

# Epidemiología nutricional

Nutrición óptima ↔ Salud óptima



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## Tema 5

- **Revisiones sistemáticas y meta-análisis.**  
Planificación, diseño e interpretación.  
**Evidencia científica y valoración.**

<https://www.ucm.es/innovadieta/nube>  
<https://www.ucm.es/innovadieta/documentos-consenso>

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## Evidencia científica

Información contrastada para la toma de decisiones

*"No hay parte de la medicina más mudable ni asentada sobre cimientos más movedizos, que la ciencia de la dietética; no pasa año que no cambie algo fundamental"*

Gregorio Marañón, 1920

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## Evidencia científica

Información contrastada para la toma de decisiones

- La vitamina C previene el resfriado y la gripe
- El consumo de aperitivos contribuye al incremento de peso
- El consumo de una copa de vino al día previene la ECV
- El consumo de antioxidantes aumenta la fertilidad en mujeres
- .....



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## Evidencia científica

Información contrastada para la toma de decisiones

“Separar el grano de la paja” y sacar conclusiones

Importancia de la síntesis de la investigación

Necesidad de evidencia para práctica clínica y salud pública

-----  
¿Qué dieta es la mejor?

¿Qué le recomiendo al paciente o a la población?

Esto que dicen, ¿es cierto? ¿pueden decirlo?

¿Es cierto lo que dice esta etiqueta del lácteo?

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### “Los hombres ciegos y el elefante”



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## ¡Demasiada información! “paradoja de la información”

**La práctica clínica tiene que estar basada en la evidencia, pero, ¿en cuál?**

1940 → 2.300 revistas biomédicas

2000 → > 30.000 revistas biomédicas

2016 → Cada año se publican más de 2 millones de artículos biomédicos  
(Pérez-Rodrigo, Rev Esp Comun Salud 2016, S1, S43-S51)

### CÓMO ESTAR AL DÍA



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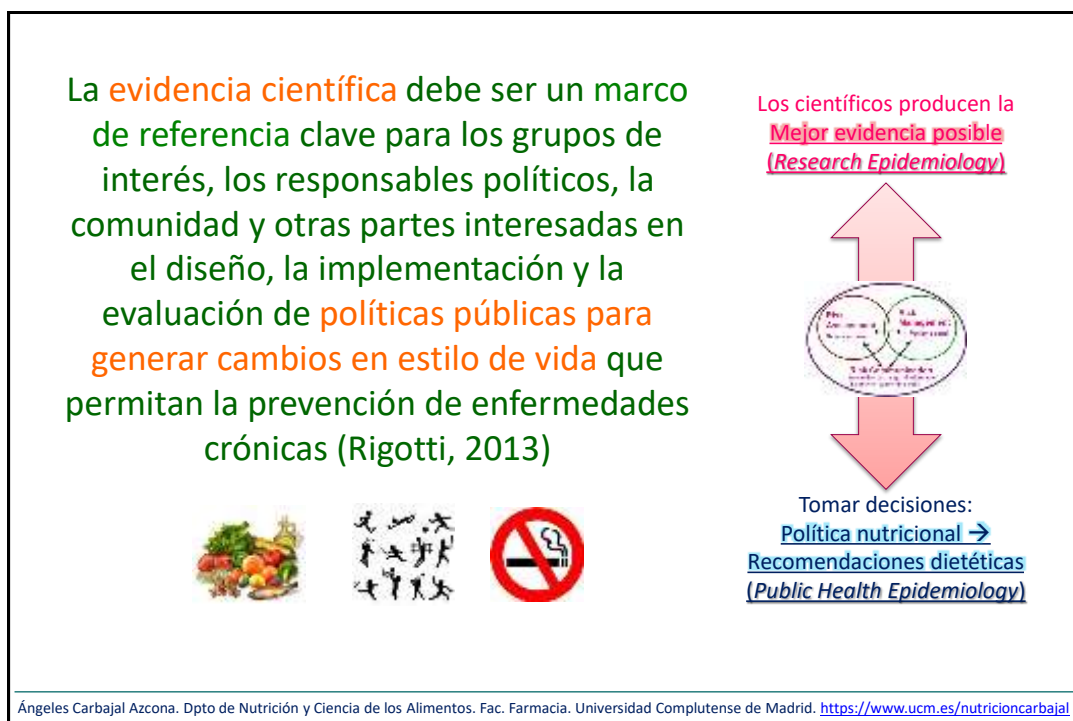
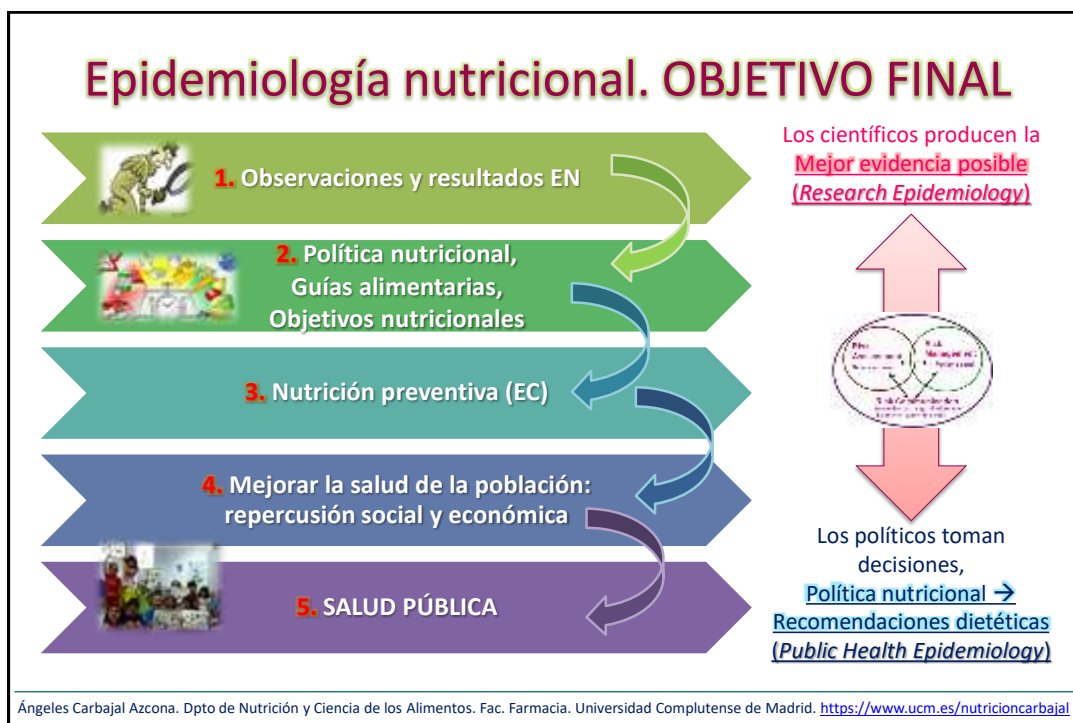
## ¡Demasiada información! “paradoja de la información”

- “Los profesionales de la salud se enfrentan a enormes dificultades para mantener actualizados sus conocimientos y para acceder a la información que necesitan al tomar decisiones”.
- “Los profesionales sanitarios se ven desbordados por una cantidad de información imposible de manejar e interpretar”.
- “Need to read 17 articles a day, 365 days a year!”
- Información contradictoria/no unanimidad.

(Madhukar Pai)

Sackett DL, WM Rosenberg, JA Gray, RB Haynes and WS Richardson 1996. Evidence based medicine: what it is and what it isn't. BMJ; 312:71-72. Disponible en URL: <http://bmj.bmjournals.com/cgi/content/full/312/7023/71>

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## Desarrollo de Políticas Públicas para Promoción de Estilo de Vida Saludable

Se requieren **iniciativas estratégicas colaborativas e integradas** de centros académicos, grupos privados (industria), gobiernos, grupos de interés y la comunidad, que permitan **un traspaso efectivo de la evidencia científica hacia medidas de salud pública** que promuevan **hábitos de vida saludables** en la población (Rigotti, 2013)



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### Summary of strength of evidence on lifestyle factors and risk of developing cardiovascular diseases (WHO, 2003)

| Evidence           | Decreased risk  | No relationship       | Increased risk   |
|--------------------|---|-----------------------|--|
| <b>Convincing</b>  | Regular physical activity<br>Linoleic acid<br>Fish and fish oils (EHA and DHA)<br>Vegetables and fruits (including berries)<br>Potassium<br>Low to moderate alcohol intake (for coronary heart disease) | Vitamin E supplements | Myristic and palmitic acids<br>Trans fatty acids<br>High sodium intake<br>Overweight<br>High alcohol intake (for stroke) |
| <b>Probable</b>    | α-Linolenic acid<br>Oleic acid<br>NSP (fibra)<br>Wholegrain cereals<br>Nuts (unsalted)<br>Plant sterols/stanols<br>Folate   | Ascorbic acid         | Dietary cholesterol<br>Unfiltered boiled coffee  |
| <b>Possible</b>    | Flavonoids<br>Soy products  |                       |  |
| <b>Inufficient</b> | Calcium<br>Magnesium<br>Vitamin C   |                       |  |

Los científicos producen la **Mejor evidencia posible (Research Epidemiology)**



**Recomendaciones dietéticas BASADAS EN LA EVIDENCIA**

↑ Plant foods: wholegrain cereals, fruits and vegetables:  
• ≥ 400 g fruits and vegetables a day

'5 a day' programmes in Germany, Poland, Spain, Sweden, the United Kingdom, '6 a day' in Denmark and '10 a day' in France and equivalent marketing-based initiatives in other countries (e.g., '3 a day' in Hungary).

- < 10% of daily energy intake from saturated fatty acids
- < 1% of daily energy intake from trans fatty acids
- < 10% of daily energy intake from free sugars
- < 5 g a day of salt

EPA, eicosapentaenoic acid; DHA, docosahexaenoic acid; NSP, non-starch polysaccharides  
WHO/FAO, Diet, Nutrition and the Prevention of Chronic Diseases. WHO Technical Report Series 916. 2003.  
<http://www.fao.org/WAIRDOCS/WHO/AC911E/AC911E00.HTM>

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## Resumen de la relación entre factores dietéticos y de estilo de vida y diabetes tipo 2 (WCRF, 1997)

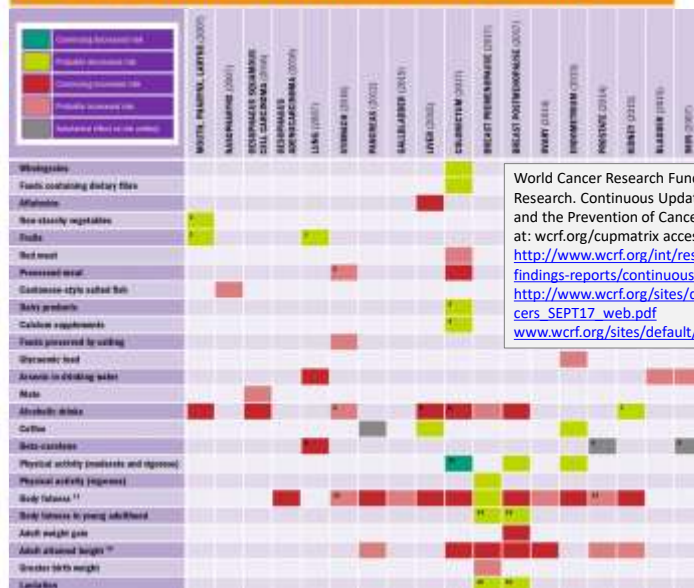
| Evidence     | Decreased risk  | No relationship | Increased risk  |
|--------------|---|-----------------|---|
| Convincing   | Voluntary weight loss in overweight and obese people<br>Physical activity                                 | -               | Overweight and obesity**<br>Abdominal obesity***<br>Physical inactivity<br>Maternal diabetes† |
| Probable     | NSPs* <span style="border: 1px solid green; padding: 2px;">Importancia en prevención y tratamiento</span> | -               | Saturated fats<br>Intrauterine growth retardation (IUGR)                                      |
| Possible     | n-3 Fatty acids<br>Low glycaemic index foods<br>Exclusive breastfeeding‡                                  | -               | Total fat intake<br>Trans fatty acids   |
| Insufficient | Vitamin E<br>Chromium<br>Magnesium<br>Moderate alcohol  | -               | Excess alcohol  |

\* NSP – Non-starch polysaccharide  
 \*\* Overweight: BMI  $\geq 25 \text{ kg/m}^2$ , obesity: BMI  $\geq 30 \text{ kg/m}^2$ .  
 \*\*\* Waist circumference: men  $\geq 102 \text{ cm}$ , women  $\geq 88 \text{ cm}$ .  
 † This includes gestational diabetes.  
 ‡ As a global public health recommendation, infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health.

(Steyn y col., 2004)

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



World Cancer Research Fund International/American Institute for Cancer Research. Continuous Update Project: Diet, Nutrition, Physical Activity and the Prevention of Cancer. Summary of Strong Evidence. Available at: [wcrf.org/cupmatrix](http://wcrf.org/cupmatrix) accessed on 16-2-2018  
<http://www.wcrf.org/int/research-we-fund/continuous-update-project-findings-reports/continuous-update-project-cup-matrix>  
[http://www.wcrf.org/sites/default/files/CUP\\_Matrix%20for%20all%20cancers\\_SEPT17\\_web.pdf](http://www.wcrf.org/sites/default/files/CUP_Matrix%20for%20all%20cancers_SEPT17_web.pdf)  
[www.wcrf.org/sites/default/files/spanish.pdf](http://www.wcrf.org/sites/default/files/spanish.pdf)

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¿Cómo se llega a estas conclusiones, cuando se dispone de TANTA información y TAN contradictoria?



