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SPECIAL ARTICLE

Recommendations of the Spanish Society of Endocrinology and Nutrition (SEEN) on ''what not to do'' in clinical practice

Juan José Díez[a,*], Emma Anda[b], Irene Bretón[c], Cintia González-Blanco[d], María Miguélez[e], Ana Zugasti[b], Alberto Fernández[f], on behalf of the Sociedad Española de Endocrinología y Nutrición

[a] *Servicio de Endocrinología y Nutrición, Hospital Universitario Puerta de Hierro Majadahonda, Instituto de Investigación Sanitaria Puerta de Hierro Segovia de Arana, Majadahonda, Departamento de Medicina, Universidad Autónoma de Madrid, Madrid, Spain*
[b] *Servicio de Endocrinología y Nutrición, Hospital Universitario de Navarra, Pamplona, Spain*
[c] *Servicio de Endocrinología, Hospital General Universitario Gregorio Marañón, Madrid, Spain*
[d] *Servicio de Endocrinología y Nutrición, Hospital General Universitario de Valencia, Valencia, Spain*
[e] *Servicio de Endocrinología y Nutrición, Fundación Jiménez Díaz, Madrid, Spain*
[f] *Servicio de Endocrinología y Nutrición, Hospital Universitario de Móstoles, Madrid, Spain*

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Abstract Quality healthcare should be grounded on clinical practice with the highest benefit-risk ratio and cost-effectiveness according to the available scientific evidence. The overuse of unproven diagnostic or therapeutic procedures is common in our setting and leads to increased healthcare spending and even iatrogenic harm. Previous cost-effectiveness initiatives have proposed identifying diagnostic and therapeutic measures that are better 'not done' in certain clinical contexts under the lens of the available scientific evidence. In this regard, the Spanish Society of Endocrinology and Nutrition (SEEN) has compiled a series of 'not-to-do' recommendations from its various working groups. These recommendations cover common clinical situations classified into the following thematic areas: diabetes, nutrition, pituitary gland, neuroendocrine tumors, thyroid, and hormone replacement therapy in postmenopausal women.

* Corresponding author.
E-mail address: juanjose.diez@salud.madrid.org (J.J. Díez).

PALABRAS CLAVE
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Talla baja;
Deficiencia de hormona de crecimiento;
Tumores neuroendocrinos;
Cromogranina A;
Hipoglucemia;
Tumor neuroendocrino pancreático;
Carcinoma diferenciado de tiroides;
Tratamiento hormonal supresor;
Nódulo tiroideo;
Terapia hormonal sustitutiva;
Menopausia;
Hormonas bioidénticas

Recomendaciones de la Sociedad Española de Endocrinología y Nutrición (SEEN) sobre ''qué no hacer'' en la práctica clínica

Resumen La asistencia sanitaria de calidad es aquella que se basa en las prácticas clínicas que tienen el mayor cociente beneficio-riesgo según la evidencia científica disponible y a unos costes razonables. La sobreutilización de procedimientos diagnósticos o terapéuticos de eficacia no probada es común en nuestro medio y genera un incremento del gasto sanitario y, potencialmente, yatrogenia. Iniciativas previas de coste-efectividad han propuesto identificar medidas diagnósticas y terapéuticas que sea mejor ''no hacer'' en determinados contextos clínicos bajo el prisma de la evidencia científica disponible. En esta línea, la Sociedad Española de Endocrinología y Nutrición (SEEN) ha recogido una serie de recomendaciones de no hacer emanadas de sus diferentes grupos de trabajo y áreas de conocimiento. Estas recomendaciones cubren varias situaciones clínicas comunes clasificadas por las siguientes áreas temáticas: diabetes, obesidad, nutrición, hipófisis, tumores neuroendocrinos, tiroides y terapia hormonal sustitutiva en la mujer postmenopáusica.

Introduction

The overuse of diagnostic or therapeutic procedures with unproven efficacy is common in our setting and leads to increased health care costs.[1] Overdiagnosis can occur due to screening tests in healthy populations without scientific evidence to support them or by requesting diagnostic tests in patients already diagnosed with a condition, which only increases risk, discomfort, and cost.[2] Overtreatment arises when unnecessary, harmful, or non-beneficial therapeutic procedures are used, providing no added value.[3]

Quality health care is based on clinical practices with the highest benefit-risk ratio according to available scientific evidence and at reasonable costs.[4,5] Various initiatives have been undertaken to identify low-value interventions and improve appropriateness.[6,7] In 2012, the American Board of Internal Medicine (ABIM) Foundation launched the Choosing Wisely campaign,[8] establishing recommendations from nine societies, which have since expanded to over 500. In Spain, the Ministry of Health's Quality Plan for the National Health System[9] aims to document and propose initiatives to reduce unjustified variability in clinical practice and promote the development and use of Clinical Practice Guidelines linked to Health Strategies. The *GuíaSalud* project[10] is responsible for the methodological coordination of this initiative. Essencial,[11] an initiative by the Agència de Qualitat i Avaluació Sanitàries de Catalunya (AQuAS), identifies low-value practices and promotes recommendations to avoid them. The *DianaSalud* portal, developed by the Clinical Epidemiology Program of the Biomedical Research Network in Epidemiology and Public Health (CIBERESP), coordinated by the Epidemiology and Public Health Service of Hospital de la Santa Creu i Sant Pau in Barcelona (Catalonia, Spain),[12] allows consultation of national and international initiatives to identify low-value interventions and improve appropriateness.[13] The MAPAC initiative (Initiative to Improve Health and Clinical Care Practices), through a defined methodology, aims to systematically analyze the appropriateness of clinical and health care services and formulate specific recommendations and actions for improvement.

In line with these initiatives, the Spanish Society of Endocrinology and Nutrition (SEEN) proposed in 2023 to draft a document compiling a series of do not do recommendations from its various working groups (WG) and knowledge areas (KA), aiming to identify inappropriate or low-value attitudes, services, or clinical procedures within our specialty.

Methods

The present project was approved by the SEEN board on September 28th, 2023. All KA and WG were invited to participate, with acceptance from the 5 KAs (diabetes, obesity, nutrition, neuroendocrinology, and thyroid) and the gonads, identity, and sexual differentiation working group. Coordinators of each KA and WG appointed a project leader responsible for selecting the health problem and health care procedure for review within their area of interest, as well as reviewing the literature and drafting relevant recommendations.

In selecting the health problem and procedure, authors considered clinical relevance based on the prevalence of the health issue and the severity of the drawbacks of inappropriate practice. Once selected, the WG and KA leaders conducted a literature review to identify evidence support-

ing the recommendations. Priority was given to synthesis documents, clinical practice guidelines, systematic reviews, and randomized controlled trials. Once the bibliographic sources were identified, it was assessed whether they were suitable for the selected problem or procedure, that is, whether the patients and the intervention for which the recommendation was to be formulated were properly included in the selected references.

Each recommendation was developed in a structured manner in three sections: writing, source of evidence, and justification. The writing was done in a clear, direct, and specific manner, in a single paragraph. Subsequently, justificatory paragraphs were included, providing a brief explanation of the factors that determined the selection of the recommendation, as well as a summary justifying the available evidence. Potential benefits for patients and the healthcare system were also included.

