (79.2)	27 (56.3)	29 (65.9)		27 (67.5)	32 (66.7)	35 (67.3)		53 (66.3)	41 (68.3)	
Stroke														
Yes	6 (6.3)	4 (8.9)	0.73	0 (0)	2 (4.2)	8 (18.2)	0.014	1 (2.5)	5 (10.4)	4 (7.7)	0.39	8 (10.0)	2 (3.3)	0.19
No	89 (96.7)	41 (91.1)		48 (100)	46 (95.8)	36 (81.8)		39 (97.5)	43 (89.6)	48 (92.3)		72 (90.0)	58 (96.7)	
Stomach cancer														
Yes	26 (27.4)	16 (35.6)	0.32	12 (25.0)	14 (29.2)	16 (36.4)	0.49	12 (30)	14 (29.2)	16 (30.8)	0.98	27 (33.8)	15 (25.0)	0.26
No	69 (72.6)	29 (64.4)		36 (75.0)	34 (70.8)	28 (63.6)		28 (70)	34 (70.8)	36 (69.2)		53 (66.3)	45 (75.0)	
Kidney stones														
Yes	1 (1.1)	1 (2.2)	0.54	1 (2.1)	1 (2.1)	0 (0)	0.99	1 (2.5)	1 (2.1)	0 (0)	0.54	1 (1.3)	1 (1.7)	0.99
No	94 (98.9)	44 (97.8)		47 (97.9)	47 (97.9)	44 (100)		39 (97.5)	47 (97.9)	52 (100)		79 (98.8)	59 (98.3)	
Attitude														
Knowledge of salt content in foods														
Yes	63 (58.3)	32 (62.8)	0.60	33 (63.5)	31 (58.5)	31 (57.4)	0.80	26 (60.5)	32 (52.5)	37 (67.3)	0.27	53 (57.0)	42 (63.6)	0.40
No	45 (41.7)	19 (37.2)		19 (36.5)	22 (41.5)	23 (42.6)		17 (39.5)	29 (47.5)	18 (32.7)		40 (43.0)	24 (36.4)	
How much salt do you think you consume?														
Too much	11 (10.2)	11 (21.6)	0.12	11 (21.2)	7 (13.2)	4 (7.4)	0.046	7 (16.3)	7 (11.5)	8 (14.5)	0.90	15 (16.1)	7 (10.6)	0.50
Just the right amount	78 (72.2)	30 (58.8)		32 (61.5)	41 (77.4)	35 (64.8)		27 (62.8)	44 (72.1)	37 (67.3)		63 (67.7)	45 (68.2)	
Not enough	19 (17.6)	10 (19.6)		9 (17.3)	5 (9.4)	15 (27.8)		9 (20.9)	10 (16.4)	10 (18.2)		15 (16.1)	14 (21.2)	