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## Práctica Basada en la Evidencia

**Hay que *cribar* / *filtrar* con criterios de calidad y científicos la información que se publica para hacerla accesible al profesional que tiene que tomar decisiones.**

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# Evidencia científica

Información contrastada para la toma de decisiones

- Práctica clínica y salud pública
- Etiquetado nutricional: Aprobación de alegaciones nutricionales/salud
  - Medicina basada en la evidencia (MBE)
  - Nutrición basada en la evidencia (NuBE)
  - Práctica dietética basada en la evidencia (DNABE)

Cómo se prepara, cómo se jerarquiza, cómo interpreta, cómo se usa y aplica

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EAT FOR HEALTH - Australian Dietary Guidelines *Providing the scientific evidence for healthier Australian diets, 2013*

The guideline is designed to provide information to assist decision-making and **is based on the best available evidence at the time of development of this publication.**

<https://www.eatforhealth.gov.au/guidelines>

**2015 Dietary Guidelines for Americans**  
**SYSTEMATIC REVIEW OF THE SCIENTIFIC EVIDENCE**

<http://health.gov/dietaryguidelines/2015-scientific-report/>



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## Revista Española de **Obesidad**

Vol. 9 • Suplemento 1 • Octubre 2011

[http://www.naos.aesan.msp.es/naos/ficheros/investigacion/Consenso\\_SEEDO.pdf](http://www.naos.aesan.msp.es/naos/ficheros/investigacion/Consenso_SEEDO.pdf)

● **Recomendaciones nutricionales basadas en la evidencia para la prevención y el tratamiento del sobrepeso y la obesidad en adultos (Consenso FESNAD-SEEDO)**





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**Las declaraciones de propiedades saludables de los alimentos solamente pueden autorizarse después de efectuar una evaluación científica del nivel más elevado posible.** Reglamento (CE) N° 1924/2006 del Parlamento Europeo y del Consejo, de 20 diciembre 2006, relativo a las declaraciones nutricionales y de propiedades saludables en los alimentos.

### Position of the American Dietetic Association: Functional Foods

ADA. 2004;104/5:814-826

**Table.** Strength of evidence for functional foods currently on the US market<sup>1,2</sup>

| Functional food     | Bioactive component            | Health benefit                                     | Type of evidence | Strength of evidence | Recommended amount or frequency of intake  | Regulatory status |
|---------------------|--------------------------------|--|------------------|----------------------|--|-------------------|
| Fortified margarine | Plant sterol and stanol esters | Reduce total and LDL <sup>1</sup> cholesterol (43) | Clinical trials  | Very strong          | 1.3 g/d for sterols<br>1.7 g/d for stanols | Health claim      |
| Psyllium            | Soluble fiber                  | Reduce total and LDL cholesterol (38)              | Clinical trials  | Very strong          | 1 g/d                                      | Health claim      |
| Soy                 | Protein                        | Reduce total and LDL cholesterol (22,42)           | Clinical trials  | Very strong          | 25 g/d                                     | Health claim      |
| Whole oat products  | $\beta$ -glucan                | Reduce total and LDL cholesterol (36)              | Clinical trials  | Very strong          | 3 g/d                                      | Health claim      |
|                     |                                |  |                  |                      |  | Conventional food |

1. Foods that have a Food and Drug Administration approved health claim, intervention claim, seal, symbol, and generally are supported by two large or more well-designed, published clinical trials. For example, the top health claim table contained more than 40 clinical trials, whereas there are only a few clinical trials on soybean oil and vitamin D-rich milk. \*Adapted with permission and adapted from the American Council on Science and Health from: Heiser EM. J Am Diet Assoc. 2003;103:577S-578S.

2. LDL=low-density lipoprotein; HDL=high-density lipoprotein; TG=triglyceride; DBP=docosahexaenoic acid; CLA=conjugated linoleic acid; PU=phospholipid.

2009: <http://www.eatright.org/ada/files/FunctionalFnp.pdf>

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## Health Claims de avena, betaglucano y colesterol

### EEUU (FDA, 21-enero-1997)

(US FDA final rule for federal labelling: health claims: oats and coronary heart disease. Fed Regist 1997;62:3584-681).  
<http://www.cfsan.fda.gov/~lrd/fr970331.html>

*"Una dieta alta en fibra soluble de avena integral y baja en grasa saturada y colesterol puede reducir el riesgo coronario"*

- Consumo de 4 raciones diarias (0,75 g/ración: 3 g/día) → reduciría un 5% los niveles de colesterol → riesgo coronario

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### ADA's Evidence Analysis Library (EAL)

Use of systematically reviewed scientific evidence in making food and nutrition practice decisions by integrating best available evidence with professional expertise and client values to improve outcomes.

*Consuming diets high in total fiber (17-30 g/d) and soluble fiber (7-13 g/d) as part of a diet low in SFA and cholesterol can further ↓ TC by 2%-3% and LDL cholesterol up to 7%*

(van Horn y col., J Am Diet Assoc 2008;108:287-331)

### Grade I: Good

The evidence consists of results from studies of strong design for answering the question addressed. The results are both clinically important and consistent. The results are free of serious doubts. Studies with negative results have sufficiently large sample sizes to have adequate statistical power.

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## ¿Cómo valorar/evaluar la evidencia científica?

- Desde finales de 1990s, cualquier procedimiento realizado en Medicina, ya sea preventivo, diagnóstico, terapéutico, pronóstico o rehabilitador, tiene que estar definido por su nivel de evidencia científica (**Medicina basada en la evidencia** o basada en las pruebas).

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## Medicina basada en la evidencia (MBE)

«La aplicación consciente, explícita y juiciosa de la **mejor evidencia clínica** disponible para tomar decisiones sobre el cuidado de los pacientes y cuya práctica integra la experiencia del clínico con la mejor evidencia externa disponible procedente de una investigación sistemática»

**Prof. David Sackett, 1996**



Expresión utilizada por primera vez en **1991** por **Gordon Guyatt**.

En **1992** se constituyó el **primer grupo de trabajo en MBE en Canadá**



Sackett DL, WM Rosenberg, JA Gray, RB Haynes and WS Richardson 1996. Evidence based medicine: what it is and what it isn't. BMJ; 312:71-72. Disponible en URL: <http://bmj.bmjournals.com/cgi/content/full/312/7023/71>

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## Nutrición basada en la evidencia (NuBE)

- Aplicación sistemática de métodos científicamente rigurosos para evaluar la efectividad de las intervenciones sanitarias, tanto terapéuticas como preventivas, a nivel individual, lo que permitiría juzgar su pertinencia y decidir su aplicabilidad teniendo en cuenta las circunstancias y preferencias de los pacientes en las decisiones clínicas.
- Y, de forma implícita, también estos principios son aplicables a nivel poblacional, lo que se ha dado en llamar **Atención o Política Sanitaria Basada en la Evidencia**, mediante los que debemos valorar la tecnología, la cartera de servicios y los modelos de gestión más efectivos y eficientes, y sus resultados, y así por ejemplo las políticas alimentarias.

(Doreste y Serra, 2005)

[http://www.respyn.uanl.mx/vi/2/ensayos/NuBE\\_Indexado.htm](http://www.respyn.uanl.mx/vi/2/ensayos/NuBE_Indexado.htm)

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## Práctica dietética basada en la evidencia (DNABE)

(desde 2009) (ICDA Evidence-based Dietetic Practice Working Group = 16 asociaciones de dietistas en el mundo)

“La práctica dietética basada en la evidencia consiste en la búsqueda sistemática de evidencia científica y la evaluación de la validez, aplicabilidad e importancia de dicha evidencia para que, combinada después con la experiencia clínica del dietista-nutricionista, las opiniones y las circunstancias y valores específicos del cliente o la comunidad, sirva de guía en la toma de decisiones en el ámbito de la dietética”

Además, la práctica dietética basada en la evidencia:

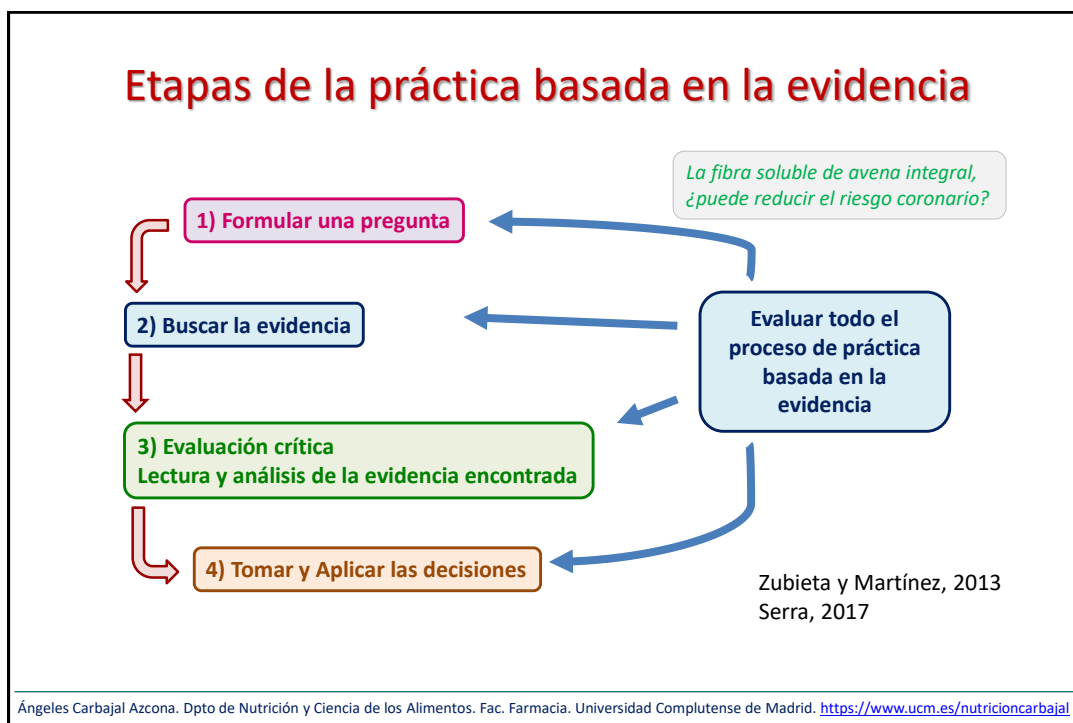
- se utiliza para tomar decisiones en todas las áreas de la práctica dietética con la finalidad de mejorar la salud de clientes (y pacientes), comunidades y poblaciones.
- establece claramente la fuente de la evidencia que sustenta las recomendaciones prácticas. Para ser pertinente y efectiva, la práctica dietética basada en la evidencia debe integrar el conocimiento de otras disciplinas.
- está fundamentada en los principios éticos y códigos de buena práctica. Esto incluye la necesidad de reflexionar acerca de cómo las perspectivas o sesgos personales pueden influenciar la interpretación de la evidencia científica.

*Approved by the ICDA Board of Directors, November 13, 2010*

<http://www.grep-aedn.es/newsletter/diciembre2010.htm>

<http://www.internationaldietetics.org/Downloads/ICDA-Report-Evidence-based-Dietetics-Practice-2010.aspx>

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## ¡Demasiada información! “paradoja de la información”

*Estado de la cuestión, state of the art*

- 1) Revisiones bibliográficas narrativas o clásicas
- 2) Revisiones sistemáticas
- 3) Meta-análisis
- 4) *Umbrella reviews: evidence synthesis with overviews of reviews and meta-epidemiologic studies*

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## 1) Revisiones bibliográficas narrativas o clásicas


(Traditional, Narrative Review, non-systematic or selective reviews)

2 o más publicaciones

No hay pregunta ni "material y métodos"

Usan métodos «informales», no explícitos y a menudo personales y subjetivos

No se especifica el proceso seguido para buscar, reunir y evaluar la información para sacar conclusiones y, sin esta información, no será posible repetir y verificar los resultados y las conclusiones de la revisión.



*Lancet* 1995 Apr; 14(2):124-36

**The health effects of vitamin C supplementation: a review.**

Brosch J, Lippman L.  
Hoffman-La Roche Inc., Pararas, New Jersey 07652, USA.

Erratum in:  
J Am Coll Nutr 1995 Aug; 14(4):398.  
J Am Coll Nutr 1995 Jun; 14(3):258.

**Abstract**  
A comprehensive review of the literature indicates that populations with long-term consumption of higher than RDA levels of vitamin C (> or = 60 mg/day) from foods and/or supplements have reduced risks of cancer at several sites, cardiovascular disease, and cataracts. The safety of higher than RDA intakes of vitamin C is confirmed in eight placebo-controlled, double-blind studies and six non-placebo clinical trials in which up to 10,000 mg of vitamin C was consumed daily for up to 3 years. There are no clinical data which suggest that vitamin C's enhancement of non-heme iron absorption in individuals with low iron status could be a critical factor in the possible increased risk of heterozygous hemochromatosis-related cardiovascular disease. In fact, the cumulative data do not confirm that iron status is related to risk of cardiovascular disease. Moreover, higher than RDA intakes of vitamin C have been associated with several indices of lowered cardiovascular disease risk including increases in HDL, and decreases in LDL, oxidation, blood pressure and cardiovascular mortality.

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## 2) Revisiones sistemáticas

(Overview, Systematic literature review)

Trabajo de investigación realizado por expertos que revisa la evidencia científica sobre una pregunta claramente definida.

Usa métodos sistemáticos y explícitos para identificar, seleccionar y evaluar críticamente estudios relevantes y extraer y analizar datos de interés para obtener conclusiones consistentes (The Centre for Review and Dissemination).

Mulrow, C. D. (1994). Systematic reviews: Rationale for systematic reviews. *BMJ*, 309(6954):597-599.



### Primera revisión sistemática en el área de nutrición fue publicada en 1953:

Stewart CP & Guthrie P (editors) (1953)

**Lind's Treatise on Scurvy.**

A bicentenary volume containing reprint on the first Edition of a Treatise of the Scurvy, by James Lind, M. D. with additional notes, p. 314. Edinburgh: Edinburgh University Press.

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## 2) Revisiones sistemáticas

(Overview, Systematic literature review)

### Pasos básicos en la realización de revisiones sistemáticas

1. Especificación del problema. Definición de las preguntas.
2. Especificación de los criterios de inclusión y exclusión de los estudios.
3. Formulación del plan de búsqueda de la literatura.
4. Selección y recuperación de los estudios que cumplen los criterios.
5. Valoración crítica de la calidad científica de los mismos.
6. Combinación de los resultados.
7. Formulación de las conclusiones y recomendaciones.

[http://www.respyn.uani.mx/vi/2/ensayos/NuBE\\_Indexado.htm](http://www.respyn.uani.mx/vi/2/ensayos/NuBE_Indexado.htm)  
 Guerra y col., 2003 - <http://www.fisterra.com/>

### Systematic Literature Review



Fig. 1. Systematic literature review process.  
 Tiago Silva da Silva (ICT/UNIFESP)

### Steps of systematic review



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## 2) Revisiones sistemáticas

(Overview, Systematic literature review)

Pretenden ser:

- a) Rigurosas**, en cuanto a los estudios incluidos (con criterios de calidad, etc.)
- b) Informativas**, enfocadas hacia **problemas reales**, tratando de contestar una **pregunta claramente delimitada o específica**, e idealmente analizando y presentando los datos de la forma que mejor **ayude a la toma de decisiones**
- c) Exhaustivas**: su objetivo es identificar y utilizar la **mayor cantidad posible de información pertinente**, sin introducir sesgos (de publicación, de selección, etc.)
- d) Explícitas**, ya que todos los métodos utilizados en la revisión deben describirse con suficiente detalle.