After the drafting of the recommendations by the responsible person, all members of each WG and KA performed an initial review, providing their suggestions or comments. Once the final draft of the recommendations was completed by the responsible person of each WG and KA, the coordinators of the WG of the SEEN board compiled and organized the recommendations, unified the style, and prepared the document final draft. After the compilation, the document was returned to all the responsible individuals of each participating WG and KA for a second review. After this second review, the coordinators revised the final version with the received comments and suggestions. Subsequently, the final document was submitted to a third review by all the members of the board of directors of SEEN.

Recommendations

Diabetes

Recommendation #1
Do not use metformin universally to prevent diabetes in individuals with prediabetes.

Evidence source
Meta-analyses, systematic reviews, and randomized controlled trials.[14–26]

Justification
Three arguments support this recommendation: (a) approximately two-thirds of individuals with prediabetes do not develop diabetes, even after many years; (b) about one-third return to normal glucose regulation; and (c) individuals meeting prediabetes criteria have a very low risk of diabetes-related microvascular complications, making the impact of metformin minimal.

Recommendation #2
Metformin is not recommended for treating gestational diabetes.

Evidence source
Meta-analyses, systematic reviews, and randomized controlled trials.[27–34]

Justification
Insulin, not metformin, is recommended as first-line therapy since metformin crossing the placenta, raising safety concerns. Metformin should be discontinued by the end of the first trimester if used for polycystic ovary syndrome. While metformin is associated with lower neonatal hypoglycemia and maternal weight gain vs insulin, it easily crosses the placenta, resulting in fetal exposure. Controlled trials and meta-analyses have shown growth alterations in fetuses exposed to metformin, including lower birth weight and higher BMI during childhood and adolescence.

Obesity

Recommendation #1
Do not use prescription or over-the-counter drugs for weight control that have not been approved by government agencies.

Evidence source
Recommendations from scientific societies.[35–43]

Justification
The goal of obesity treatment, as a chronic disease, is not only weight loss but also inducing favorable changes in body composition and improving complications and quality of life without clinically relevant side effects. Regulatory agencies certify that all approved obesity drugs meet safety and efficacy profiles based on established criteria. Due to past experiences with some approved obesity drugs that were later withdrawn for severe adverse effects, regulatory agencies now require adequate safety profiles, particularly cardiovascular, for long-term treatment.

Recommendation #2
Do not prescribe or maintain pharmacological treatments for obesity during pregnancy and lactation.

Evidence source
Recommendations from scientific societies.[44–48]

Justification
Lifestyle interventions are recommended for pregnant and lactating women to achieve and maintain a healthy weight. Pharmacological treatments with approved drugs are not indicated during pregnancy, lactation, or for women planning pregnancy due to a lack of safety studies.

Recommendation #3
Do not screen for hypercortisolism in all patients with obesity.

Evidence source
Recommendations from scientific societies.[49–61]

Justification
Current clinical practice guidelines indicate that screening for hypercortisolism is not warranted in all obese patients without specific symptoms. Obesity alone has a very low pretest probability for Cushing's syndrome. Additionally, biochemical screening tests may yield false positives in obese patients.

Nutrition

Recommendation #1
Do not use albumin levels to assess nutritional status in the acute postoperative period or in hospitalized patients.

Evidence source
Recommendations from scientific societies.[62,63]

Justification
Scientific evidence indicates that albumin levels do not reflect nutritional status but are influenced by factors such as inflammation, hydration, liver function, and protein synthesis. Albumin, a long half-life protein, does not change rapidly with nutritional intervention. Its use as a nutritional parameter in postoperative or hospitalized patients is neither appropriate nor efficient and may lead to overtreatment or undertreatment, increasing costs.

Recommendation #2
Do not measure skinfold thickness in patients with bioimpedance analysis available.

Evidence source
Expert consensus recommendations.[37,64,65]

Justification
Bioimpedance analysis is a more precise technique for assessing body composition, providing detailed information on body fat, muscle mass, and water content. For evaluating and monitoring patients with malnutrition or obesity, bioimpedance offers more comprehensive and accurate data. Performing both techniques on the same patient adds no additional information and requires more time and resources.

Recommendation #3
Do not prescribe pureed diets for hospitalized patients who can consume soft or regular-textured diets.

Evidence source
Recommendations from scientific societies.[66–68]

Justification
ESPEN guidelines emphasize meeting nutritional requirements with the least restrictions to ensure adequate intake. Pureed diets can cause dysphagia due to disuse atrophy of the masseter muscle and malnutrition due to limited intake. Their prescription should be limited to patients unable to consume other oral diets.

Pituitary disease

Recommendation #1
Avoid performing pituitary MRI in patients with hyperprolactinemia without first ruling out physiological causes, systemic diseases, drugs, or improper blood draw.

Evidence source
Grading of Recommendations, Assessment, Development, and Evaluation (GRADE).[69–79]

Justification
Hyperprolactinemia can result from analytical interference, physiological responses to pregnancy, lactation, or stress, or pathological causes such as drugs—antidepressants, antipsychotics, antiemetics, estrogens—or sellar tumors, including prolactinomas or other tumors with infundibular compression. Since 16% of the general population has clinically inert pituitary lesions, proper clinical and analytical evaluation is essential before requesting an MRI.

Recommendation #2
Do not measure basal growth hormone (GH) levels in short stature (SS) evaluations.

Evidence source
Clinical guidelines using GRADE methodology.[80–83]

Justification
GH is a pulsatile hormone, and basal levels do not guide the diagnosis of GH deficiency. SS evaluation should include anthropometric parameters, clinical examination to rule out dysmorphic features, and psychomotor development assessment. If SS is confirmed, more informative tests include hand radiography, blood count, ESR, creatinine, electrolytes, calcium, phosphate, alkaline phosphatase, albumin, thyrotropin (TSH), free thyroxine, insulin-like growth factor 1 (IGF-1), anti-transglutaminase antibodies, and karyotype.

Recommendation #3
Do not perform a stimulation test for adult GH deficiency diagnosis if decreased IGF-1 and at least 3 other pituitary hormone deficiencies are present.

Evidence source
Clinical practice guidelines using GRADE methodology.[84–89]

Justification
In patients with 3 other pituitary hormone deficiencies (among corticotropin, TSH, gonadotropins, and/or antidi-

uretic hormone), there is a high pretest probability of adult GH deficiency. In this context, decreased IGF-1 levels confirm diagnosis, avoiding the need for a stimulation test. Consider potential false positives and negatives when interpreting IGF-1 levels.

Neuroendocrine tumors

Recommendation #1
Do not request pancreatic imaging in individuals without diabetes mellitus, with hypoglycemia symptoms, in whom Whipple's triad or endogenous hyperinsulinism has not been confirmed as the cause.

Evidence source
Clinical guidelines using GRADE methodology.[90]

Justification
Hypoglycemic syndromes are very rare in individuals who do not receive insulin or sulfonylureas as antidiabetic treatment. It is important to first confirm the hypoglycemic syndrome using the Whipple's triad (neuroglycopenic symptoms, coincidence of these symptoms with a laboratory glucose level <45 mg/dL, and symptomatic resolution upon treating the hypoglycemia), either spontaneously or during a fasting test of up to 72 h. It must also be confirmed that the hypoglycemia is due to endogenous hyperinsulinism (insulin and C-peptide not suppressed during hypoglycemia). Only if this triad with endogenous hyperinsulinism has been confirmed should a pancreatic MRI be requested to rule out an insulinoma.

Recommendation #2
Do not measure chromogranin A (CgA) without discontinuing proton pump inhibitors (PPIs) in advance.