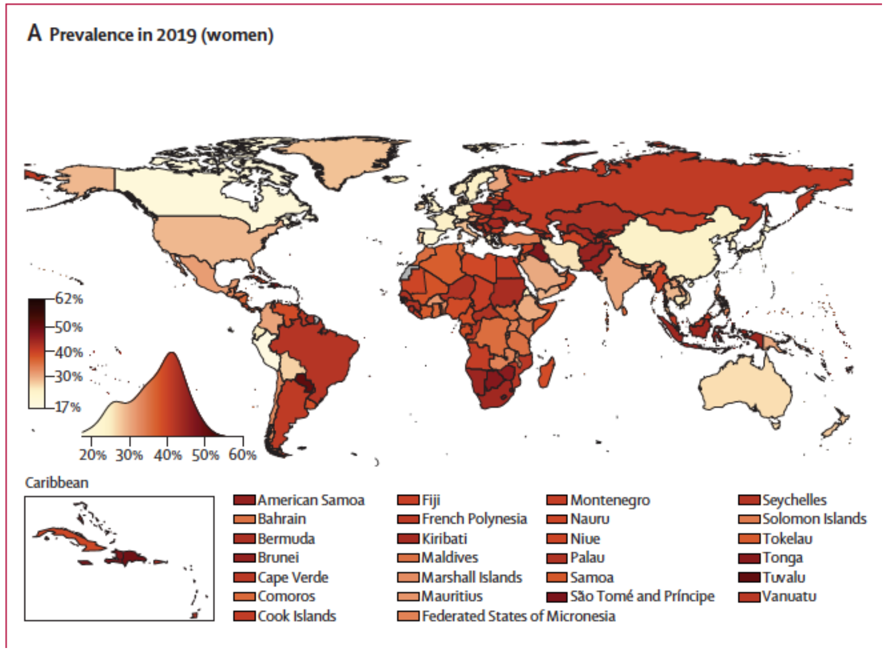
Hoja de ruta

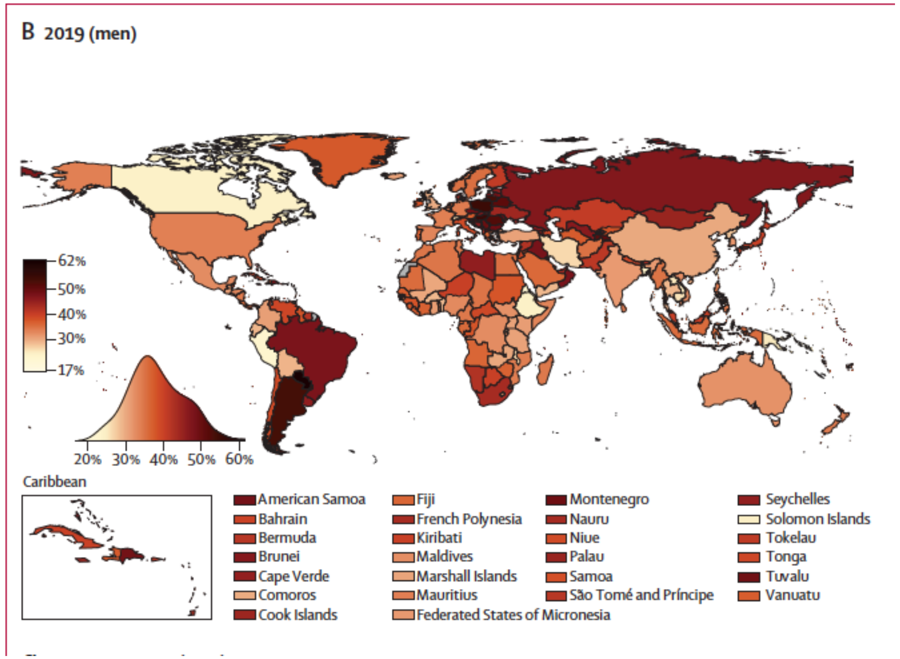
- Agua corporal
  - Distribución
  - Presión arterial media
  - Sodio corporal
- Sanitización
  - Niveles aceptables
- Ingesta diaria de sodio
- Hipertensión Arterial
- Mortalidad
- Grupos de riesgo
- Recomendaciones

Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants

*NCD Risk Factor Collaboration (NCD-RisC)**

PhD Bin Zhou, Prof. Majid Ezzati Imperial College of London





Lancet 2021; 398: 957–80

Published Online
August 24, 2021
https://doi.org/10.1016/S0140-6736(21)01330-1

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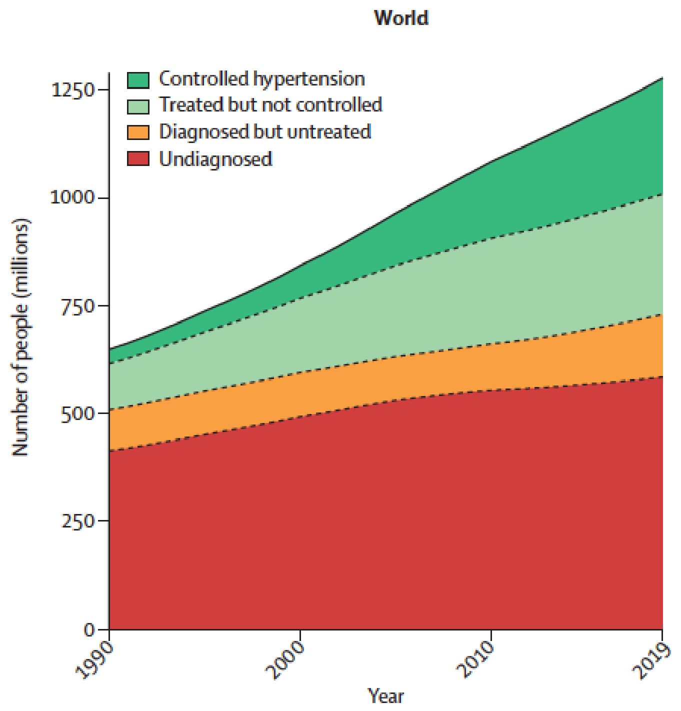