(Gisbert y Bonfill, 2004)

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Importante: "explicit methods section"

REVIEW ARTICLE

A Systematic Review of the Evidence Supporting a Causal Link Between Dietary Factors and Coronary Heart Disease

Andrew Mente, PhD; Lawrence de Koning, MSc; Harry S. Shunmugan, PhD; Sonia S. Anand, MD, PhD, FRCPC

**Background:** Although a wealth of literature links dietary factors and coronary heart disease (CHD), the strength of the evidence supporting valid associations has not been evaluated systematically in a single investigation.

**Methods:** We conducted a systematic search of MEDLINE for prospective cohort studies or randomized trials investigating dietary exposures in relation to CHD. We used the Bradford Hill guidelines to derive a causation score based on 4 criteria (strength, consistency, temporality, and coherence) for each dietary exposure in cohort studies and examined for consistency with the findings of randomized trials.

**Results:** Strong evidence supports valid associations (4 criteria satisfied) of protective factors, including intake of vegetables, nuts, and "Mediterranean" and high-quality dietary patterns with CHD, and associations of harmful factors, including intake of trans-fatty acids and foods with a high glycemic index or load. Among studies of higher methodologic

quality, there was also strong evidence for monounsaturated fatty acids and "prudent" and "western" dietary patterns. Moderate evidence (3 criteria) of associations exists for intake of fish, marine ω-3 fatty acids, folate, whole grains, dietary vitamins E and C, beta carotene, alcohol, fruit, and fiber. Insufficient evidence (≤2 criteria) of association is present for intake of supplementary vitamin E and ascorbic acid (vitamin C); saturated and polyunsaturated fatty acids; total fat; α-linolenic acid; meat; eggs; and milk. Among the dietary exposures with strong evidence of causation from cohort studies, only a Mediterranean dietary pattern is related to CHD in randomized trials.

**Conclusions:** The evidence supports a valid association of a limited number of dietary factors and dietary patterns with CHD. Future evaluation of dietary patterns, including their nutrient and food components, in cohort studies and randomized trials is recommended.

Arch Intern Med. 2009;169(7):659-669

SEARCH STRATEGY AND STUDY SELECTION

We searched the MEDLINE database for prospective cohort studies and RCTs from 1990 through June 2007. The bibliographies of retrieved articles were scanned for additional cohort studies and RCTs. Two of us (A.M. and L.D.) independently assessed study eligibility. Excluded studies and reasons for exclusion were listed, and disagreement was resolved by discussion and consensus. We included original English language articles pertaining to the effect of diet on the following primary outcomes: coronary or ischemic heart disease and fatal or nonfatal myocardial infarction. These articles were also evaluated for the following secondary outcomes: angina pectoris, sudden death, cardiovascular disease, and total mortality. Relative risks (RRs) of outcomes are presented with their 95% confidence intervals (CIs) after adjusting for potential confounders. We only considered studies that followed up subjects for at least 1 year. Cohort studies had to include estimates of dietary intake using conventional dietary assessment tools (eg, food frequency questionnaires, food records, or 24-hour diet recall). Clinical trials had to be randomized and to compare dietary exposure with a control diet or a placebo. Cross-over trials were excluded if glucose biomarkers or other metabolic indicators were not evaluated because cross-over outcomes occurring after a crossover would be difficult to interpret.

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Cochrane Collaboration



Medicina basada en la evidencia

La mayoría de las revisiones sistemáticas se han hecho bajo los auspicios de la Cochrane collaboration y publicados en la Cochrane Library.

Objetivo: preparar, mantener y divulgar revisiones sistemáticas en el campo de la salud.

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- <http://www.cochrane.org/contact/entities.htm#CENTRES>
- [www.thecochranelibrary.com](http://www.thecochranelibrary.com)

Summerbell y Moore, 2007

- Higgins, J. P. and Green, S., editors (2008). Cochrane Handbook for Systematic Reviews of Interventions. Cochrane Book Series. Wiley.
- Nightingale, A. (2009). A guide to systematic literature reviews. Surgery (Oxford), 27(9):381-384.
- White, A. Schmidt, K. (2005). Systematic literature reviews. Complementary Therapies in Medicine, 13(1):54-60.

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# Cochrane Collaboration



<https://cccr.org.cochrane.org/animated-storyboard-what-are-systematic-reviews>

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The image shows the website for the Centro Cochrane Iberoamericano. At the top, it says "Centro Cochrane Iberoamericano" and "Preparar, mantener y divulgar revisiones sistemáticas sobre los efectos de la atención sanitaria." Below this, it states: "El Centro Cochrane Iberoamericano está ubicado en el Hospital de la Santa Creu i Sant Pau de Barcelona y es miembro del Instituto de Investigación Biomédica Sant Pau." There is a navigation menu on the left with items like "Sensibilización Cochrane Centro Médico", "información para recién llegados", "información para profesionales sanitarios", "información para autores e investigadores Cochrane", and "información para los pacientes y ciudadanía". In the center, there is contact information for the Hospital de la Santa Creu i Sant Pau, including the address "C/sg de Comalefadrós, Sant Antoni M, Clavet 171, 08041 Barcelona" and phone numbers "+34-93-553 79 14 Fax: +34-93-553 79 99". On the right, there is a search bar with "Idiomas" (Spanish, Catalan, English) and a "Buscar" button. Below the search bar are logos for "La Biblioteca Cochrane Plus", "Excellencia Clínica.net", "Red Cochrane Iberoamericana", and "THE COCHRANE COLLABORATION".

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## Uso de la evidencia en políticas sanitarias internacionales: la colaboración entre Cochrane y la OMS

<http://es.cochrane.org/es/news/uso-de-la-evidencia-en-pol%C3%ADticas-sanitarias-internacionales-la-colaboraci%C3%B3n-entre-cochrane-y-la>

2. The collaboration has contributed to the WHO Programme of Work in the following (below): **eLENA**

Category of Work: Non communicable diseases  
Programme Area: Nutrition

Outcome target/s: Reduced nutritional risk factors  
Short description of the collaboration:

WHO **e-Library of Evidence for Nutrition Actions (eLENA)** is an online library of evidence-informed guidance for nutrition interventions. It is a single point of reference for the latest nutrition guidelines and related information including supporting materials such as scientific evidence, background materials and commentaries from invited experts.

Cochrane has contributed to the development of eLENA since its launch in 2011. Thanks to an agreement with the publishers of the Cochrane Library, John Wiley & Sons, Ltd, eLENA users have access to the full reviews and are also able to track the use of reviews in guideline development processes<sup>5</sup>.



<http://www.who.int/elena/en/index.html>  
En español: <http://www.who.int/elena/es/index.html>

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## Uso de la evidencia en políticas sanitarias internacionales: la colaboración entre Cochrane y la OMS

<http://es.cochrane.org/es/news/uso-de-la-evidencia-en-pol%C3%ADticas-sanitarias-internacionales-la-colaboraci%C3%B3n-entre-cochrane-y-la>



**Uso de la evidencia en políticas sanitarias internacionales: la colaboración entre Cochrane y la OMS**

Cochrane es una OMS que trabaja estrechamente con la Organización Mundial de la Salud (OMS) desde 2011. En junio se publicó un informe dirigido a la OMS con los resultados de una colaboración a largo plazo entre estos dos organismos.

La colaboración se centra en responder de forma rápida, que faciliten el acceso a la OMS con los resultados generados por Cochrane:

- Desde junio de 2016, se han utilizado 400 evidencias de la Organización Mundial de la Salud (OMS) desde 2011. En junio se publicó un informe dirigido a la OMS con los resultados de una colaboración a largo plazo entre estos dos organismos.
- La creación del Comité de Normas de Evidencia, organismo regulador de evidencia y que facilita el acceso a la evidencia de la OMS y de la OMS, así de los 100 países y territorios dependientes a través de la Organización Mundial de la Salud (OMS).
- La colaboración a la OMS de Evidencia de la OMS y la creación de la OMS también utilizan evidencia Cochrane. Información sobre acceso que, en 2017, se han usado 25 evidencias de evidencia Cochrane. En 2017 se han usado 25 evidencias.
- Cochrane trabaja con la Biblioteca de Datos de Evidencia y la Biblioteca de Evidencia de la Organización Mundial de la Salud (OMS) de los países de ingresos altos que se encuentran en el mundo. Información sobre acceso que, en 2017, se han usado 25 evidencias de evidencia Cochrane. En 2017 se han usado 25 evidencias.

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- Personalised risk communication for informed decision making about taking screening tests
- 1 Physician use of red flags to screen for cancer in patients with new back pain
- 1 Physical rehabilitation for older people in long-term care
- 1 Training to recognise the early signs of recurrence in schizophrenia
- 1 Selective serotonin reuptake inhibitors for stroke recovery
- 1 **Selenium supplements for the prevention of cardiovascular disease**

<http://www.cochrane.org/>

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**Selenium supplements for the prevention of cardiovascular disease**

Rees K, Huxley L, Day C, Flwers R, Clarke A, Stranges E **Published Online: January 31, 2013**

Use of selenium enriched foods, supplements and fertilizers has increased in recent years in many countries because of the perception that selenium may reduce the risk of cardiovascular disease and other chronic conditions. Therefore, it is important to understand the effects of a nutrient that is frequently supplemented on common conditions such as cardiovascular disease or diabetes. This review assessed the effects of providing selenium supplements to healthy adults in order to prevent the occurrence of cardiovascular disease. Whether selenium supplements would reduce the risk factors associated with heart disease was also examined. We found 12 trials in which 18,715 healthy adults were randomly assigned to receive selenium supplements or placebo. The vast majority of participants involved in these trials were male individuals from the US, where people are already well nourished and take large amounts of selenium from natural foods. Overall, the included studies were regarded as at low risk of bias. In our review, providing selenium supplements to healthy adults did not prevent the occurrence of major cardiovascular disease. The increased risk of developing type 2 diabetes when taking selenium supplements, as suggested in some previous studies, could not definitely be ruled out in our review. In summary, this review of the available evidence to date suggests that taking selenium supplements is neither beneficial nor harmful for cardiovascular disease, but it is probably unnecessary for those who are already well nourished and who take large amounts of selenium from natural foods.

**Find the research**

Get full text in The Cochrane Library for this Review (free)  
 Selenium supplementation for the primary prevention of cardiovascular disease

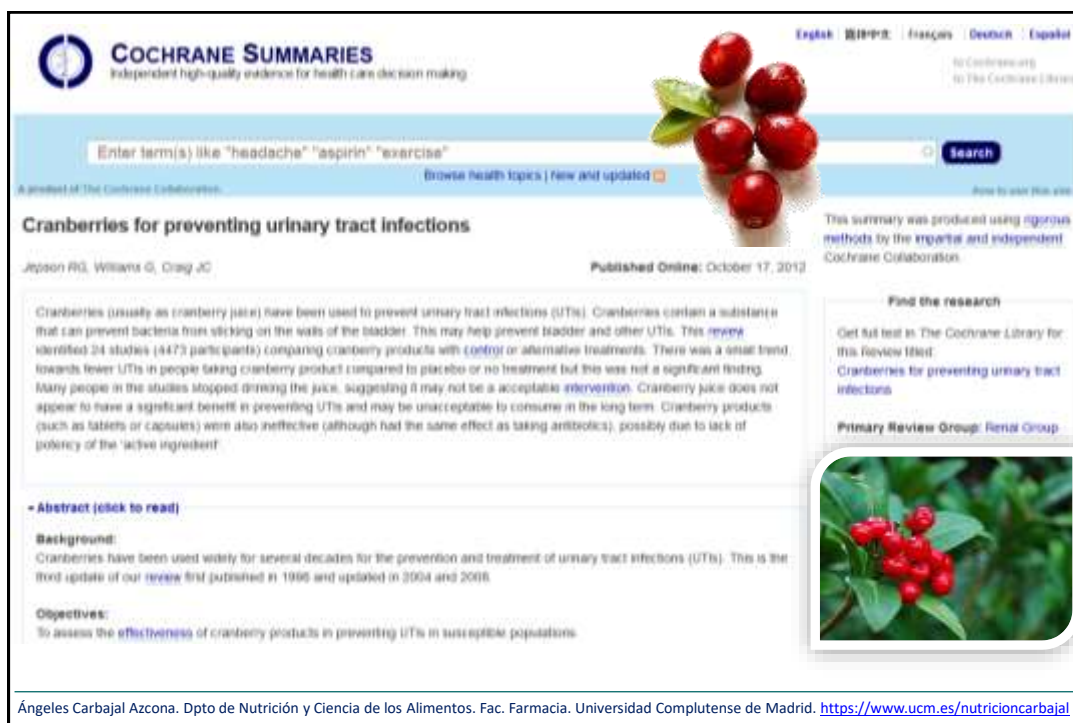
**Primary Review Group: Heart Group**

**Podcast**


+ Abstract (click to read)

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### Cranberries for preventing urinary tract infections

Jepson RG, Williams G, Craig JC Published Online: October 17, 2013

Cranberries (usually as cranberry juice) have been used to prevent urinary tract infections (UTIs). Cranberries contain a substance that can prevent bacteria from sticking on the walls of the bladder. This may help prevent bladder and other UTIs. This review identified 24 studies (4473 participants) comparing cranberry products with control or alternative treatments. There was a small trend towards fewer UTIs in people taking cranberry product compared to placebo or no treatment but this was not a significant finding. Many people in the studies stopped drinking the juice, suggesting it may not be an acceptable intervention. Cranberry juice does not appear to have a significant benefit in preventing UTIs and may be unacceptable to consume in the long term. Cranberry products (such as tablets or capsules) were also ineffective (although had the same effect as taking antibiotics), possibly due to lack of potency of the 'active ingredient'.

**Find the research**

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[Cranberries for preventing urinary tract infections](#)

Primary Review Group: [Renal Group](#)

**Abstract (click to read)**

**Background:**  
Cranberries have been used widely for several decades for the prevention and treatment of urinary tract infections (UTIs). This is the first update of our review first published in 1996 and updated in 2004 and 2008.

**Objectives:**  
To assess the effectiveness of cranberry products in preventing UTIs in susceptible populations.

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## Perlas Cochrane: Evidencia práctica para situaciones de la vida real

Breves resúmenes de revisiones sistemáticas orientadas a problemas atendidos en el ámbito de la atención primaria.