Evidence source
Clinical guidelines using GRADE methodology.[91–98]

Justification
CgA is a secretion protein from neuroendocrine cells and neurons that can be elevated in individuals with tumors or hyperplasia of various endocrine cell types, as well as in epithelial tumors. CgA has high sensitivity and low specificity for detecting neuroendocrine tumors. Treatment with PPIs leads to achlorhydria and, secondarily, a hyperplasia of enterocromaffin-like gastric cells, which increase CgA levels. Therefore, especially when using this marker for the initial diagnosis of neuroendocrine tumors, it is important to discontinue these drugs or replace them with anti-H2 drugs, at least, 2 weeks before determining this marker.

Thyroid disease

Recommendation #1
Do not use suppressive levothyroxine therapy in low-risk differentiated thyroid carcinoma patients with excellent response.

Evidence source
Recommendations from scientific societies.[99–106]

Justification
Recent clinical practice guidelines classify TSH target levels based on initial recurrence risk and clinical response (dynamic risk stratification) after initial treatment. They aim to balance suppressive levothyroxine therapy with the risks of iatrogenic thyrotoxicosis. In patients with an excellent treatment response, serum TSH should be maintained in the low-normal range (0.3–2 mU/L).

Recommendation #2
Avoid treating asymptomatic benign thyroid nodules with normal thyroid function.

Evidence source
Recommendations from scientific societies.[107–113]

Justification
Treatment of benign thyroid nodules is only necessary for those with autonomous thyroid function, compressive symptoms, or esthetnic concerns. Clinical practice guidelines recommend clinical follow-up without treatment for cytologically benign, asymptomatic nodules, including those with mild size increase. Thyroid hormone therapy is not indicated in euthyroid patients with thyroid nodular disease.

Menopausal hormone therapy

Recommendation #1
Do not systematically deny hormonal and non-hormonal menopausal therapy to symptomatic women younger than 60 years with < 10 years since menopause onset.

Evidence source
Recommendations from scientific societies and systematic reviews.[114–132]

Justification
The positioning of scientific societies and professional organizations provides excellent resources for multidisciplinary teams (including gynecologists, primary care physicians, endocrinologists, nurses, and others) who care for middle-aged and older women. It is important for clinicians to recognize the early signs and symptoms of the menopausal transition and be prepared to offer treatment to mitigate these symptoms. Hormonal and non-hormonal therapies have been described, and it has been suggested that early initiation of hormonal therapy plays a substantial beneficial role in controlling symptoms, but also in improving quality of life and reducing mortality.

Recommendation #2
Do not use pellets for menopause.

Evidence source
Recommendations from scientific societies and systematic reviews.[133,134]

Justification
Pellets are therapies not approved by the Food and Drug Administration (FDA), as they lack data on pharmacokinetics, safety, and efficacy, and do not have a label detailing the risks. Moreover, the therapy provides women with a supraphysiological hormonal dose, which raises safety concerns. To truly understand the benefits and risks of bioidentical hormonal therapy in the form of pellets for menopause, randomized trials with long-term follow-up are needed to compare bioidentical products with approved hormonal therapies for menopause.

Conclusions

SEEN 2023-2027 strategic reflection,[135] under strategic line 3, aims to improve care and health outcomes for individuals with endocrine and/or nutritional diseases through quality, safety, and humanization. It promotes improving the quality of care in endocrinology and nutrition services by developing unit standards and performance indicators for comparative analysis (benchmarking) and emulation-based improvement.

The purpose of this document is to provide clear recommendations to endocrinology professionals that have a direct and immediate application in their clinical practice. The recommendations have been selected and drafted by members designated by the various WGs and KAs of the Spanish Society of Endocrinology and Nutrition (SEEN) who participated in the document. Although, obviously, it is not possible to cover the full scope of our specialty, the topics addressed and the recommendations formulated are of clear use for the everyday practice of clinical endocrinologists.

All the recommendations stated here are supported by previously published documents, such as clinical practice guidelines, systematic reviews, and randomized clinical trials. Recommendations based on indirect evidence—ie, studies in which patients differ from those for whom the recommendation is intended, or those where the procedure is not specifically related to the recommendation—have been avoided.

The main limitation of this document comes from the lack of recommendations in some areas of the specialty. Although a recommendation for pediatric patients has been included, most of the recommendations presented are for adult patients. A common methodology for searching the bibliographic information and selecting documents for the drafting of recommendations by the various participating areas and groups has not been used. This document allowed the selected experts to use their clinical judgment to collect the thematic areas they considered most appropriate and useful to improve clinical practice in endocrinology. In addition, a rigorous review process was followed, both for the selected recommendations and for the justificatory texts. Two reviews were conducted by the SEEN groups and areas, and finally, a review by the SEEN board of directors, which approved the document.

Despite the importance of various awareness campaigns to prevent inappropriate practices, knowledge and implementation of these in the routine clinical practice is rather limited.[8] Some studies have even shown only a moderate impact from the implementation of the proposed recommendations.[136] The authors of this document believe that its publication and dissemination through a scientific society like SEEN, with more than 2,500 members, most of whom provide health care as their main professional activity, is an appropriate procedure to reach a large number of endocrinologists who can apply the recommendations to their routine clinical practice in Spain. Therefore, this document reflects the result of joint and coordinated work from various SEEN KAs and WGs, formulating different recommendations for clinical practice in the field of endocrinology and nutrition.

Ethical responsibilities

As a literature review and WG coordination study, ethical committee approval was deemed unnecesary. However, the project was approved by the SEEN board before drafting.

The full document is available at: https://manual.seen.es/article?id=6763e8fe-aed0-43a3-a6ae-767b0aca0133[137]

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Declaration of competing interest

None declared.