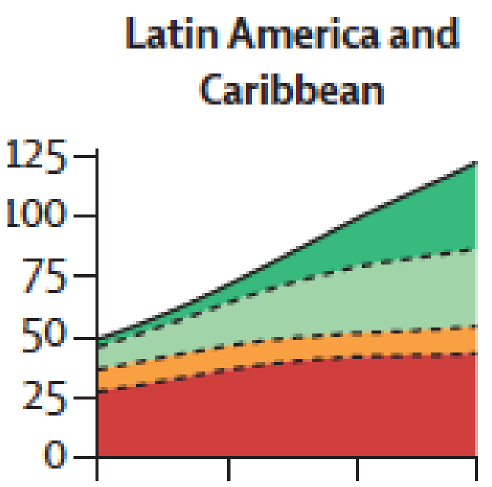

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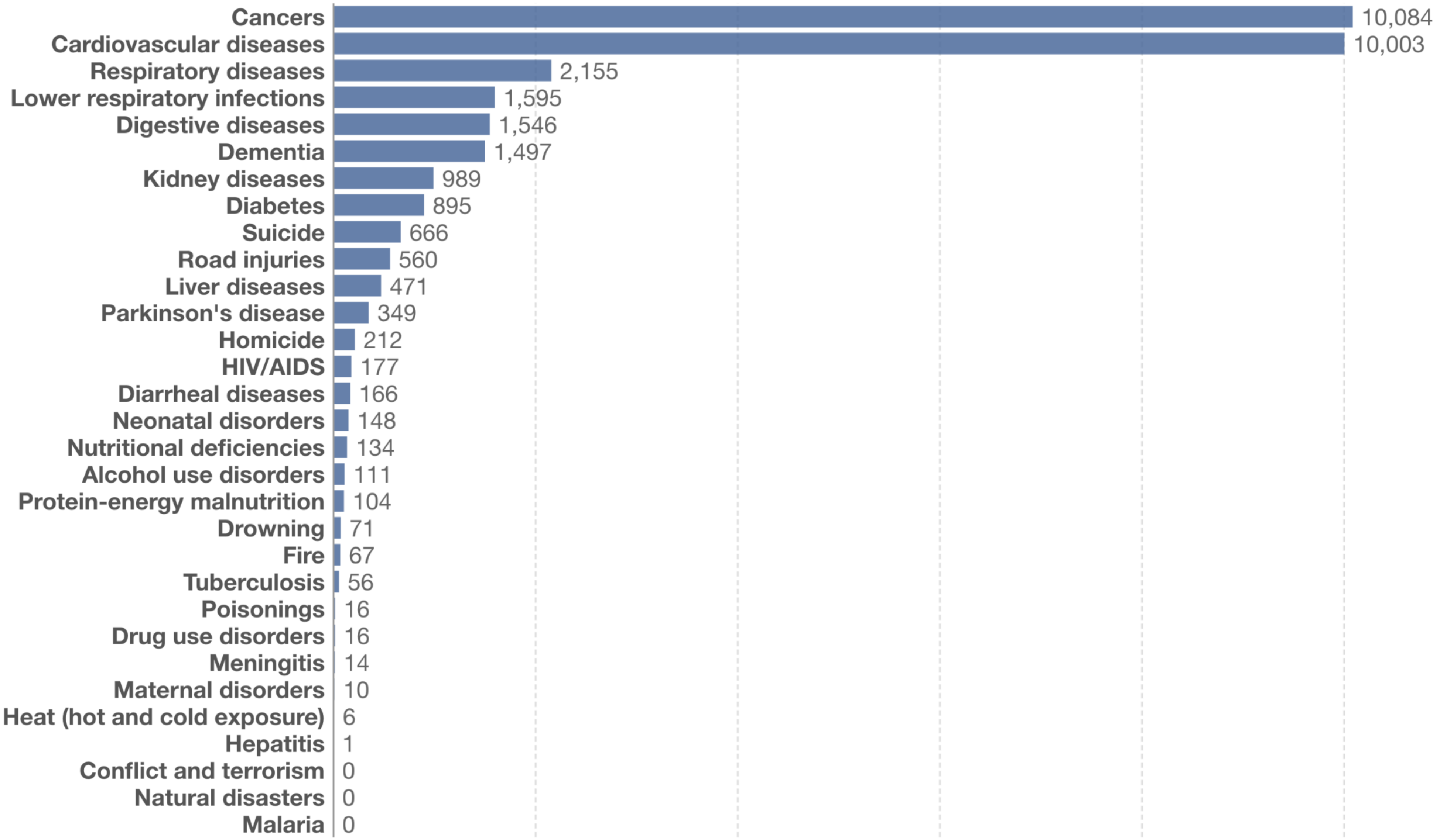
Number of deaths by cause, Uruguay, 2019



Source: IHME, Global Burden of Disease (2019)

OurWorldInData.org/causes-of-death • CC BY

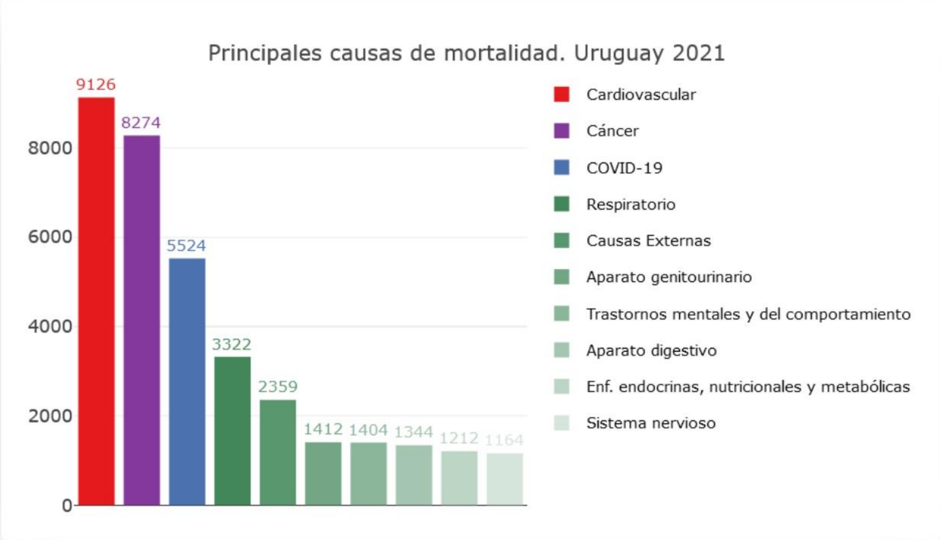


Figura 1.1: Principales causas de mortalidad. Uruguay 2021. Fuente MSP.