**Abstract (click to read)**

**PEARLS - Practical Evidence About Real Life Situations (click to read)**

**Clinical question:**  
How effective are cranberry products in preventing urinary tract infections (UTIs) in susceptible populations?


**Bottom line:**  
There was some evidence that cranberries (juice or capsules) may decrease the number of symptomatic UTIs over a 12-month period, particularly for women with recurrent UTIs (NNT\*7). The evidence for elderly men and women was less clear, and there was evidence cranberry products were not effective in people who needed either intermittent or indwelling catheters. \*NNT = number needed to treat to benefit 1 individual.

**Caveat:**  
Many people in the trials stopped drinking the juice, suggesting it may not be a popular intervention. It is not clear how long cranberry juice needs to be taken to be effective or what the required dose might be.

**Context:**  
No definite mechanism of action has been established for cranberries in the prevention or treatment of UTI. However, the main suggestion is cranberries prevent bacteria, particularly Escherichia coli, from adhering to uroepithelial cells lining the bladder. Without adhesion, E. coli cannot infect the mucosal surface of the urinary tract.

**Cochrane Systematic Review:**  
Jepson RG and Craig JC. Cranberries for preventing urinary tract infections. Cochrane Reviews 2006, Issue 1. Article No. CD001321. DOI: 10.1002/14651858.CD001321.pub4. This review contains 10 trials involving 1049 participants.

**Authored by:**  
Brian R McArdy  
Cochrane Primary Health Care Field



**Respuesta**

**Advertencia**

<http://www.cochraneprimarycare.org/pearls-2012-254-296>  
<http://summaries.cochrane.org/CD001321/cranberries-for-preventing-urinary-tract-infections>

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### 3) Meta-análisis

Tipo de revisión sistemática que usa métodos estadísticos para obtener un estimado único (un riesgo relativo, una diferencia de riesgos) a partir de los **resultados de los estudios independientes**.

- Procedimiento estadístico que integra los resultados de estudios independientes pero con un diseño y objetivos similares.
- Proceso de recopilación y combinación de información de diversos estudios relacionados con el propósito de llegar a una conclusión.

Se consigue:

- Una mayor potencia estadística para detectar diferencias.
- Una estimación más precisa del efecto global.
- Una técnica claramente superior y más objetiva que la revisión bibliográfica tradicional.

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### 3) Meta-análisis

**1904**

Karl Pearson (matemático británico)

**1976**

Glass GV (Psicólogo)

Introduce el término de Meta-análisis

**1970-1980**

Se redescubre para la medicina (ECV, cáncer)

Tom Chalmers (EEUU)

Richard Peto (RU)

Ian Chalmers (RU)

**1990**

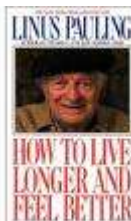
Meta-análisis: Término incluido como "Medical subject heading" en el sistema de indexación de MedLine de la National Library of Medicine  
Cochrane Centre

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## Linus Pauling (1901-1994)

1954. Premio Nobel de Química

1962. Premio Nobel de la Paz



How to live longer and feel better  
Vitamina C, resfriado común y gripe  
Cáncer y vitamina C, 1970.



Portuguese edition of Vitamin C and the  
Common Cold, a book that was translated  
into nine different languages.

Linus Pauling; José María Ladero Quesada (trad.)  
Madrid : AC, 1980; ISBN: 84-7288-202-0

Propone que el consumo de  
1.000 mg/día de vitamina C reduce la  
incidencia del resfriado común en un 45%.  
(IDR: 60 mg/día)

USA: production of vitamin C increased from 8.9 million pounds in 1969 to 11.7 in 1971 (increase of 39% in two years and an annual growth rate of 18%) (CMR 1972a), in contrast to the annual growth rate of about 6% in the 1960s (CMR 1972c). About 5.6 million pounds of vitamin C were also imported to the US between January and November 1971, up about 160% from the amount imported during the same period in 1970 (CMR 1972b).

<http://paulingblog.wordpress.com/2010/11/09/vitamin-c-the-common-cold-and-controversy/>  
<http://www.ltdk.helsinki.fi/users/hemila/reviews/pauling/>

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Proc. Am. Acad. Sci. Cold  
Vol. 66, No. 11, pp. 2025-2031, November 1971.

### The Significance of the Evidence about Ascorbic Acid and the Common Cold

(A Review of Controlled Clinical and Quasi-Clinical Experiments)

LINUS PAULING

Department of Chemistry, Stanford University, Stanford, California 94305

(Received by Science, October 14, 1971)

**ABSTRACT**—Only four randomized double-blind studies have been reported on the effect of ascorbic acid. When taken together, they indicate a statistically significant effect of ascorbic acid in reducing the incidence and duration of the common cold. A meta-analysis of these four studies leads to a conclusion that the risk of contracting the common cold is reduced by 45% when the intake of ascorbic acid is increased from the average level of 10 mg per day to 1,000 mg per day.

For many years there has existed the popular belief that ascorbic acid has not an overall protective effect against the common cold and in maintaining the normalcy of the vital functions. This popular belief has, however, not been generally shared by physicians, scientists, or nutritionists and other health workers.

I was troubled by the contradiction between the popular belief and the official opinion, so I studied the published reports of controlled trials of ascorbic acid in relation to the common cold. On the basis of this study and of more general arguments about experimental medicine (1), the preservation of good health and the treatment of disease by varying the concentration in the human body of substances that are normally present in the body and are required for health and the prevention of metabolic diseases (2). I reached the conclusion that ascorbic acid, when in the proper amount, decreases the incidence of colds and related infections, and also decreases the severity of individual colds. These opinions were presented in my book "Vitamin C and the Common Cold" (3). The evidence and arguments presented in this book were not receiving the same publicity and acknowledgment as needed. Many statements contradicting my conclusions were made.

ascorbic acid in both trials (4), and those in the second group were administered an apparently identical sugar material, a placebo. The studies were double-blind, with neither the subjects nor the investigators knowing which material received the ascorbic acid and which received the placebo. But knowledge being kept by some other person and all of the information had been collected.

The question that I attempted to answer by analyzing the published reports is the following: Does the regular administration of ascorbic acid at a rate greater than 100 mg per day, over a period of time beginning before the subjects have contracted a cold, and with the subjects exposed to cold, influenza, ordinary living conditions, have an effect different from that of a placebo in decreasing the incidence and the severity of the common cold? A comparison with a placebo, with the subjects not knowing which group they are in, is a natural measure of the well-known "placebo effect" of oral ascorbic acid.

The statistical methods used in the analysis are the conventional ones, for the most part Student's *t*-test in the evaluation of *P* and dose of the probability. It is pointed out that the observed difference in effect of ascorbic acid and placebo is a large difference, could be detected by those who are not given placebo as controls, from a million population if the total population of people administered ascorbic acid and placebo were ten. I have chosen to give these values rather than *P*-values (5) because on one hand the placebo prevents the possibility of a greater effect than ascorbic acid in relation to the common cold, and the difference in opinion between those people who state that ascorbic acid is no better than a placebo and those who say that it is better. Moreover, in some of the studies discussed all the investigators had a greater protective effect of the placebo than of ascorbic acid.

Pauling (1971) carried out a meta-analysis of 4 placebo-controlled trials, which was one of the very first meta-analyses in medicine.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC389499/?page=1>

Ángeles Carbajal Azcona. Dpto de Nutrición y Ciencia de los Alimentos. Fac. Farmacia. Universidad Complutense de Madrid. <https://www.ucm.es/nutricioncarbajal>

1971

## Ascorbic acid and the common cold

*Linus Pauling, Ph.D.*

The American Journal of Clinical Nutrition

For a number of years I have been interested in the possibility that the state of health of many people could be significantly improved by the ingestion in the optimum amounts of certain substances normally present in the human body, including the vitamins. This interest developed from the work that my associates and I have done on molecular diseases, especially the hemoglobinemias (1). I decided in 1953 that it would be worthwhile to make a study of the extent to which mental diseases could be described as molecular diseases. Work along these lines was carried out in our laboratory in the California Institute of Technology from 1954 to 1964, and was continued in the University of California, San Diego, and (since 1969) in Stanford University. In the course of this period I formulated some ideas about orthomolecular medicine, defined as the preservation of good health and the treatment of disease by varying the concentrations in the human body of substances that are normally present in the body and are required for health (2-4). I also became aware of arguments indicating that the optimum rate of intake of ascorbic acid may be far greater than the recommended daily allowance of this vitamin, which is approximately 50 mg/day.

For example, as recently as November 1970, Dr. Philip L. White (10), Secretary of the Council on Foods and Nutrition of the American Medical Association, stated that "Unfortunately, it is still a widespread belief that extra ascorbic acid can not only prevent colds but also lessen the severity and duration of colds and other respiratory infections. Even when consumed at the first sign of a sniffle, large doses of the vitamin are useless." Also, many statements contradicting my conclusions were made by physicians, experts in nutrition, and health officials within a few weeks after the publication of my book. For example, Dr. Charles C. Edwards, United States Food and Drug Commissioner, was reported in the press on December 29, 1970 as having said that the use of ascorbic acid was ridiculous, and that there was no scientific evidence and never had been any meaningful studies indicating that vitamin C is capable of preventing or curing colds. The Editors of *The Medical Letter* published an article in which nearly all my statements were contradicted; for example, it was stated that there had been no controlled trials of the effectiveness of vitamin C, in comparison with a placebo, against upper respiratory infections over a long period and including many hun-

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ANÁLISIS DE 30 TRABAJOS

## El falso mito de la vitamina C para el resfriado

- Este micronutriente acorta los catarros y alivia los síntomas, pero no los previene
- En el caso de marentonianos o esquimales sí reduce un 50% el número de resfriados

actualizado viernes 28/07/2017 08:11 (GMT)

**ISABEL F. LANTIGUA**

MACROTO. • Durante más de 60 años el papel de la vitamina C para prevenir los resfriados comunes ha sido objeto de controversia. Una última revisión de más de 30 ensayos en los que han intervenido 11.350 participantes zanja la cuestión al afirmar que "hay claras evidencias que muestran que no tiene sentido tomar suplementos de vitamina C todo el año, ya que no reduce la incidencia de los catarros".



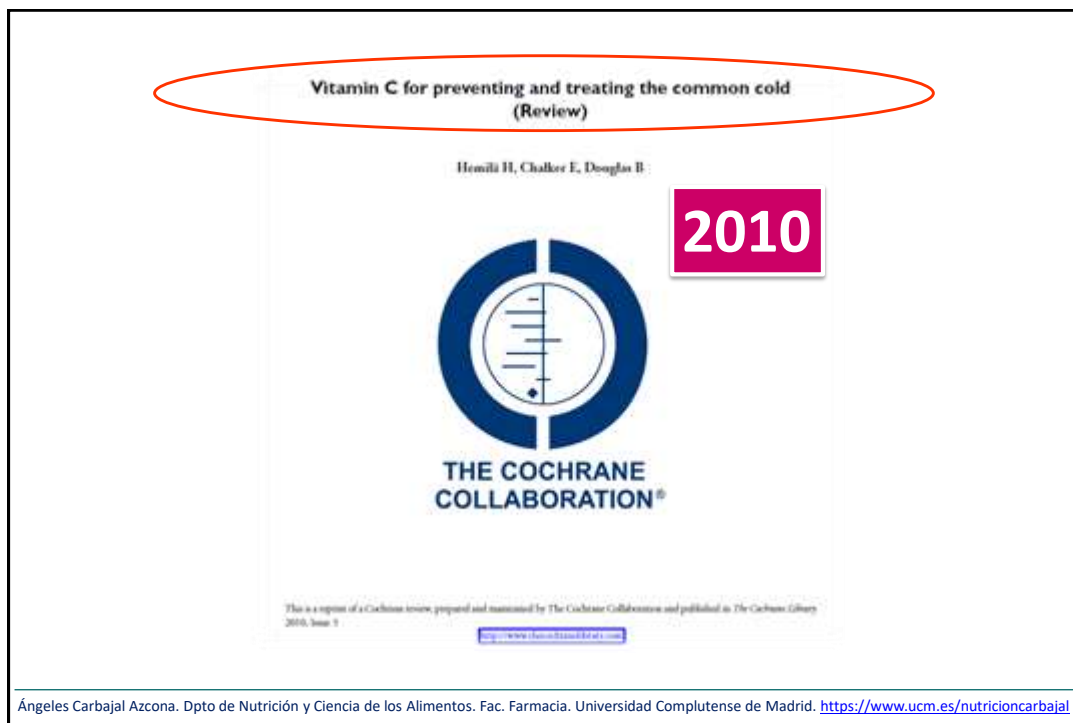
• (Foto: José María Pineses)

Aunque esta sustancia es muy popular entre la gente para no 'pillar' un resfriado "hemos comprobado durante varias décadas que no es la panacea", afirma Ham Hamälä, del departamento de Salud Pública en la Universidad de Helsinki (Finlandia) y uno de los autores de esta revisión que se publica en el último número de *The Cochrane Library*, una publicación que revisa las evidencias científicas sobre un tema.

Los 30 ensayos analizados muestran que la utilización de suplementos de vitamina C todos los días —una práctica bastante extendida— para prevenir los catarros "no está justificada, puesto que este efecto no se ha comprobado en la población general". Sin embargo, Hamälä explica que "si tenemos [www.elmundo.es/elmundo/ciencia/2017/07/28/1501501501.html](https://www.elmundo.es/elmundo/ciencia/2017/07/28/1501501501.html) **acorta la duración de los resfriados y alivia sus síntomas**".

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#### **AUTHORS' CONCLUSIONS**

##### **Implications for practice**

The lack of effect of prophylactic vitamin C supplementation on the incidence of the common cold in the general population throws doubt on the usefulness of this practice. In special circumstances, where people are engaged in extreme physical exertion or exposed to significant cold stress, or both, vitamin C supplementation may have a beneficial effect, but caution should be exercised in generalising this finding.

The prophylaxis trials found a reduction in common cold duration of 8% in adults and 13% in children. The practical relevance of these findings is open. In our opinion, this level of benefit does not justify long-term prophylaxis in its own right. So far, therapeutic supplementation has not been shown to be effective.

Nevertheless, given the consistent effect of vitamin C on duration and severity in the regular supplementation studies, and the low cost and safety, it may be worthwhile for common cold patients to test on an individual basis whether therapeutic vitamin C is beneficial for them.