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Annex. SEEN Board Members

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References

1. Brownlee S, Chalkidou K, Doust J, Elshaug AG, Glasziou P, Heath I, et al. Evidence for overuse of medical services around the world. Lancet. 2017;390(10090):156–68, http://dx.doi.org/10.1016/S0140-6736(16)32585-5.
2. Lichtenfeld L. Overdiagnosed. Making people sick in the pursuit of health. J Clin Invest. 2011;121(8):2954, http://dx.doi.org/10.1172/JCI57171.
3. Berwick DM. Avoiding overuse-the next quality frontier. Lancet. 2017;390(10090):102–4, http://dx.doi.org/10.1016/S0140-6736(16)32570-3.
4. Gray M. The demand for evidence-based practice. J Wound Ostomy Continence Nurs. 1997;24(6):291–2, http://dx.doi.org/10.1016/s1071-5754(97)90129-7.
5. Gray M. Value based healthcare. BMJ. 2017;356:j437, http://dx.doi.org/10.1136/bmj.j437.
6. Brody H. Medicine's ethical responsibility for health care reform–the Top Five list. N Engl J Med. 2010;362(4):283–5, http://dx.doi.org/10.1056/NEJMp0911423.
7. Good Stewardship Working Group. The ̈top 5l̈ists in primary care: meeting the responsibility of professionalism. Arch Intern Med. 2011;171(15):1385–90, http://dx.doi.org/10.1001/archinternmed.2011.231.
8. Choosing Wisely. An initiative of the ABIM Foundation. Available from: https://www.choosingwisely.org/. Visitado el 30 de septiembre de 2024.
9. Plan de Calidad para el Sistema Nacional de Salud del Ministerio de Sanidad. Available from: https://www.sanidad.gob.es/organizacion/sns/planCalidadSNS/excelencia/mpc/home.htm. Visitado el 30 de septiembre de 2024.
10. Proyecto Guiasalud. Available from: https://portal.guiasalud.es/. Visitado el 30 de septiembre de 2024.
11. Essencial. Available from: https://essencialsalut.gencat.cat/es/inici/. Visitado el 30 de septiembre de 2024.
12. DianaSalud. Divulgación de iniciativas para analizar la adecuación en salud. Available from: https://www.dianasalud.com/. Visitado el 30 de septiembre de 2024.
13. Bonfill X, Osorio D, Solà I, Pijoan JI, Balasso V, Quintana MJ, et al. DianaHealth.com, an on-line database containing appraisals of the clinical value and appropriateness of healthcare interventions: database development and retrospective analysis. PLoS One. 2016;11(2):e0147943, http://dx.doi.org/10.1371/journal.pone.0147943.
14. Knowler WC, Barrett-Connor E, Fowler SE, Hamman RF, Lachin JM, Walker EA, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. N Engl J Med. 2002;346(6):393–403, http://dx.doi.org/10.1056/NEJMoa012512.
15. Diabetes Prevention Program Research Group. Long-term effects of metformin on diabetes prevention: identification of subgroups that benefited most in the diabetes prevention program and diabetes prevention program outcomes study. Diabetes Care. 2019;42(4):601–8, http://dx.doi.org/10.2337/dc18-1970.
16. Perreault L, Pan Q, Mather KJ, Watson KE, Hamman RF, Kahn SE, et al. Effect of regression from prediabetes to normal glucose regulation on long-term reduction in diabetes risk: results from the Diabetes Prevention Program Outcomes Study. Lancet. 2012;379(9833):2243–51, http://dx.doi.org/10.1016/S0140-6736(12)60525-X.
17. Haw JS, Galaviz KI, Straus AN, Kowalski AJ, Magee MJ, Weber MB, et al. Long-term sustainability of diabetes prevention approaches: a systematic review and meta-analysis of randomized clinical trials. JAMA Intern Med. 2017;177(12):1808–17, http://dx.doi.org/10.1001/jamainternmed.2017.
18. Echouffo-Tcheugui JB, Niiranen TJ, McCabe EL, Jain M, Vasan RS, Larson MG, et al. Lifetime prevalence and prognosis of prediabetes without progression to diabetes. Diabetes Care. 2018;41(7):e117–8, http://dx.doi.org/10.2337/dc18-0524.
19. Richter B, Hemmingsen B, Metzendorf MI, Takwoingi Y. Development of type 2 diabetes mellitus in people with intermediate hyperglycaemia. Cochrane Database Syst Rev. 2018;10(10):CD012661, http://dx.doi.org/10.1002/14651858.CD012661.pub2.
20. Hwang YC, Cho IJ, Jeong IK, Ahn KJ, Chung HY. Factors associated with regression from prediabetes to normal glucose tolerance in a Korean general population: a community-based 10-year prospective cohort study. Diabet Med. 2018;35(11):1544–51, http://dx.doi.org/10.1111/dme.13789.
21. Shang Y, Marseglia A, Fratiglioni L, Welmer AK, Wang R, Wang HX, et al. Natural history of prediabetes in older adults from a population-based longitudinal study. J Intern Med. 2019;286(3):326–40, http://dx.doi.org/10.1111/joim.12920.
22. Vistisen D, Kivimäki M, Perreault L, Hulman A, Witte DR, Brunner EJ, et al. Reversion from prediabetes to normoglycaemia and risk of cardiovascular disease and mortality: the Whitehall II cohort study. Diabetologia. 2019;62(8):1385–90, http://dx.doi.org/10.1007/s00125-019-4895-0.
23. RISE Consortium. Lack of durable improvements in β-Cell function following withdrawal of pharmacological interventions in adults with impaired glucose tolerance or recently diagnosed type 2 diabetes. Diabetes Care. 2019;42(9):1742–51, http://dx.doi.org/10.2337/dc19-0556.
24. Davidson MB. Metformin should not be used to treat prediabetes. Diabetes Care. 2020;43(9):1983–7, http://dx.doi.org/10.2337/dc19-2221.
25. Wagner R, Heni M, Tabák AG, Machann J, Schick F, Randrianarisoa E, et al. Pathophysiology-based subphenotyping of individuals at elevated risk for type 2 diabetes. Nat Med. 2021;27(1):49–57, http://dx.doi.org/10.1038/s41591-020-1116-9.
26. American Diabetes Association Professional Practice Committee. Prevention or delay of diabetes and associated comorbidities: standards of care in diabetes—2024. Diabetes Care. 2024;47 Suppl. 1:S43–51, http://dx.doi.org/10.2337/dc24-S003.
27. ElSayed NA, Aleppo G, Aroda VR, Bannuru RR, Brown FM, Bruemmer D, et al. Management of diabetes in pregnancy: standards of care in diabetes-2023. Diabetes Care. 2023;46 Suppl 1:S254–66, http://dx.doi.org/10.2337/dc23-S015.
28. Vanky E, Zahlsen K, Spigset O, Carlsen SM. Placental passage of metformin in women with polycystic ovary syndrome. Fertil Steril. 2005;83(5):1575–8, http://dx.doi.org/10.1016/j.fertnstert.2004.11.051.
29. Charles B, Norris R, Xiao X, Hague W. Population pharmacokinetics of metformin in late pregnancy. Ther