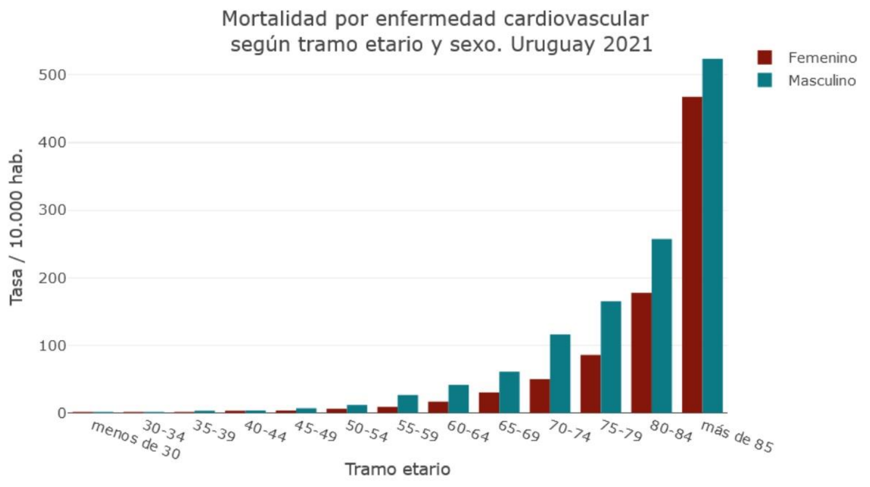


Figura 1.5: Mortalidad global por ECV según tramo etario y sexo. Uruguay 2021. Fuente MSP.

Tabla 1.4: Tasa de mortalidad cada 100.000 habitantes, según causa. Uruguay 2021. Fuente MSP.

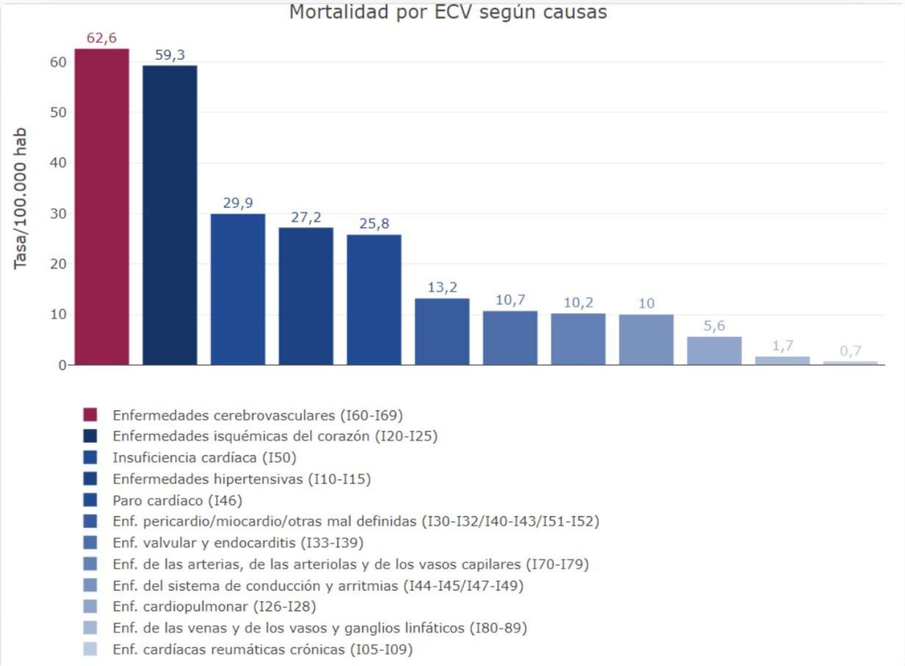


Figura 1.8: Muertes por enfermedades cardiovasculares según causas (CIE- 10). Uruguay 2021. Fuente MSP