##### **Implications for research**

**It does not seem worthwhile to carry out further regular supplementation trials in the general population. However, the findings in marathon runners, skiers and soldiers operating in subarctic conditions warrant further research.**

None of the therapeutic trials carried out so far have examined the effect of vitamin C on children, even though the regular supplementation trials have found substantially greater effect on cold duration in children than in adults. In view of the greater incidence of respiratory infections in children, such therapeutic trials are warranted.

The findings in the Anderson 1974 study on the greater benefit of 8 g than 4 g dose on the day of onset of respiratory symptoms suggest that doses in further therapeutic trials with adults should be at least 8 g/day.

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Vitamin C for preventing and treating the common cold

Ham Hemila<sup>1</sup>, Elizabeth Chalker<sup>2</sup> Database Title

Editorial Group: Cochrane Infection and Respiratory Infections Group  
 Published Online: 21 JAN 2013  
 Accessed as at 16:46:23 29 NOV 2012  
 DOI: 10.1002/14651958.CD009880.pub4  
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 Published by John Wiley & Sons, Ltd

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Tab: Abstract, Keywords

Search:

Medical Terms (MeSH) >  
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**Authors' conclusions**

The failure of vitamin C supplementation to reduce the incidence of colds in the general population indicates that routine vitamin C supplementation is not justified, yet vitamin C may be useful for people exposed to brief periods of severe physical exercise. Regular supplementation trials have shown that vitamin C reduces the duration of colds, but this was not replicated in the few therapeutic trials that have been carried out. Nevertheless, given the consistent effect of vitamin C on the duration and severity of colds in the regular supplementation studies, and the low cost and safety, it may be worthwhile for common cold patients to test on an individual basis whether therapeutic vitamin C is beneficial for them. Further therapeutic RCTs are warranted.

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**RESEARCH**

Sofi et al., BMJ 2008;337:a1344

Sofi F et al. Am J Clin Nutr 2010;92:1189-1196

Sofi et al., Public Health Nutr. 2014 Dec;17(12):2769-82

**Adherence to Mediterranean diet and health status:  
meta-analysis**

**Conclusiones:** una mayor adherencia a la Dieta Mediterránea se asocia con una mejora de la salud, con reducciones significativas de:

- Mortalidad total (9%),
- Mortalidad cardiovascular (9%),
- Incidencia y mortalidad de cáncer (6%), y
- Incidencia de Parkinson y Alzheimer (13%).

Salud pública

Resultados clínicamente relevantes para la salud pública. Sería recomendable fomentar la Dieta Mediterránea para prevención primaria y secundaria de las principales enfermedades crónicas.

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## Características de la dieta Mediterránea tradicional (Mediterranean diet score)

1. Alta relación AGM/AGS
2. Consumo moderado de alcohol (vino)
3. Alto de leguminosas
4. Alto de cereales (integrales y pan)
5. Alto de frutas
6. Alto de verduras y hortalizas
7. Bajo de carnes y derivados
8. Moderado de leches y derivados
9. Alto consumo de pescados

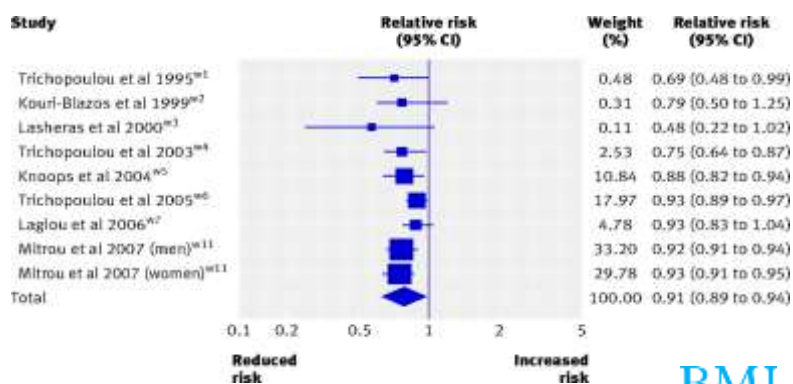


Óptimo = score de 9  
(Trichopoulou y col., 2000)

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**Fig 2 Risk of all cause mortality associated with two point increase in adherence score for Mediterranean diet**

Squares represent effect size; extended lines show 95% confidence intervals; diamond represents total effect size



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4) Umbrella reviews: evidence synthesis with overviews of reviews and meta-epidemiologic studies

The screenshot shows a PubMed search result for the article "Coffee, Caffeine, and Health Outcomes: An Umbrella Review." The interface includes the PubMed logo, search filters, and a list of search results. The selected result is highlighted, showing the title, authors (Crescenzo D, Godwin J, Galvano F, Giannuzzi EI), and an abstract. The abstract discusses the evaluation of evidence from meta-analyses of observational studies and randomized controlled trials (RCTs) regarding coffee and caffeine consumption and various health outcomes. It notes that coffee was associated with a probable decreased risk of several cancers, cardiovascular disease, and mortality, while caffeine was associated with a decreased risk of Parkinson's disease and type-2 diabetes, and an increased risk of pregnancy loss. The article also mentions that coffee was associated with a rise in serum lipids and blood pressure. The abstract concludes that coffee can be part of a healthful diet.

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Statistics in practice

Ten simple rules for conducting umbrella reviews FREE

Paolo Fusar-Poli<sup>1, 2, 3</sup>, Joaquim Radua<sup>1, 4, 5</sup>

Author affiliations +

<https://ebmh.bmj.com/content/21/3/95>



Abstract

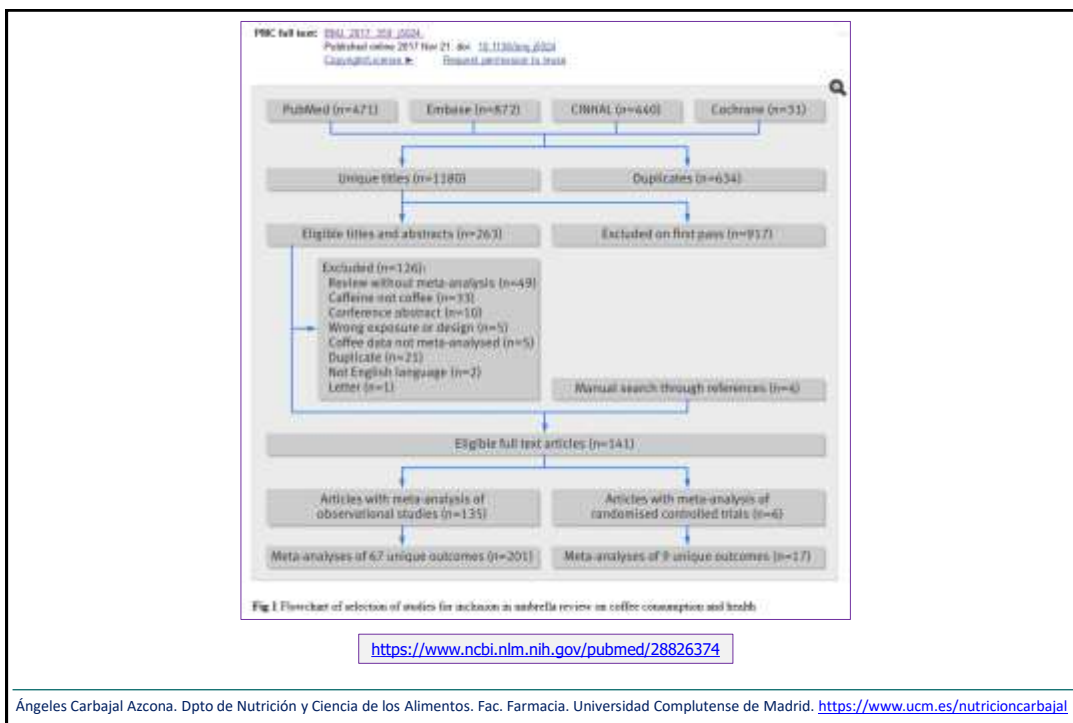
**Objective** Evidence syntheses such as systematic reviews and meta-analyses provide a rigorous and transparent knowledge base for translating clinical research into decisions, and thus they represent the basic unit of knowledge in medicine. Umbrella reviews are reviews of previously published systematic reviews or meta-analyses. Therefore, they represent one of the highest levels of evidence synthesis currently available, and are becoming increasingly influential in biomedical literature. However, practical guidance on how to conduct umbrella reviews is relatively limited.

**Methods** We present a critical educational review of published umbrella reviews, focusing on the essential practical steps required to produce robust umbrella reviews in the medical field.

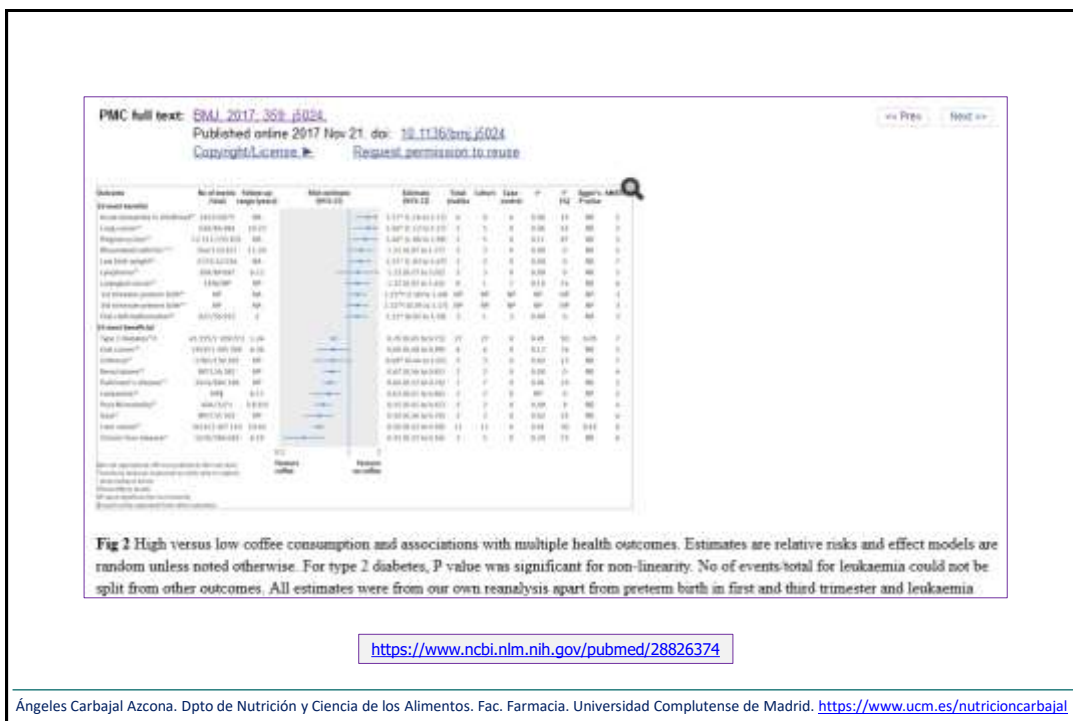
**Results** The current manuscript discusses 10 key points to consider for conducting robust umbrella reviews. The points are: ensure that the umbrella review is really needed, prespecify the protocol, clearly define the variables of interest, estimate a common effect size, report the heterogeneity and potential biases, perform a stratification of the evidence, conduct sensitivity analyses, report transparent results, use appropriate software and acknowledge the limitations. We illustrate these points through recent examples from umbrella reviews and suggest specific practical recommendations.

**Conclusions** The current manuscript provides a practical guidance for conducting umbrella reviews in medical areas. Researchers, clinicians and policy makers might use the key points illustrated here to inform the planning, conduction and reporting of umbrella reviews in medicine.

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The screenshot shows the homepage of the NMC D (Nutrition, Metabolism & Cardiovascular Diseases) journal. The article title is "Mediterranean diet and multiple health outcomes: An umbrella review of meta-analyses of observational studies and randomized trials" by M. Dire, G. Pagliai, A. Casari, F. Sofi. The journal is from January 2017, Volume 27, Issue 1, Page e21. The DOI is 10.1038/nmcd.2016.11.055. The page includes navigation links, a search bar, and various article tools like PDF download, email article, and citation alerts.

[http://www.nmcd-journal.com/article/S0939-4753\(16\)30247-2/fulltext](http://www.nmcd-journal.com/article/S0939-4753(16)30247-2/fulltext)

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## ¿Cuándo hacer un meta-análisis?

- 1) **Acumular evidencia** sobre una situación ya documentada en distintos trabajos que individualmente no tienen suficiente peso estadístico para poder tomar decisiones sólidamente fundadas.
- 2) **Aclarar resultados** de trabajos contradictorios.
- 3) **Resumir resultados** cuando hay información muy abundante.
- 4) Para **justificar la necesidad** de realizar ensayos de mayor tamaño que los realizados hasta ese momento o, por el contrario, para justificar que no es necesario gastar más tiempo y recursos en estudios de mayor tamaño.

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### AUTHORS' CONCLUSIONS

#### Implications for practice

The lack of effect of prophylactic vitamin C supplementation on the incidence of the common cold in the general population throws doubt on the usefulness of this practice. In special circumstances, where people are engaged in extreme physical exertion or exposed to significant cold stress, or both, vitamin C supplementation may have a beneficial effect, but caution should be exercised in generalising this finding.

The prophylaxis trials found a reduction in common cold duration of 8% in adults and 13% in children. The practical relevance of these findings is open. In our opinion, prophylaxis in its own right. So far, therapeutic supplementation. Nevertheless, given the consistent effect of vitamin C in supplementation studies, and the low cost and safety, a test on an individual basis whether therapeutic vitamin

### AUTHORS' CONCLUSIONS

- Implications for practice
- Policy implications
- Implications for research

#### Implications for research

It does not seem worthwhile to carry out further regular supplementation trials in the general population. However, the findings in marathon runners, skiers and soldiers operating in subarctic conditions warrant further research.

None of the therapeutic trials carried out so far have examined the effect of vitamin C on children, even though the regular supplementation trials have found substantially greater effect on cold duration in children than in adults. In view of the greater incidence of respiratory infections in children, such therapeutic trials are warranted.

The findings in the Anderson 1974 study on the greater benefit of 8 g than 4 g dose on the day of onset of respiratory symptoms suggest that doses in further therapeutic trials with adults should be at least 8 g/day.

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## Sesgos de publicación/selección/citación

- Resultados "positivos"
- Resultados significativos
- Muestras grandes
- Grupos de investigación de prestigio
  
- Rápida publicación
- Publicación múltiple
- Mayor citación
- Aumenta la probabilidad de que aparezcan en la bibliografía

BMJ 2005;331:433-434

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Why science needs to publish negative results  
<https://www.elsevier.com/authors-update/story/innovation-in-publishing/why-science-needs-to-publish-negative-results>

**Journal**  
of Negative & No Positive Results  
<http://revistas.proeditio.com/ionnpr/index>

**Figure 1:** The most common approach taken by journals, in which only those experiments yielding positive results end up as publication material.