Drug Monit. 2006;28(1):67–72, http://dx.doi.org/10.1097/01.ftd.0000184161.52573.0e.
30. Hanem LGE, Stridsklev S, Júlíusson PB, Salvesen Ø, Roelants M, Carlsen SM, et al. Metformin use in PCOS pregnancies increases the risk of offspring overweight at 4 years of age: follow-up of two RCTs. J Clin Endocrinol Metab. 2018;103(4):1612–21, http://dx.doi.org/10.1210/jc.2017-02419.
31. Tarry-Adkins JL, Aiken CE, Ozanne SE. Neonatal, infant, and childhood growth following metformin versus insulin treatment for gestational diabetes: a systematic review and meta-analysis. PLoS Med. 2019;16(8):e1002848, http://dx.doi.org/10.1371/journal.pmed.1002848.
32. Hanem LGE, Salvesen Ø, Juliusson PB, Carlsen SM, Nossum MCF, Vaage MØ, et al. Intrauterine metformin exposure and offspring cardiometabolic risk factors (PedMet study): a 5-10 year follow-up of the PregMet randomised controlled trial. Lancet Child Adolesc Health. 2019;3(3):166–74, http://dx.doi.org/10.1016/S2352-4642(18)30385-7.
33. Meng J, Tang H, Gao S. Early metformin treatment for gestational diabetes. JAMA. 2024;331(7):617–8, http://dx.doi.org/10.1001/jama.2023.27790.
34. Paschou SA, Shalit A, Gerontiti E, Athanasiadou KI, Kalampokas T, Psaltopoulou T, et al. Efficacy and safety of metformin during pregnancy: an update. Endocrine. 2024;83(2):259–69, http://dx.doi.org/10.1007/s12020-023-03550-0.
35. Toplak H, Woodward E, Yumuk V, Oppert JM, Halford JC, Frühbeck G. 2014 EASO position statement on the use of anti-obesity drugs. Obes Facts. 2015;8(3):166–74, http://dx.doi.org/10.1159/000430801.
36. Garvey WT, Mechanick JI, Brett EM, Garber AJ, Hurley DL, Jastreboff AM, et al. American Association of Clinical Endocrinologists and American College of Endocrinology comprehensive clinical practice guidelines for medical care of patients with obesity. Endocr Pract. 2016;22 Suppl 3:1–203, http://dx.doi.org/10.4158/EP161365.GL.
37. Ballesteros Pomar MD, Vilarrasa García N, Rubio Herrera MÁ, Barahona MJ, Bueno M, Caixàs A, et al. The SEEN comprehensive clinical survey of adult obesity: executive summary. Endocrinol Diabetes Nutr (Engl Ed). 2021;68(2):130–6, http://dx.doi.org/10.1016/j.endinu.2020.05.003.
38. Wharton S, Lau DCW, Vallis M, Sharma AM, Biertho L, Campbell-Scherer D, et al. Obesity in adults: a clinical practice guideline. CMAJ. 2020;192(31):E875–91, http://dx.doi.org/10.1503/cmaj.191707.
39. Colman E. Food and Drug Administration's Obesity Drug Guidance Document: a short history. Circulation. 2012;125(17):2156–64, http://dx.doi.org/10.1161/CIRCULATIONAHA.111.028381.
40. Food and Drug Administration (FDA). Guidance for Industry Developing Products for Weight Management. Available from: https://www.fda.gov/media/71252/download. Visitado el 10 de junio de 2024.
41. European Medicines Agency (EMA) Clinical evaluation of medicinal products used in weight control - Scientific guideline. 2017. Available from: https://www.ema.europa.eu/en/clinical-evaluation-medicinal-products-used-weight-control-scientific-guideline. Visitado el 10 de junio de 2024.
42. Pedersen SD, Manjoo P, Wharton S. Canadian Adult Obesity Clinical Practice Guidelines: Pharmacotherapy for Obesity Management. Available from: https://obesitycanada.ca/wp-content/uploads/2022/10/Pharmacotherapy-CPG-2022_finalA.pdf. Visitado el 10 de junio de 2024.
43. Guía española GIRO. Guía Española de Manejo Integral y Multidisciplinar de la Obesidad en Personas Adultas. Available from: https://www.seedo.es/images/images/site/SEEDO_Gua_GIRO_final_v12_16072024.pdf. Visitado el 10 de junio de 2024.
44. Langley-Evans SC, Pearce J, Ellis S. Overweight, obesity and excessive weight gain in pregnancy as risk factors for adverse pregnancy outcomes: a narrative review. J Hum Nutr Diet. 2022;35(2):250–64, http://dx.doi.org/10.1111/jhn.12999.
45. McAuliffe FM, Killeen SL, Jacob CM, Hanson MA, Hadar E, McIntyre HD, et al. Management of prepregnancy, pregnancy, and postpartum obesity from the FIGO Pregnancy and Non-Communicable Diseases Committee: A FIGO (International Federation of Gynecology and Obstetrics) guideline. Int J Gynaecol Obstet. 2020;151 Suppl 1:16–36, http://dx.doi.org/10.1002/ijgo.13334.
46. Boyle BR, Ablett AD, Ochi C, Hudson J, Watson L, Rauh D, et al. The effect of weight loss interventions for obesity on fertility and pregnancy outcomes: a systematic review and meta-analysis. Int J Gynaecol Obstet. 2023;161(2):335–42, http://dx.doi.org/10.1002/ijgo.14597.
47. Maslin K, Alkutbe R, Gilbert J, Pinkney J, Shawe J. What is known about the use of weight loss medication in women with overweight/obesity on fertility and reproductive health outcomes? A scoping review. Clin Obes. 2024:e12690, http://dx.doi.org/10.1111/cob.12690.
48. Guo Y, Souza SCS, Bruce L, Luo R, El-Chaâr D, Gaudet LM, et al. Gestational weight loss and fetal growth in uncomplicated pregnancies among women with obesity: a population-based retrospective cohort study. Int J Obes (Lond). 2023;47(12):1269–77, http://dx.doi.org/10.1038/s41366-023-01382-6.
49. Rubinstein G, Osswald A, Hoster E, Losa M, Elenkova A, Zacharieva S, et al. Time to diagnosis in cushing's syndrome: a meta-analysis based on 5367 patients. J Clin Endocrinol Metab. 2020;105(3):dgz136, http://dx.doi.org/10.1210/clinem/dgz136.
50. Braun LT, Vogel F, Zopp S, Marchant Seiter T, Rubinstein G, Berr CM, et al. Whom should we screen for cushing syndrome? The endocrine society practice guideline recommendations 2008 revisited. J Clin Endocrinol Metab. 2022;107(9):e3723–30, http://dx.doi.org/10.1210/clinem/dgac379.
51. Savastano S, Pivonello R, Colao A. Bariatric surgery for obesity and hidden Cushing syndrome. Surg Obes Relat Dis. 2009;5(1):121–2, http://dx.doi.org/10.1016/j.soard.2008.07.006.
52. Javorsky BR, Carroll TB, Tritos NA, Salvatori R, Heaney AP, Fleseriu M, et al. Discovery of Cushing's syndrome after bariatric surgery: multicenter series of 16 patients. Obes Surg. 2015;25(12):2306–13, http://dx.doi.org/10.1007/s11695-015-1681-z.
53. Pedro J, Belo S, Guerreiro V, Ferreira MJ, Salazar D, Costa C, et al. Cushing's syndrome: consequences of late diagnosis after bariatric surgery. Clin Case Rep. 2020;8(3):559–62, http://dx.doi.org/10.1002/ccr3.2694.
54. Tatranska T, Strele-Trieb P, Wiesinger CG, Windpessl M. Unexpected turnaround: cushing's Syndrome causing new weight gain after bariatric surgery. Am J Med. 2022;135(7):e219–20, http://dx.doi.org/10.1016/j.amjmed.2022.03.017.
55. Fleseriu M, Ludlam WH, Teh SH, Yedinak CG, Deveney C, Sheppard BC. Cushing's syndrome might be underappreciated in patients seeking bariatric surgery: a plea for screening.