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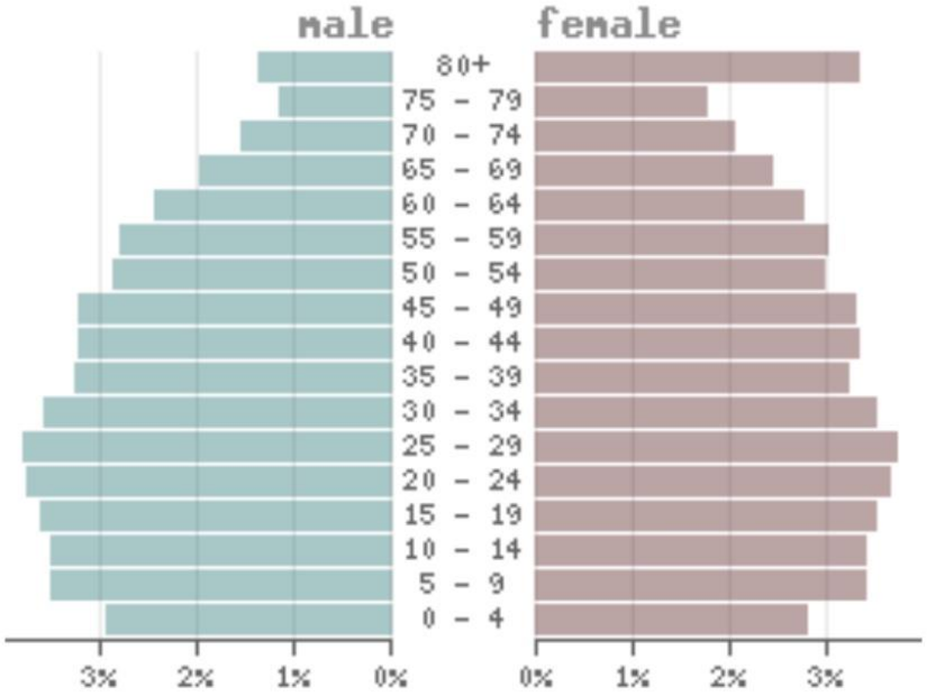
Población

Población:	3.426.000
Habitantes por km²:	19,44
Esperanza de vida (hom.):	Ø 74,7 años
Esperanza de vida (muj.):	Ø 81,9 años
Tasa de natalidad:	10,3 ‰
Tasas de muerte:	9,4 ‰
Hombres/mujeres:	48,4% : 51,6%

Pirámide de población



Grupos de riesgo

- Hipertensión arterial
  - Subdiagnóstico
  - 37% de la población general
  - 60% mayores de 60 años
- Embarazadas
- Enfermedad renal crónica
  - Diálisis crónica
  - Trasplante renal
- Insuficiencia cardíaca
- Cirrosis hepática

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Recomendaciones en relación al consumo de agua de OSE en Montevideo y Canelones, zona metropolitana
09/05/2023

- **Población que utiliza medicamentos antihipertensivos y diuréticos**

    - Deberán disminuir al máximo el consumo de alimentos con exceso de sodio.
    - Podrán seguir consumiendo el agua de OSE hasta un litro por día y se recomienda completar su ingesta habitual con agua mineral.

- **Población con alguna de las siguientes condiciones: enfermedad renal crónica, insuficiencia cardíaca, cirrosis, embarazadas**

    - Evitar en lo posible el consumo de agua de OSE, asesorado por su médico tratante.
    - En caso de tener que tomarla, se recomienda no exceder el litro de agua/día y aumentar la frecuencia de los controles de presión arterial.
    - Completar la ingesta del volumen diario de agua recomendado por su médico.

Estas recomendaciones son dinámicas y estarán sujetas a la situación detectada. Mantendremos informada a la población en función de los parámetros de referencia y el resultado del análisis de riesgo.