**Figure 2:** A more neutral approach, in which all results are published, as long as they are generated by well-carried-out experiments based on sound hypotheses.

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## Sesgo del idioma

- Revistas de lengua inglesa son las de mayor prestigio y difusión. Los trabajos escritos en inglés aparecen con mayor frecuencia en las bases de datos.

## Sesgos de publicación

- Financiación por parte de la industria: puede condicionar que sólo se publiquen los resultados favorables.
- Sesgo del propio autor en la selección de los trabajos (subjetividad) (es importante que en el meta-análisis queden bien definidos los criterios de selección).

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El "milagro" de las vitaminas

*Descubrimiento de los nutrientes*  
*"The golden age of Nutrition"*  
*(Carpenter, 2003)*

"descubrimiento tan importante como el de las vacunas o el saneamiento de las aguas" (Trichopoulos y col., 2000)

**1881. N Lunin (1844-1920).** Basilea (Suiza)  
 "A la dieta sintética (mezcla artificial de componentes purificados de leche) + agua le falta alguna sustancia desconocida sin la cual no puede llevarse a cabo la vida".

Dieta sintética

**1897. Christian Eijkman (1858-1930).**  
 Holandés que trabajaba en la isla de Java (Indonesia).  
Provoca el Beri-beri en pollos alimentándolos con una dieta que sólo contenía arroz pulido.  
 Las aves curaban cuando se les daba arroz integral o la cascarilla del arroz.

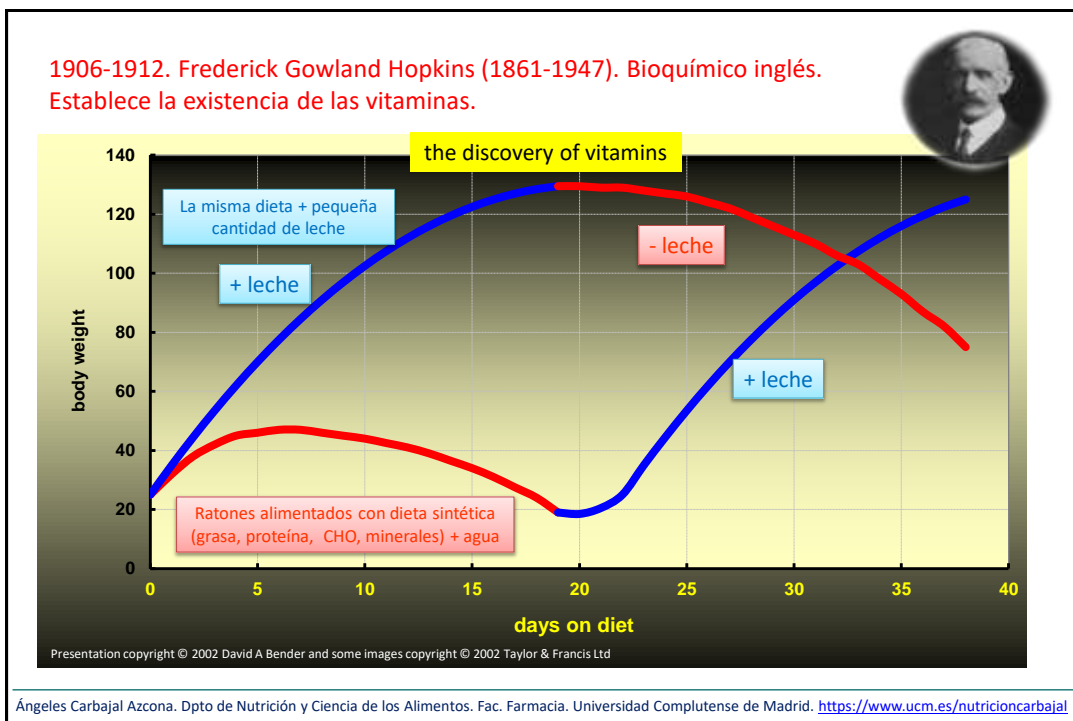
Enfermedad carencial

Sesgo del idioma

**1905. Cornelius Adrianus Pekelharing (1848-1922).** Utrecht (Holanda).  
 Dieta sintética + agua + **leche**.  
 "En la leche hay una sustancia que, incluso en pequeñas cantidades, es necesaria para la vida y sin la cual el animal pierde la capacidad de usar los otros componentes de la dieta". **Trabajo escrito en holandés.**



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**1906-1912. Frederick Gowland Hopkins (1861-1947). Bioquímico inglés.**  
Establece la existencia de las vitaminas.



**“En los alimentos naturales, como en este caso la leche, existen sustancias que en pequeña cantidad son necesarias para la nutrición de los animales: “factores accesorios de la alimentación”.**

(“Feeding experiments illustrating the importance of accessory factors in normal dietaries”. J Physiol 1912;44:425-460).

Concepto de “enfermedad carencial”.

Alimentos: portadores de “reguladores metabólicos” = **vitaminas**.

Premio Nobel de Medicina (1929) junto con el holandés Eijkman.

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The Nobel Prize in Physiology or Medicine 1929  
Christiaan Eijkman, Sir Frederick Hopkins

The Nobel Prize in Physiology or Medicine 1929  
Nobel Prize Award Ceremony  
Christiaan Eijkman  
Sir Frederick Hopkins  
Biographical  
Nobel Lecture  
Banquet Speech  
Documentary

### Nobel Lecture

Nobel Lecture, December 11, 1929

[http://nobelprize.org/nobel\\_prizes/medicine/laureates/1929/hopkins-lecture.html](http://nobelprize.org/nobel_prizes/medicine/laureates/1929/hopkins-lecture.html)

#### The Earlier History of Vitamin Research

When the present century began, animal nutrition was being viewed too exclusively from the standpoint of energy requirements. The fundamental pioneer work of Rubner and its later extension to human subjects in the remarkable enterprise of Atwater, Benedict, Rosa, and others in the United States could not fail to produce a deep impression upon the thought of the time. The quantitative character of the data obtained and the attractive circumstance that such data appeared to supply a real measure of nutritional needs, independent of, and apparently superior to, considerations based upon chemical details, induced a feeling that knowledge concerning these needs had become highly adequate and was approximating even to finality. As a matter of fact, however, these calorimetric studies, invaluable in themselves, were then

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**Sir Frederick Hopkins. The Nobel Prize in Physiology or Medicine 1929  
The Earlier History of Vitamin Research. Nobel Lecture, December 11, 1929**



Yet the pregnant suggestions arising from the observations just discussed did ultimately, though not for many years after the latest of them were published, awaken (as we may suppose) the interest of an investigator distinguished in many fields who was led to repeat and extend them. **I allude to the late Professor Pekelharing, whose own observations (published in 1905) unhappily again remained unknown to the majority till very recently. It is indeed astonishing that the results of such significant work as his, though published in the Dutch language alone, should not have become rapidly broadcast. I cannot refrain from referring to the circumstance that the paper was not abstracted or mentioned in Maly's Jahresbericht für Thierchemie, so adequate, and in general so complete, in its dealings with current literature.** Many of us were accustomed to rely upon it for references to work published in journals that we could not consult, or in a language that we could not read. Though other work by Pekelharing was duly recorded at this time, no mention was made of the extraordinarily interesting paper in question. My own experiments began soon after the paper was published, and as a proportion of my own work was very similar to that of Pekelharing, I shall never cease to regret that, in common with so many others, I was then completely ignorant of the latter. After speaking of experiments carried out on lines similar to some of those done in Bunge's laboratory, and indicating that they pointed to the existence of some unknown essential, Pekelharing goes on to say: "Till now my efforts, constantly repeated during the last few years, to separate this substance and get to know more about it, have not led to a satisfactory result, so I shall not say any more about them. My intention is only to point out that there is a still unknown substance in milk which even in very small quantities is of paramount importance to nutrition. If this substance is absent, the organism loses the power properly to assimilate the well-known principal parts of food, the appetite is lost and with apparent abundance the animals die of want. Undoubtedly this substance occurs not only in milk but in all sorts of foodstuffs both of vegetable and animal origin." Here we have a clear statement of the vitamin doctrine already a quarter of a century old. It is noteworthy that Pekelharing records prolonged endeavours towards the isolation of a vitamin.

[http://nobelprize.org/nobel\\_prizes/medicine/laureates/1929/hopkins-lecture.html](http://nobelprize.org/nobel_prizes/medicine/laureates/1929/hopkins-lecture.html)

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## Conflicto de intereses

*"No investigators have any affiliations or financial involvement (e.g., employment, consultancies, honoraria, stock options, expert testimony, grants or patents received or pending, or royalties) that conflict with material presented in this report."*

*Los autores declaran que no existe ningún compromiso o vínculo con la entidad financiadora que pueda ser entendido como un conflicto de intereses.*

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## Estandarización, normas y control de revisiones sistemáticas y meta-análisis. Control de calidad

- MOOSE (Meta-analysis of Observational Studies in Epidemiology)  
JAMA 2000;283:2008–12.
- **QUOROM (Quality of Reporting of Meta-Analyses)**  
Lancet 1999;354:1896–900.
- Cochrane Handbook, <http://www.cochrane-handbook.org>
- AHRQ Methods Guide for Effectiveness and Comparative Effectiveness Reviews
- Institutes of Medicine Standards for Systematic Reviews
- The PRISMA Statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)  
<http://www.prisma-statement.org/>

Reporting of systematic reviews of micronutrients and health: a critical appraisal<sup>1–4</sup>  
Mei Chung, Ethan M Balk, Stanley Ip, Gowri Raman, Winifred W Yu, Thomas A Trikalinos, Alice H Lichtenstein, Elizabeth A Yetley, and Joseph Lau  
Am J Clin Nutr 2009;89:1–15.

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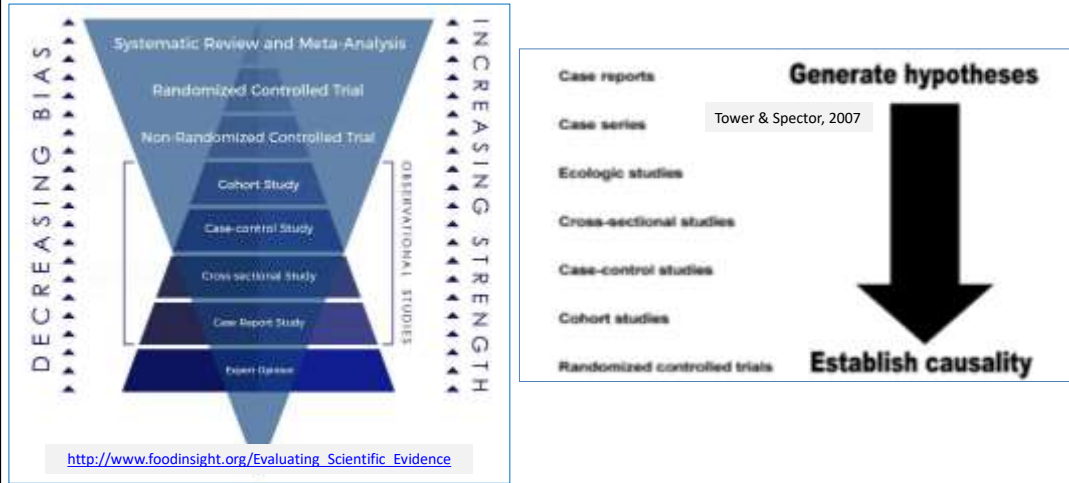
**TODA LA INFORMACIÓN CIENTÍFICA ¿“PESA” LO MISMO?**

**NO**



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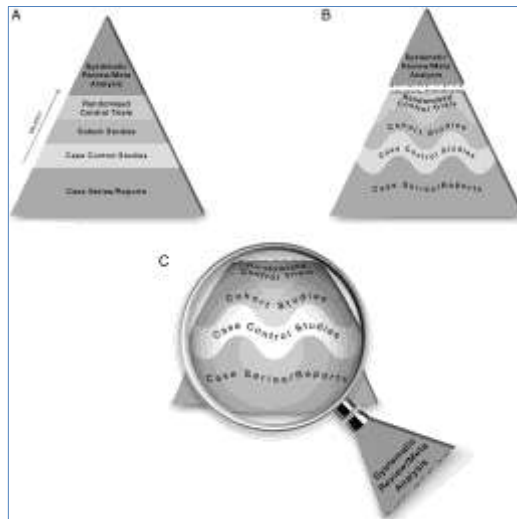
# Jerarquía de la Evidencia Científica



<http://fedn.es/blog/evidencianutricion/los-metaanalisis-no-son-el-mayor-nivel-de-evidencia/ca>

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## The proposed new evidence-based medicine pyramid.



M Hassan Murad et al. Evid Based Med 2016;21:125-127

<https://ebm.bmj.com/content/21/4/125>

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The infographic illustrates the hierarchy of scientific evidence, organized into five levels from top to bottom:

- Individual options & anecdotes:** A single person's experience or a specific product.
- Animal & cell studies:** Research conducted on animals or in laboratory cells.
- Observational research:** Studies that observe people's behavior and health outcomes without intervening.
- Randomized controlled trials (RCTs):** Experimental studies where participants are randomly assigned to different groups.
- Meta-analyses:** A statistical analysis that combines the results of multiple individual studies.

Each level is accompanied by an illustration and a brief description of the study type. A vertical line on the right side of the infographic indicates the strength of the evidence, with a sun icon at the top representing the highest level of evidence.

<http://www.eufic.org/en/understanding-science/article/hierarchy-of-science-evidence-infographic#.WPXQO0rcE-M.twitter>

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## Niveles de Evidencia Científica y Grados de recomendación

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## Importancia de tomar decisiones

**Convinciente:** Evidencia de una relación causal concluyente. **Información suficiente para realizar recomendaciones dietéticas (RD) en la población en general.** Poca o ninguna evidencia de lo contrario. La asociación debe ser biológicamente plausible.