Surg Obes Relat Dis. 2009;5(1):116–9, http://dx.doi.org/10.1016/j.soard.2008.09.011.
56. Tiryakioglu O, Ugurlu S, Yalin S, Yirmibescik S, Caglar E, Yetkin DO, et al. Screening for Cushing's syndrome in obese patients. Clinics (Sao Paulo). 2010;65(1):9–13, http://dx.doi.org/10.1590/S1807-59322010000100003.
57. Stiles LE. Cushing syndrome and bariatric surgery: why, when, and how to evaluate preoperatively. Surg Obes Relat Dis. 2009;5(1):119–21, http://dx.doi.org/10.1016/j.soard.2008.07.002.
58. Baid SK, Rubino D, Sinaii N, Ramsey S, Frank A, Nieman LK. Specificity of screening tests for Cushing's syndrome in an overweight and obese population. J Clin Endocrinol Metab. 2009;94(10):3857–64, http://dx.doi.org/10.1210/jc.2008-2766.
59. Catargi B, Rigalleau V, Poussin A, Ronci-Chaix N, Bex V, Vergnot V, et al. Occult Cushing's syndrome in type-2 diabetes. J Clin Endocrinol Metab. 2003;88(12):5808–13, http://dx.doi.org/10.1210/jc.2003-030254.
60. Mechanick JI, Apovian C, Brethauer S, Garvey WT, Joffe AM, Kim J, et al. Clinical practice guidelines for the perioperative nutrition, metabolic, and nonsurgical support of patients undergoing bariatric procedures - 2019 update: cosponsored by American Association of Clinical Endocrinologists/American College of Endocrinology, The Obesity Society, American Society for Metabolic & Bariatric Surgery, Obesity Medicine Association, and American Society of Anesthesiologists. Surg Obes Relat Dis. 2020;16(2):175–247, http://dx.doi.org/10.1016/j.soard.2019.10.025.
61. Pasquali R, Casanueva F, Haluzik M, van Hulsteijn L, Ledoux S, Monteiro MP, et al. European society of endocrinology clinical practice guideline: endocrine work-up in obesity. Eur J Endocrinol. 2020;182(1):G1–32, http://dx.doi.org/10.1530/EJE-19-0893.
62. Soeters PB, Wolfe RR, Shenkin A. Hypoalbuminemia: pathogenesis and clinical significance. JPEN J Parenter Enteral Nutr. 2019;43(2):181–93, http://dx.doi.org/10.1002/jpen.1451.
63. Evans DC, Corkins MR, Malone A, Miller S, Mogensen KM, Guenter P, et al. The use of visceral proteins as nutrition markers: an ASPEN position paper. Nutr Clin Pract. 2021;36(1):22–8, http://dx.doi.org/10.1002/ncp.10588.
64. González Jiménez E. Composición corporal: estudio y utilidad clínica. Endocrinol Nutr. 2013;60(2):69–75, http://dx.doi.org/10.1016/j.endonu.2012.04.003.
65. García-Almeida JM, García-García C, Ballesteros-Pomar MD, Olveira G, Lopez-Gomez JJ, Bellido V, et al. Expert consensus on morphofunctional assessment in disease-related malnutrition. Grade Review and Delphi Study. Nutrients. 2023;15(3):612, http://dx.doi.org/10.3390/nu15030612.
66. González-Fernández M, Arbones-Mainar JM, Ferrer-Lahuerta E, Perez-Nogueras J, Serrano-Oliver A, Torres-Anoro E, et al. Ultrasonographic measurement of masseter muscle thickness associates with oral phase dysphagia in institutionalized elderly individuals. Dysphagia. 2021;36(6):1031–9, http://dx.doi.org/10.1007/s00455-020-10234-8.
67. Wright L, Cotter D, Hickson M, Frost G. Comparison of energy and protein intakes of older people consuming a texture modified diet with a normal hospital diet. J Hum Nutr Diet. 2005;18(3):213–9, http://dx.doi.org/10.1111/j.1365-277X.2005.00605.x.
68. Thibault R, Abbasoglu O, Ioannou E, Meija L, Ottens-Oussoren K, Pichard C, et al. ESPEN guideline on hospital nutrition. Clin Nutr. 2021;40(12):5684–709, http://dx.doi.org/10.1016/j.clnu.2021.09.039.
69. Kars M, Souverein PC, Herings RM, Romijn JA, Vandenbroucke JP, de Boer A, et al. Estimated age- and sex-specific incidence and prevalence of dopamine agonist-treated hyperprolactinemia. J Clin Endocrinol Metab. 2009;94(8):2729–34, http://dx.doi.org/10.1210/jc.2009-0177.
70. Petersenn S. Biochemical diagnosis in prolactinomas: some caveats. Pituitary. 2020;23(1):9–15, http://dx.doi.org/10.1007/s11102-019-01024-z.
71. Fernandez A, Karavitaki N, Wass JA. Prevalence of pituitary adenomas: a community-based, cross-sectional study in Banbury (Oxfordshire, UK). Clin Endocrinol (Oxf). 2010;72(3):377–82, http://dx.doi.org/10.1111/j.1365-2265.2009.03667.x.
72. Melmed S, Casanueva FF, Hoffman AR, Kleinberg DL, Montori VM, Schlechte JA, et al. Diagnosis and treatment of hyperprolactinemia: an Endocrine Society clinical practice guideline. J Clin Endocrinol Metab. 2011;96(2):273–88, http://dx.doi.org/10.1210/jc.2010-1692.
73. Freda PU, Beckers AM, Katznelson L, Molitch ME, Montori VM, Post KD, et al. Pituitary incidentaloma: an endocrine society clinical practice guideline. J Clin Endocrinol Metab. 2011;96(4):894–904, http://dx.doi.org/10.1210/jc.2010-1048.
74. Petakov MS, Damjanović SS, Nikolić-Durović MM, Dragojlović ZL, Obradović S, Gligorović MS, et al. Pituitary adenomas secreting large amounts of prolactin may give false low values in immunoradiometric assays. The hook effect. J Endocrinol Invest. 1998;21(3):184–8, http://dx.doi.org/10.1007/BF03347299.
75. Petersenn S, Fleseriu M, Casanueva FF, Giustina A, Biermasz N, Biller BMK, et al. Diagnosis and management of prolactin-secreting pituitary adenomas: a Pituitary Society international Consensus Statement. Nat Rev Endocrinol. 2023;19(12):722–40, http://dx.doi.org/10.1038/s41574-023-00886-5.
76. Junqueira DR, Bennett D, Huh SY, Casañas I, Comabella C. Clinical presentations of drug-induced hyperprolactinaemia: a literature review. Pharmaceut Med. 2023;37(2):153–66, http://dx.doi.org/10.1007/s40290-023-00462-2.
77. Lo JC, Beck GJ, Kaysen GA, Chan CT, Kliger AS, Rocco MV, et al. Hyperprolactinemia in end-stage renal disease and effects of frequent hemodialysis. Hemodial Int. 2017;21(2):190–6, http://dx.doi.org/10.1111/hdi.12489.
78. Farthing MJ, Green JR, Edwards CR, Dawson AM. Progesterone, prolactin, and gynaecomastia in men with liver disease. Gut. 1982;23(4):276–9, http://dx.doi.org/10.1136/gut.23.4.276.
79. Raber W, Gessl A, Nowotny P, Vierhapper H. Hyperprolactinaemia in hypothyroidism: clinical significance and impact of TSH normalization. Clin Endocrinol (Oxf). 2003;58(2):185–91, http://dx.doi.org/10.1046/j.1365-2265.2003.01694.x. PMID: 12580934.
80. Cohen P, Rogol AD, Deal CL, Saenger P, Reiter EO, Ross JL, et al. Consensus statement on the diagnosis and treatment of children with idiopathic short stature: a summary of the Growth Hormone Research Society, the Lawson Wilkins Pediatric Endocrine Society, and the European Society for Paediatric Endocrinology Workshop. J Clin Endocrinol Metab. 2008;93(11):4210–7, http://dx.doi.org/10.1210/jc.2008-0509.