**Probable:** Evidencia lo suficientemente fuerte (RR/OR>2 o <0.5, estadísticamente significativo) para concluir que puede haber una relación causal. **En función de esta información también pueden realizarse RD.**

**Posible:** Puede existir una relación causal, pero la evidencia **no es lo suficientemente fuerte como para establecer RD.**

**Insuficiente:** Evidencia sugerente pero tan escasa o contradictoria que **no permite llegar a ninguna conclusión.**

WCRF, 2007; <http://eprints.ucl.ac.uk/4841/1/4841.pdf>

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Adapted from the World Health Organization, Diet, Nutrition and the Prevention of Chronic Diseases: report of a joint WHO/FAO expert consultation (WHO, FAO, 2003).

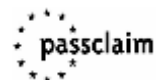
| Grading             | Evidence  |
|---------------------|---|
| <b>Convinciente</b> | Evidencia de estudios epidemiológicos que muestren <u>asociaciones consistentes</u> entre exposición y enfermedad, con poca o ninguna evidencia de lo contrario.<br>Se basa en resultados de un <u>número importante</u> de estudios: <ul style="list-style-type: none"> <li>• Observacionales prospectivos y</li> <li>• Ensayos controlados aleatorizados, realizados con muestras grandes y adecuada duración.</li> </ul> La asociación debe ser biológicamente plausible                   |
| <b>Probable</b>     | Evidencia basada en estudios epidemiológicos que muestren asociaciones <u>bastante consistentes</u> entre exposición y enfermedad. Limitaciones por: evidencia de lo contrario, insuficiente duración del estudio, insuficientes estudios, muestras inadecuadas, seguimiento incompleto, etc.<br>La asociación debe ser biológicamente plausible  |
| <b>Posible</b>      | Evidencia basada principalmente en resultados de: <ul style="list-style-type: none"> <li>• Estudios caso-control y</li> <li>• estudios transversales.</li> </ul> Puede haber también resultados de algunos: <ul style="list-style-type: none"> <li>• Ensayos controlados aleatorizados</li> <li>• Ensayos controlados no aleatorizados</li> <li>• Estudios observacionales</li> </ul> Son necesarios más ensayos que apoyen la asociación.<br>La asociación debe ser biológicamente plausible |
| <b>Insuficiente</b> | Pocos estudios que sugieran la asociación, insuficientes para establecer dicha asociación.<br>Limitada información o ninguna procedente de ensayos controlados aleatorizados.<br>Son necesarios más estudios mejor diseñados  |

(WCRF, 1997; WHO, 2003). World Cancer Research Fund. American Institute for Cancer Research. Food, Nutrition and Prevention of Cancer: a Global Perspective. 1997. <http://www.wcrf.org/>  
WHO/FAO. 2003. Diet, Nutrition and the Prevention of Chronic Diseases. Technical Report Series 916. <http://www.who.int/dietphysicalactivity/publications/trs916/en/>

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## Etiquetado nutricional de los alimentos

PASSCLAIM ("Process of the Assessment of Scientific Support for Claims on Foods")



### Framework for strength of evidence

- **CONVINCING:** **A** Significant scientific agreement **can be trusted to guide practice**
- **PROBABLE:** **B** Good to moderate level of scientific agreement **can be trusted to guide practice in most situations**
- **POSSIBLE:** **C** Low level of scientific agreement **some support for the recommendations but care should be taken in its application**
- **INSUFFICIENT:** **D** Very low level of scientific agreement **evidence is weak and any recommendation must be applied with caution**

WCRF (2007); USFDA (2003); WHO (2004); CODEX (2007)

Professor D. P. Richardson, DPR Nutrition Ltd, UK  
<http://www.eski.hu/new3/konyvtar/bookshop/EFSA%20Conference%20on%20Nutrition%20and%20Health%20Claims.pdf>

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## Evidence Grading Summary

| Types of Research: Evidence Hierarchies           |   |
|---|---|
| Agency for Healthcare Research and Quality (AHRQ) |   |
| Level I   | Meta-Analysis (Combination of data from many studies)                         |
| Level II  | Experimental Designs (Randomized Control Trials)                              |
| Level III   | Well designed Quasi Experimental Designs (Not randomized or no control group) |
| Level IV  | Well designed Non-Experimental Designs (Descriptive-can include qualitative)  |
| Level V   | Case reports/clinical expertise   |

| Strength of Evidence  |   |
|---|---|
| United States Preventive Services Task Force (USPSTF) Grading |   |
| A   | Strongly recommended; Good evidence   |
| B   | Recommended; At least fair evidence   |
| C   | No recommendation; Balance of benefits and harms too close to justify a recommendation                |
| D   | Recommend against; Fair evidence is ineffective or harm outweighs the benefit                         |
| I   | Insufficient evidence; Evidence is lacking or of poor quality, benefit and harms cannot be determined |

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**Ejemplo**

Revista Española de  
**Obesidad**

● Recomendaciones nutricionales basadas en la evidencia para la prevención y el tratamiento del sobrepeso y la obesidad en adultos (Consenso FESNAD-SEEDO)

fesnad

SEEDO

[http://www.naos.aesan.msp.es/naos/ficheros/investigacion/Consenso\\_SEEDO.pdf](http://www.naos.aesan.msp.es/naos/ficheros/investigacion/Consenso_SEEDO.pdf)

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**LA DIETA EN LA PREVENCIÓN DE LA OBESIDAD**

**1. Equilibrio energético y peso corporal**

**1.1. Densidad energética**

*Evidencia*

1. Los patrones alimentarios de alta densidad energética pueden conducir a un incremento de peso en adultos (nivel de evidencia 1+).

*Recomendaciones*

1. El aumento de peso puede prevenirse mediante dietas que contengan alimentos con baja densidad energética (recomendación de grado A).

**1.2. Equilibrio energético y ambiente obesogénico**

*Evidencia*

2. La ausencia de supermercados con disponibilidad de frutas y hortalizas o su ubicación a grandes distancias, sobre todo en núcleos humanos con niveles socioeconómicos desfavorecidos, son factores condicionantes de un mayor IMC medio poblacional (nivel de evidencia 1+).

*Recomendaciones*

2. Deben arbitrase estrategias que hagan posible la disponibilidad alimentaria y el acceso a alimentos saludables, en especial a frutas y hortalizas, para crear ambientes favorables

**1.4. Equilibrio energético: tamaño de las raciones**

*Evidencia*

4. El ofrecimiento de raciones de mayor tamaño condiciona un aumento en la ingesta energética de los individuos (nivel de evidencia 2+).

*Recomendaciones*

4. La utilización de raciones de menor tamaño limita la ingesta energética (recomendación de grado B).

**1.5. Equilibrio energético: desayuno**

*Evidencia*

5. Son controvertidas e inconsistentes las investigaciones que estudian la relación entre la omisión del desayuno en adultos y el riesgo de sobrepeso y obesidad.

**1.6. Equilibrio energético: aperitivos**

*Evidencia*

6. Son controvertidas e inconsistentes las investigaciones que sugieren que el consumo de aperitivos está asociado con el incremento de peso.

**1.7. Equilibrio energético: frecuencia**

*Evidencia*

7. Las investigaciones que estudian la relación entre la

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## MÉTODO SIGN: Niveles de evidencia

(Scottish Intercollegiate Guidelines Network)

| Tabla 1. NIVELES DE EVIDENCIA <sup>SM</sup> |     | Tabla 2. GRADOS DE RECOMENDACIÓN <sup>SM</sup>   |   |  |
|---|-----|--|---|--|
| 1   | 1++ | Metaanálisis de alta calidad, revisiones sistemáticas de ECA, o ECA con un riesgo muy bajo de sesgo  | A | Como mínimo un metaanálisis, revisión sistemática o ECA con una clasificación de 1++ y directamente aplicable a la población diana; o una revisión sistemática o ECA con un cuerpo de evidencia consistente principalmente en estudios puntuados como 1+, directamente aplicable a la población diana, y que demuestre una consistencia global en sus resultados |
|   | 1+  | Metaanálisis bien realizados, revisiones sistemáticas de ECA, o ECA con bajo riesgo de sesgo   |   | B  |
|   | 1-  | Metaanálisis, revisiones sistemáticas de ECA o ECA con alto riesgo de sesgo  | C |  |
| 2   | 2++ | Revisiones sistemáticas de alta calidad de estudios caso-control o de cohortes   | D | Evidencias de nivel 3 o 4; o evidencias extrapoladas de estudios puntuados como 2+   |
|   | 2+  | Estudios caso-control o de cohortes de alta calidad con un riesgo muy bajo de confusión o sesgo, y una alta probabilidad de que la relación sea causal |   | ECA: ensayo controlado aleatorizado<br>Los estudios clasificados como 1- y 2- no deben usarse en el proceso de elaboración de recomendaciones, por su alto potencial de sesgo  |
|   | 2-  | Estudios caso-control o de cohortes bien realizados con un riesgo bajo de confusión o sesgo, y una probabilidad moderada de que la relación sea causal |   |  |
| 3   |     | Estudios no analíticos (p. ej.: casos clínicos o series de casos)  |   |  |
| 4   |     | Opinión de experto/s   |   |  |

[http://www.naos.aesan.mspes.es/naos/ficheros/investigacion/Consenso\\_SEEDO.pdf](http://www.naos.aesan.mspes.es/naos/ficheros/investigacion/Consenso_SEEDO.pdf)

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## MÉTODO SIGN: Niveles de evidencia

(Scottish Intercollegiate Guidelines Network)

• SIGN evalúa la calidad de la evidencia científica en función de:

- Diseño del estudio:
  - Ensayos clínicos, revisiones sistemáticas o metanálisis (1)
  - Opinión de expertos (4)
- Riesgo de sesgo:

|    |  |
|----|--|
| ++ | Se han cumplido todos o la mayoría de los criterios de calidad metodológica. En los puntos en que no se han cumplido, se considera muy poco probable que dicho incumplimiento pueda afectar a las conclusiones del estudio o revisión. |
| +  | Se han cumplido algunos de los criterios de calidad metodológica. Se considera poco probable que los criterios que no se han cumplido o que no se describen de forma adecuada puedan afectar a las conclusiones.                       |
| -  | Se han cumplido sólo unos pocos criterios de calidad metodológica, o ninguno de ellos. Se considera probable o muy probable que esto afecte a las conclusiones.  |

Scottish Intercollegiate Guidelines Network. A guideline developers' handbook (Publication no 50). Edinburgh: SIGN; 2001 [actualizado Noviembre 2011]. Disponible en: <http://www.sign.ac.uk/pdf/sign50.pdf>

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<https://www.ucm.es/innovadieta/nube>  
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**En las BBDD de Innovadieta busca la evidencia sobre los efectos del chocolate negro en la salud**

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## BBDD de Evidencia científica Algunos ejemplos



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**RED NuBE**  
RED de Nutrición  
BASADA en la EVIDENCIA

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La Red de Nutrición Basada en la Evidencia (RED-NuBE) es una red de trabajo colaborativa que pretende aunar todos los esfuerzos que se están realizando en investigación secundaria (elaboración de guías basadas en pruebas o evidencias y metaanálisis) en el campo de la nutrición humana y Dietética, fomentando tanto el acceso libre y equitativo como el acceso más económico y asequible a las principales herramientas y bases de datos especializadas existentes.

Entre los objetivos de RED-NuBE se encuentra acercar las mejores pruebas imparciales (evidencias) a aquellos profesionales que más las necesitan, los dietistas-nutricionistas que trabajan día a día con los pacientes/clientes. Para ello hemos desarrollado un sistema de evidencias rápidas que permite el acceso a las mejores recomendaciones basadas en pruebas (evidencias) en pocos minutos. La base o inicio de dicho sistema se realiza a través del software de ayuda de toma de decisiones Practice-based Evidence in Nutrition (PEN)® un sistema creado por y para dietistas-nutricionistas de todo el mundo. RED-NuBE, a través de la Academia Española de Nutrición y Dietética y del Consejo General de Dietistas-Nutricionistas de España se ha convertido en Partner Iberoamericano con permiso oficial para ofrecer licencias individuales al PEN® a un precio único y adaptado a la situación económica de este profesional. Más información sobre licencias del PEN® aquí.

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**Publicaciones RED NuBE**

**Entradas en el blog de RED-NuBE:**  
<http://www.rednube.net/blog/>

**Digestor semanal de movimiento en redes sociales:**  
<http://paper.kic-1436136177>

**Revistas Científicas y otras monografías**

**2017**

- **Balada E, Martínez-Rodríguez R. Revisión científica sobre la alimentación y nutrición en el embarazo.** RED-NuBE; 2017. Disponible en: [http://diamond.dietistanutricionista.org/wp-content/uploads/2017/05/Balada\\_evidencias\\_new.pdf](http://diamond.dietistanutricionista.org/wp-content/uploads/2017/05/Balada_evidencias_new.pdf) / en ResearchGate

**2016**

- **Balada E, Martínez-Rodríguez R. Legumbres y salud: resumen de evidencias rápidas.** RED-NuBE; 2016. Disponible en: [http://www.rednube.net/docs/legumbres\\_2016.pdf](http://www.rednube.net/docs/legumbres_2016.pdf) / Presentación del documento en YouTube / en ResearchGate
- **Balada E, Martínez-Rodríguez R. Conflictos de interés en nutrición humana y dietética / Conflicts of interest in human nutrition and dietetics.** Rev Esp Nutr Hum Diet. 2016; 20(2):77-79. doi: 10.14306/renhyd.20.2.261
- **Balada E, Frutos Pérez-Surió A, Martínez-Rodríguez R. Resumen de recomendaciones nutricionales basadas en la evidencia de la Guía de Práctica Clínica para el manejo de pacientes con enfermedad de Parkinson / Summary of evidence-based nutritional recommendations of the Clinical Practice Guideline for the management of patients with Parkinson's disease.** Nutr Hosp. 2016; 33(3):749-760 [Factor de impacto = 1,487]. Texto completo. También en ResearchGate.
- **Estañel N, Aguilar Barrera ES, Martínez-Rodríguez R, Balada E, Duran Agüero S, Camacho S, Buhning K, Herrero-López A, Gil-González DM. Items de referencia para publicar Protocolos de Revisiones Sistemáticas y Metaanálisis-Declaración PRISMA-P 2015.** Rev Esp Nutr Hum Diet. 2016; 20(2):145 - 160. doi: 10.14306/renhyd.20.2.223

<http://www.rednube.net/publicaciones-red-nube/>

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Dietitians of Canada 2012  
<http://www.pennutrition.com/index.aspx>

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Topics in Nutrition

A-Z Index

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A

- About the EAL
- ADA Evidence-Based Practice
- Adolescent Nutrition
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- Adult Weight Management (AWM) index
- Advance Food Production and Sustainable Agriculture Project
- Amino Acid Studies
- Amino Acids
- Aspartame index
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**Grade I: Good**—The evidence consists of results from studies of **strong** design for answering the question addressed. The results are both clinically important and consistent with minor exceptions at most. The results are free of serious doubts about generalizability, bias, and flaws in research design. Studies with negative results have sufficiently large sample sizes to have adequate statistical power.