81. Sisley S, Trujillo MV, Khoury J, Backeljauw P. Low incidence of pathology detection and high cost of screening in the evaluation of asymptomatic short children. J Pediatr. 2013;163(4):1045–51, http://dx.doi.org/10.1016/j.jpeds.2013.04.002.
82. Collett-Solberg PF, Ambler G, Backeljauw PF, Bidlingmaier M, Biller BMK, Boguszewski MCS, et al. Diagnosis, genetics, and therapy of short stature in children: a growth hormone research society international perspective. Horm Res Paediatr. 2019;92(1):1–14, http://dx.doi.org/10.1159/000502231.
83. Olarescu NC, Gunawardane K, Hansen TK, Møller N, Jørgensen JOL. Normal Physiology of Growth Hormone in Adults. In: Feingold KR, Anawalt B, Blackman MR, Boyce A, Chrousos G, Corpas E, et al., editors. Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000. Disponible en: http://www.ncbi.nlm.nih.gov/books/NBK279056/. Visitado el 16 de agosto de 2024.
84. Molitch ME, Clemmons DR, Malozowski S, Merriam GR, Vance ML, Endocrine Society. Evaluation and treatment of adult growth hormone deficiency: an Endocrine Society clinical practice guideline. J Clin Endocrinol Metab. 2011;96(6):1587–609, http://dx.doi.org/10.1210/jc.2011-0179.
85. Yuen KCJ, Biller BMK, Radovick S, Carmichael JD, Jasim S, Pantalone KM, et al. American Association of Clinical Endocrinologists and American College of Endocrinology guidelintes for management of growth hormone deficiency in adults and patients transitioning from pediatric to adult care. Endocr Pract. 2019;25(11):1191–232, http://dx.doi.org/10.4158/GL-2019-0405.
86. Toogood AA, Beardwell CG, Shalet SM. The severity of growth hormone deficiency in adults with pituitary disease is related to the degree of hypopituitarism. Clin Endocrinol (Oxf). 1994;41(4):511–6, http://dx.doi.org/10.1111/j.1365-2265.1994.tb02583.x.
87. Hartman ML, Crowe BJ, Biller BM, Ho KK, Clemmons DR, Chipman JJ, et al. Which patients do not require a GH stimulation test for the diagnosis of adult GH deficiency? J Clin Endocrinol Metab. 2002;87(2):477–85, http://dx.doi.org/10.1210/jcem.87.2.8216.
88. Kwan AY, Hartman ML. IGF-I measurements in the diagnosis of adult growth hormone deficiency. Pituitary. 2007;10(2):151–7, http://dx.doi.org/10.1007/s11102-007-0028-8.
89. Glynn N, Agha A. Diagnosing growth hormone deficiency in adults. Int J Endocrinol. 2012;2012:972617, http://dx.doi.org/10.1155/2012/972617.
90. Cryer PE, Axelrod L, Grossman AB, Heller SR, Montori VM, Seaquist ER, et al. Evaluation and management of adult hypoglycemic disorders: an Endocrine Society Clinical Practice Guideline. J Clin Endocrinol Metab. 2009;94(3):709–28, http://dx.doi.org/10.1210/jc.2008-1410.
91. Sultana Q, Kar J, Verma A, Sanghvi S, Kaka N, Patel N, et al. A comprehensive review on neuroendocrine neoplasms: presentation, pathophysiology and management. J Clin Med. 2023;12(15):5138, http://dx.doi.org/10.3390/jcm12155138.
92. Modlin IM, Oberg K, Chung DC, Jensen RT, de Herder WW, Thakker RV, et al. Gastroenteropancreatic neuroendocrine tumours. Lancet Oncol. 2008;9(1):61–72, http://dx.doi.org/10.1016/S1470-2045(07)70410-2.
93. Di Giacinto P, Rota F, Rizza L, Campana D, Isidori A, Lania A, et al. Chromogranin A: from laboratory to clinical aspects of patients with neuroendocrine tumors. Int J Endocrinol. 2018;2018:8126087, http://dx.doi.org/10.1155/2018/8126087.
94. Oberg K, Couvelard A, Delle Fave G, Gross D, Grossman A, Jensen RT, et al. ENETS consensus guidelines for standard of care in neuroendocrine tumours: biochemical markers. Neuroendocrinology. 2017;105(3):201–11, http://dx.doi.org/10.1159/000472254.
95. Taupenot L, Harper KL, O'Connor DT. The chromogranin-secretogranin family. N Engl J Med. 2003;348(12):1134–49, http://dx.doi.org/10.1056/NEJMra021405.
96. Hirschowitz BI, Worthington J, Mohnen J, Haber M. Chromogranin A in patients with acid hypersecretion and/or hypergastrinaemia. Aliment Pharmacol Ther. 2007;26(6):869–78, http://dx.doi.org/10.1111/j.1365-2036.2007.03439.x.
97. Sachs G, Prinz C, Loo D, Bamberg K, Besancon M, Shin JM. Gastric acid secretion: activation and inhibition. Yale J Biol Med. 1994;67(3-4):81–95.
98. Bulzico D. The search for a reliable biomarker in MEN1 duodenopancreatic neuroendocrine tumors. J Clin Endocrinol Metab. 2024;109(3):e1301–2, http://dx.doi.org/10.1210/clinem/dgad521.
99. Ducai L, Zafereo M, Cabanillas ME. Thyroid cancer. A review. JAMA. 2024;331(5):425–35, http://dx.doi.org/10.1001/jama.2023.26348.
100. Perros P, Boelaert K, Colley S, Evans C, Evans RM, Gerrard Ba G, et al. Guidelines for the management of thyroid cancer. Clin Endocrinol (Oxf). 2014;81 Suppl 1:1–122, http://dx.doi.org/10.1111/cen.12515.
101. Grani G, Ramundo V, Verrienti A, Sponziello M, Durante C. Thyroid hormone therapy in differentiated thyroid cancer. Endocrine. 2019;66(1):43–50, http://dx.doi.org/10.1007/s12020-019-02051-3.
102. Sugitani I, Fujimoto Y. Does postoperative thyrotropin suppression therapy truly decrease recurrence in papillary thyroid carcinoma? A randomized controlled trial. J Clin Endocrinol Metab. 2010;95(10):4576–83, http://dx.doi.org/10.1210/jc.2010-0161.
103. Park S, Kim WG, Han M, Jeon MJ, Kwon H, Kim M, et al. Thyrotropin suppressive therapy for low-risk small thyroid cancer: a propensity score-matched cohort study. Thyroid. 2017;27(9):1164–70, http://dx.doi.org/10.1089/thy.2017.0177.
104. Haugen BR, Alexander EK, Bible KC, Doherty GM, Mandel SJ, Nikiforov YE, et al. 2015 American thyroid association management guidelines for adult patients with thyroid nodules and differentiated thyroid cancer: the American thyroid association guidelines task force on thyroid nodules and differentiated thyroid cancer. Thyroid. 2016;26(1):1–133, http://dx.doi.org/10.1089/thy.2015.0020.
105. Díez JJ, Oleaga A, Álvarez-Escolá C, Martín T, Galofré JC, en representación del Grupo de Trabajo de Cáncer de Tiroides de la Sociedad Española de Endocrinología y Nutrición. Guía clínica para el manejo de pacientes con carcinoma diferenciado de tiroides de bajo riesgo. Endocrinol Nutr. 2015;62(6):e57–72, http://dx.doi.org/10.1016/j.endonu.2015.02.006.
106. Biondi B, Cooper DS. Thyroid hormone suppression therapy. Endocrinol Metab Clin North Am. 2019;48(1):227–37, http://dx.doi.org/10.1016/j.ecl.2018.10.008.
107. Alexander EK, Cibas ES. Diagnosis of thyroid nodules. Lancet Diabetes Endocrinol. 2022;10(7):533–9, http://dx.doi.org/10.1016/S2213-8587(22)00101-2.

108. Grani G, Sponziello M, Pecce V, Ramundo V, Durante C. Contemporary thyroid nodule evaluation and management. J Clin Endocrinol Metab. 2020;105(9):2869–83, http://dx.doi.org/10.1210/clinem/dgaa322.
109. Durante C, Hegedüs L, Czarniecka A, Paschke R, Russ G, Schmitt F, et al. 2023 European Thyroid Association Clinical Practice Guidelines for thyroid nodule management. Eur Thyroid J. 2023;12(5):e230067, http://dx.doi.org/10.1530/ETJ-23-0067.
110. Lee EK, Park YJ, Jung CK, Na DG. A narrative review of the 2023 Korean thyroid association management guideline for patients with thyroid nodules. Endocrinol Metab (Seoul). 2024;39(1):61–72, http://dx.doi.org/10.3803/EnM.2024.1938.
111. Durante C, Costante G, Lucisano G, Bruno R, Meringolo D, Paciaroni A, et al. The natural history of benign thyroid nodules. JAMA. 2025;313(9):926–35, http://dx.doi.org/10.1001/jama.2015.0956.
112. Gharib H, Papini E, Garber JR, Duick DS, Harrell RM, Hegedüs L, et al. American college of endocrinology, and associazione medici endocrinologi medical guidelines for clinical practice for the diagnosis and management of thyroid nodules–2016 update. Endocr Pract. 2016;22(5):622–39, http://dx.doi.org/10.4158/EP161208.GL.
113. Papini E, Monpeyssen H, Frasoldati A, Hegedüs L. 2020 European thyroid association clinical practice guideline for the use of image-guided ablation in benign thyroid nodules. Eur Thyroid J. 2020;9(4):172–85, http://dx.doi.org/10.1159/000508484.
114. Flores VA, Pal L, Manson JE. Hormone therapy in menopause: concepts, controversies, and approach to treatment. Endocr Rev. 2021;42(6):720–52, http://dx.doi.org/10.1210/endrev/bnab011.
115. Vigneswaran K, Hamoda H. Hormone replacement therapy - Current recommendations. Best Pract Res Clin Obstet Gynaecol. 2022;81:8–21, http://dx.doi.org/10.1016/j.bpobgyn.2021.12.001.
116. Mehta J, Kling JM, Manson JE. Risks, benefits, and treatment modalities of menopausal hormone therapy: current concepts. Front Endocrinol (Lausanne). 2021;12:564781, http://dx.doi.org/10.3389/fendo.2021.564781.
117. Papadakis GE, Hans D, Gonzalez Rodriguez E, Vollenweider P, Waeber G, Marques-Vidal P, et al. Menopausal hormone therapy is associated with reduced total and visceral adiposity: the osteolaus cohort. J Clin Endocrinol Metab. 2018;103(5):1948–57, http://dx.doi.org/10.1210/jc.2017-02449.
118. Ferreira Campos L, de Andrade Costa G, Domingues Feitosa M, Ferreira Félix I, Gabrielli L, C Almeida MDC, et al. Effect of hormone therapy on blood pressure and hypertension in postmenopausal women: a systematic review and meta-analysis. Menopause. 2024;31(6):556–62, http://dx.doi.org/10.1097/GME.0000000000002359.
119. Gu Y, Han F, Xue M, Wang M, Huang Y. The benefits and risks of menopause hormone therapy for the cardiovascular system in postmenopausal women: a systematic review and meta-analysis. BMC Womens Health. 2024;24(1):60, http://dx.doi.org/10.1186/s12905-023-02788-0.
120. Bontempo S, Yeganeh L, Giri R, Vincent AJ. Use of MHT in women with cardiovascular disease: a systematic review and meta-analysis. Climacteric. 2024;27(1):93–103, http://dx.doi.org/10.1080/13697137.2023.2273524.
121. Collins P, Rosano G, Casey C, Daly C, Gambacciani M, Hadji P, et al. Management of cardiovascular risk in the perimenopausal women: a consensus statement of European cardiologists and gynecologists. Climacteric. 2007;10(6):508–26, http://dx.doi.org/10.1080/13697130701755213.
122. Davis SR, Baber RJ. Treating menopause - MHT and beyond. Nat Rev Endocrinol. 2022;18(8):490–502, http://dx.doi.org/10.1038/s41574-022-00685-4.
123. Hemachandra C, Taylor S, Islam RM, Fooladi E, Davis SR. A systematic review and critical appraisal of menopause guidelines. BMJ Sex Reprod Health. 2024;50(2):122–38, http://dx.doi.org/10.1136/bmjsrh-2023-202099.
124. Carter AE, Merriam S. Menopause. Med Clin North Am. 2023;107(2):199–212, http://dx.doi.org/10.1016/j.mcna.2022.10.003.
125. Santoro N, Roeca C, Peters BA, Neal-Perry G. The menopause transition: signs, symptoms, and management options. J Clin Endocrinol Metab. 2021;106(1):1–15, http://dx.doi.org/10.1210/clinem/dgaa764.
126. Voedisch AJ, Dunsmoor-Su R, Kasirsky J. Menopause: a global perspective and clinical guide for practice. Clin Obstet Gynecol. 2021;64(3):528–54, http://dx.doi.org/10.1097/GRF.0000000000000639.
127. Duralde ER, Sobel TH, Manson JE. Management of perimenopausal and menopausal symptoms. BMJ. 2023 Aug;8(382):e072612, http://dx.doi.org/10.1136/bmj-2022-072612.
128. Lobo RA, Gompel A. Management of menopause: a view towards prevention. Lancet Diabetes Endocrinol. 2022;10(6):457–70, http://dx.doi.org/10.1016/S2213-8587(21)00269-2.
129. David PS, Smith TL, Nordhues HC, Kling JM. A clinical review on paroxetine and emerging therapies for the treatment of vasomotor symptoms. Int J Womens Health. 2022;14:353–61, http://dx.doi.org/10.2147/IJWH.S282396.
130. Morga A, Ajmera M, Gao E, Patterson-Lomba O, Zhao A, Mancuso S, et al. Systematic review and network meta-analysis comparing the efficacy of fezolinetant with hormone and nonhormone therapies for treatment of vasomotor symptoms due to menopause. Menopause. 2024;31(1):68–76, http://dx.doi.org/10.1097/GME.0000000000002281.
131. Rahman UA, Kashif TB, Usman M, Rana M, Hasanain M, Anjum MU, et al. Efficacy and safety of fezolinetant, a neurokinin-3 antagonist, in treating vasomotor symptoms in postmenopausal women: A systematic review and meta-analysis. Medicine (Baltimore). 2023;102(50):e36592, http://dx.doi.org/10.1097/MD.0000000000036592.
132. Casiano Evans EA, Hobson DTG, Aschkenazi SO, Alas AN, Balgobin S, Balk EM, et al. Nonestrogen Therapies for Treatment of Genitourinary Syndrome of Menopause: A Systematic Review. Obstet Gynecol. 2023;142(3):555–70, http://dx.doi.org/10.1097/AOG.0000000000005288.
133. Pinkerton JV. Concerns about compounded bioidentical menopausal hormone therapy. Cancer J. 2022;28(3):241–5, http://dx.doi.org/10.1097/PPO.0000000000000597.
134. Compounded bioidentical menopausal hormone therapy: ACOG clinical consensus No. 6. Obstet Gynecol. 2023;142(5):1266–73, http://dx.doi.org/10.1097/AOG.0000000000005395.
135. Reflexión estratégica de la Sociedad Española de Endocrinología y Nutrición 2023-2027. Available from:

https://www.seen.es/portal/noticias/noticia-reflexion-estrategica-seen-2023-2027. Visitado el 30 de septiembre de 2024.
136. Hong AS, Ross-Degnan D, Zhang F, Wharam JF. Small decline in low-value back imaging associated with the 'choosing wisely' campaign, 2012-14. Health Aff (Millwood). 2017;36(4):671–9, http://dx.doi.org/10.1377/hlthaff.2016.1263.
137. www.seen.es.