**Grade II: Fair**—The evidence consists of results from studies of strong design answering the question addressed, but there is uncertainty attached to the conclusion because of inconsistencies among the results from different studies or because of doubts about generalizability, bias, research design flaws, or adequacy of sample size. Alternatively, the evidence consists solely of results from weaker designs for the questions addressed, but the results have been confirmed in separate studies and are consistent with minor exceptions at most.

**Grade III: Limited**—The evidence consists of results from a limited number of studies of **weak** design for answering the questions addressed. Evidence from studies of strong design is either unavailable because no studies of strong design have been done or because the studies that have been done are inconclusive due to lack of generalizability, bias, design flaws, or inadequate sample sizes.

**Grade IV: Expert Opinion Only**—The support of the conclusion consists solely of the statement of informed medical commentators based on their clinical experience, unsubstantiated by the results of any research studies.

**Grade V: Not Assignable**—There is no evidence available that directly supports or refutes the conclusion.

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## Conditional versus Imperative Recommendations

Recommendations can be worded as conditional or imperative statements. **Conditional** statements clearly define a specific situation, while **imperative** statements are broadly applicable to the target population without restraints on their pertinence.

More specifically, a **conditional recommendation** can be stated in **if/then** terminology (e.g., If an individual does not eat food sources of omega-3 fatty acids, then 1g of EPA and DHA omega-3 fatty acid supplements may be recommended for secondary prevention).

In contrast, **imperative recommendations** “require,” or “must,” or “should achieve certain goals,” but do not contain conditional text that would limit their applicability to specified circumstances. (e.g., Portion control should be included as part of a comprehensive weight management program. Portion control at meals and snacks results in reduced energy intake and weight loss).

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## ¿Cuántas comidas al día deben hacerse?

Position of the American Dietetic Association: Weight Management

Journal of the American Dietetic Association - Volume 109/2, Pages 185-364 (February 2009)

### Revisión sistemática de todos los estudios y concluyen:

EAL Recommendation "Total caloric intake should be distributed throughout the day, with the consumption of four to five meals/snacks per day including breakfast. Consumption of greater energy intake during the day may be preferable to evening consumption"

**Rating: Fair, Imperative.**

Conclusion. Several studies show that consumption of four to five meals or snacks per day is associated with reduced or no obesity risk, while three or fewer and six or more meals or snacks per day may result in increased risk of obesity, depending on gender. Higher eating frequency is related to lower total daily energy intake and body weights in men, but in women the data is less conclusive. Five studies demonstrate that consumption of greater energy intake in the morning vs. the evening is associated with lower body weights and greater loss of weight. Further research is needed on the distribution of calories consumed at meals and snacks during the day.

### Grade II

#### Recommendation Strength Rationale

- Conclusion statements both given a Grade II
- Consistent findings among a variety of study designs
- Minority Opinions

Consensus reached

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USDA Nutrition Evidence Library.gov  
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WELCOME TO NEL

USDA's Nutrition Evidence Library (NEL) specializes in conducting systematic reviews to inform Federal nutrition policy and programs. NEL staff collaborate with stakeholders and leading scientists using state-of-the-art methodology to

WHAT'S NEW

2015 Dietary Guidelines Advisory Committee's Systematic Reviews

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The screenshot shows the USDA Nutrition Evidence Library website. The header includes the USDA logo, the site name 'NutritionEvidenceLibrary.gov', and the United States Department of Agriculture. Navigation tabs include HOME, REVIEWS, PROJECTS, METHODOLOGY, and PUBLICATIONS. A search bar is present with the text 'Enter Search'. A sidebar on the left lists various topics such as Digital Media and Technology, Parental Involvement, and Type of Educator. The main content area displays a search result for 'A Series of Systematic Reviews on the Effects of Nutrition Education on Children's and Adolescents' Dietary Intake'. It includes a thumbnail of the report cover, a 'Full Report' link, and an 'Executive Summary' section. The executive summary text states: 'Consuming a healthy diet consistent with the Dietary Guidelines for Americans, 2015(2) can help individuals achieve and maintain a healthy weight, reduce the risk of developing chronic diseases, and promote good health. However, many children are consuming excess calories, while not meeting nutrient needs, and are overweight/obese and/or at increased risk of chronic diseases.'

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Cont.

### Systematic Review Questions

The systematic review questions addressed were identified and prioritized to focus the reviews on topics that would enhance current nutrition education practice and programs. A broad range of school- and community-based nutrition education interventions involving children in preschool, kindergarten, and elementary school and adolescents in middle and high school were considered, in order to answer the following systematic review questions:

1. What is the effect of nutrition education delivered via digital media and/or technology on children's and adolescents' dietary intake-related behaviors?
2. What is the effect of nutrition education with parental involvement compared to no parental involvement on children's and adolescents' dietary intake-related behaviors?
3. Which type of educator who delivers nutrition education is most effective in changing children's and adolescents' dietary intake-related behaviors?
4. What are the effects of addressing changes in the food environment and nutrition education compared to either of those strategies alone on children's and adolescents' dietary intake-related behaviors?
5. What are the effects of multi-component compared to single-component nutrition education interventions on children's and adolescents' dietary intake-related behaviors?

### Background and Methodology

USDA's Nutrition Evidence Library (NEL) conducted these systematic reviews. The NEL uses a rigorous, transparent, and reproducible methodology to conduct systematic reviews on food- and nutrition-related topics to support Federal nutrition policies and programs using a six-step process:

1. Develop systematic review questions
2. Create and implement literature search and sort plans
3. Develop evidence portfolios
4. Synthesize the bodies of evidence
5. Develop conclusion statements and grade the evidence
6. Describe research recommendations

This NEL systematic review project was planned, organized, and guided by a NEL Systematic Review Management Team composed of Federal nutritionists trained in systematic review methodology. The NEL systematic review team worked with a Technical Expert Collaborative (TEC), which consisted of eight leading nutrition education experts, whose expertise was needed to address specific issues related to the topic of nutrition education and to guide synthesis of the body of evidence.

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The screenshot shows the WHO eLENA interface. At the top, the WHO logo and navigation menu are visible. The main heading is "e-Library of Evidence for Nutrition Actions (eLENA)". The search bar contains the text "Iodine supplementation during pregnancy".

**Health condition:** Pregnant women need about 60% more iodine than non-pregnant women. This nutrient is essential for healthy brain development in the fetus and young child.

**Life course:** Most foods are relatively low in iodine content. To ensure that everyone has a sufficient intake of iodine, WHO and UNICEF recommend universal salt iodization as a global strategy. However, in certain countries salt iodization may not be feasible in all regions.

**Nutrient:** WHO and UNICEF therefore recommend iodine supplementation for pregnant and lactating women in countries where less than 20% of households have access to iodized salt, until the salt iodization programme is scaled up. Countries with a household access to iodized salt between 20 and 90% should make efforts to accelerate salt iodization or assess the feasibility of increasing iodine intake in the form of a supplement or iodine fortified foods by the most susceptible groups.

**Intervention:** Iodine supplementation during pregnancy. Status: guidelines under development. Publication year: expected 2012.

**Related links:**

- Publication: Nutrition essentials: a guide to health managers (pdf, 1.95Mb)
- Publication: Iodine deficiency in 2007: Global progress since 2003 (pdf, 421kb)
- Publication: Prevention and control of iodine deficiency in pregnant and lactating women and in children less than 2 years old: conclusions and recommendations of the technical consultation (pdf, 87kb)
- Publication: Iodized oil during pregnancy: safe use of iodized oil to prevent iodine deficiency in pregnant women (pdf, 475kb)

<http://www.who.int/elena/en/index.html>  
En español: <http://www.who.int/elena/es/index.html>

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The screenshot shows the WHO eLENA interface. At the top, the WHO logo and navigation menu are visible. The main heading is "e-Library of Evidence for Nutrition Actions (eLENA)". The search bar contains the text "Increasing fruit and vegetable consumption to reduce the risk of noncommunicable diseases".

**Health conditions:** Fruits and vegetables are important components of a healthy diet. Reduced fruit and vegetable consumption is linked to poor health and increased risk of noncommunicable diseases (NCDs). An estimated 6.7 million deaths worldwide were attributable to inadequate fruit and vegetable consumption in 2010.

**Life course:** Including fruits and vegetables as part of the daily diet may reduce the risk of some NCDs including cardiovascular diseases and certain types of cancer. More limited evidence suggests that when consumed as part of a healthy diet, low in fat, sugars and salt/sodium, fruits and vegetables may also help to prevent weight gain and reduce the risk of obesity, an independent risk-factor for NCDs.

**Nutrients:** Moreover, fruits and vegetables are rich sources of vitamins and minerals, dietary fibre and a host of beneficial non-nutrient substances including plant sterols, flavonoids and other antioxidants and consuming a variety of fruits and vegetables helps to ensure an adequate intake of many of these essential nutrients.

**Intervention type:** WHO recommendations

**Interventions by category:** As part of a healthy diet, low in fat, sugars and sodium, WHO suggests consuming more than 400 grams of fruits and vegetables per day to improve overall health and reduce the risk of certain NCDs.

**Category 2 intervention:** Systematic review(s) have been conducted but no recent guidelines yet available that have been approved by the WHO Guidelines Review Committee

- More about categories of interventions

**Biological, behavioural and contextual rationale:**

- Increasing fruit and vegetable consumption to reduce the risk of noncommunicable diseases

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## Evaluar la calidad de la Evidencia

Grading of Recommendations Assessment, Development, and Evaluation (año 2000)



[www.gradeworkinggroup.org](http://www.gradeworkinggroup.org)

Ver también: <http://www.fisterra.com/guias-clinicas/la-evaluacion-calidad-evidencia-graduacion-fuerza-recomendaciones-sistema-grade/>  
<http://www.sciencedirect.com/science/article/pii/S0212656714000493>

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## MÉTODO GRADE



GRADE working group <http://www.gradeworkinggroup.org>

Organizations that have endorsed or that are using GRADE\*



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### Método GRADE: Representación

| Calidad de la evidencia científica                          |      |   |
|---|------|---|
| Alta  | ⊕⊕⊕⊕ | A |
| Moderada  | ⊕⊕⊕○ | B |
| Baja  | ⊕⊕○○ | C |
| Muy baja  | ⊕○○○ | D |
| Fuerza de la recomendación                                  |      |   |
| Recomendación fuerte a favor de utilizar una intervención   | ↑↑   | 1 |
| Recomendación débil a favor de utilizar una intervención    | ↑?   | 2 |
| Recomendación débil en contra de utilizar una intervención  | ↓?   | 2 |
| Recomendación fuerte en contra de utilizar una intervención | ↓↓   | 1 |

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### Método GRADE: Niveles de evidencia

| Calidad de la evidencia científica | Definición  |
|------------------------------------|---|
| Alta (⊕⊕⊕⊕)                        | Estamos muy seguros de que el verdadero efecto se encuentra cerca de la estimación del efecto.  |
| Moderada (⊕⊕⊕)                     | Estamos moderadamente seguros en la estimación del efecto: el verdadero efecto es probable que esté cerca de la estimación del efecto, pero hay una posibilidad de que sea sustancialmente diferente. |
| Baja (⊕⊕)                          | Nuestra confianza en la estimación del efecto es limitada: el verdadero efecto puede ser sustancialmente diferente de la estimación del efecto.   |
| Muy Baja (⊕)                       | Tenemos muy poca seguridad en el efecto estimado: El verdadero efecto es probable que sea sustancialmente diferente de la estimación del efecto.  |

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Método GRADE: Grados de recomendación



| Tipos de recomendación                   | Definición   |
|--|--|
| <b>Fuerte</b>                            | El grupo elaborador confía en que los efectos beneficiosos que se pueden dar como resultado de adherirse/llevar a cabo una recomendación son mayores que los efectos perjudiciales.                                  |
| <b>Débil (Condicional, Discrecional)</b> | El grupo elaborador concluye , aunque no está completamente seguro, que los potenciales efectos beneficiosos de llevar a cabo una recomendación probablemente son mayores que los potenciales efectos perjudiciales. |

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**Ejemplo:** Evaluation, Treatment, and Prevention of Vitamin D Deficiency: an Endocrine Society Clinical Practice Guideline

<https://www.ncbi.nlm.nih.gov/pubmed/21646368>

1912 Holick et al. Guidelines on Vitamin D Deficiency J Clin Endocrinol

**2.0 Recommended dietary intakes of vitamin D for patients at risk for vitamin D deficiency**

2.1 We suggest that infants and children aged 0–1 yr require at least 400 IU/d (IU = 25 ng) of vitamin D and children 1 yr and older require at least 600 IU/d to maximize bone health. Whether 400 and 600 IU/d for children aged 0–1 yr and 1–18 yr, respectively, are enough to provide all the potential nonskeletal health benefits associated with vitamin D to maximize bone health and muscle function is not known at this time. However, to raise the blood level of 25(OH)D consistently above 30 ng/ml (75 nmol/liter) may require at least 1000 IU/d of vitamin D (2⊕⊕⊕⊕).

2.2 We suggest that adults aged 19–50 yr require at least 600 IU/d of vitamin D to maximize bone health and muscle function. It is unknown whether 600 IU/d is enough to provide all the potential nonskeletal health benefits associated with vitamin D. However, to raise the

vitamin D<sub>2</sub> or vitamin D<sub>3</sub>, or vitamin D<sub>3</sub> once weekly of 25(OH)D above 30 ng/ml therapy of 400–1000 IU/d

3.3 For children aged deficient, we suggest treatment or vitamin D<sub>3</sub> for at least tamin D<sub>2</sub> once a week for level of 25(OH)D above nance therapy of 600–1000

3.4 We suggest that all deficient be treated with 50,000 IU D<sub>3</sub> once a week for 8 wk vitamin D<sub>2</sub> or vitamin D<sub>3</sub> 25(OH)D above 30 ng/ml. apy of 1500–2000 IU/d (

3.5 In obese patients, p

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## Evidencia científica

Información contrastada para la toma de decisiones

"¿Quién sabe, preguntó Robert Browning, si el mundo no terminará esta noche? Ciertamente, pero con la evidencia disponible, la mayoría de nosotros deberíamos prepararnos para salir a trabajar mañana a las 8.30 h."

A.B. Hill

[Schoenbach, 1999]

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## Evidencia científica



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