Practice Changing UpDates

AUTHORS: April F Eichler, MD, MPH, Sadhna R Vora, MD

All topics are updated as new evidence becomes available and our peer review process is complete.

Literature review current through: **Jul 2023.**
This topic last updated: **Jul 19, 2023.**

INTRODUCTION

This section highlights selected specific new recommendations and/or updates that we anticipate may change usual clinical practice. Practice Changing UpDates focus on changes that may have significant and broad impact on practice, and therefore do not represent all updates that affect practice. These Practice Changing UpDates, reflecting important changes to UpToDate over the past year, are presented chronologically, and are discussed in greater detail in the identified topic reviews.

PSYCHIATRY (December 2022, Modified July 2023)

Screening for anxiety in children and adults

- We suggest screening for anxiety disorders in individuals between age 8 and 65 years (**Grade 2C**).

Anxiety disorders are common but underrecognized conditions and may cause chronic distress and impaired functioning throughout the lifespan. The United States Preventive Services Task Force now recommends screening for anxiety in all individuals ages 8 to 65 years, including pregnant and postpartum persons [1,2]. These new recommendations are supported by systematic reviews and meta-analyses in both children and adults, documenting that screening tools can accurately identify anxiety disorders and that treatment results in moderate benefits in reducing anxiety and improving disease remission [3,4]. Major harms were not identified. Evidence was insufficient to demonstrate benefits and harms in individuals <8 or >65 years,

although screening may also be appropriate in these individuals. Our approach is consistent with these recommendations. (See "Anxiety disorders in children and adolescents: Assessment and diagnosis", section on 'Screening' and "Generalized anxiety disorder in adults: Epidemiology, pathogenesis, clinical manifestations, course, assessment, and diagnosis", section on 'Screening'.)

INFECTIOUS DISEASES (April 2023)

Bivalent COVID-19 mRNA vaccine recommendations

- All individuals aged six years and older should receive a bivalent mRNA COVID-19 vaccine, if they have not already received one. Certain individuals have the option for additional bivalent vaccine doses: For individuals with moderately to severely immunocompromising conditions (table 1) who had already been vaccinated with monovalent vaccines and subsequently received one bivalent vaccine dose, we suggest an additional bivalent vaccine dose, given at least two months after the first (**Grade 2C**). We individualize the decision to offer additional bivalent vaccine doses after the second based on exposure risk and severity of immunosuppression. For adults aged 65 and older who have already received a bivalent vaccine dose and do not have a moderately to severely immunocompromising condition, we base the decision to give a second bivalent vaccine on the individual risk for severe COVID-19, history of SARS-CoV-2, exposure risk, and patient preference.

The US Food and Drug Administration and Centers for Disease Control and Prevention have updated COVID-19 vaccine authorizations and recommendations [5-7]. All individuals aged six years and older should receive at least one bivalent mRNA vaccine dose if they have not already. For most immunocompetent people, a single bivalent vaccine dose to boost pre-existing SARS-CoV-2 immunity (from prior vaccination or infection) is expected to be sufficient (algorithm 1). Individuals who have moderately to severely immunocompromising conditions (table 1) and adults ≥65 years old have the option to receive a second bivalent vaccine dose to maximize protection in case of waning immunity. For children six months to five years old, the number of bivalent vaccine doses depends on their vaccination history and whether they are receiving the Moderna or Pfizer COVID-19 vaccine (algorithm 2). Monovalent mRNA vaccines are no longer recommended. (See "COVID-19: Vaccines".)

INFECTIOUS DISEASES; PRIMARY CARE (ADULT); FAMILY MEDICINE AND GENERAL PRACTICE (April 2023)

Expanded recommendations for hepatitis B virus screening in adults

- For most individuals without risk factors for hepatitis B virus (HBV), we suggest one-time HBV screening for those ≥18 years of age (**Grade 2C**). For adults at increased risk for acquiring HBV (table 1), we recommend HBV screening (**Grade 1B**).

Screening for hepatitis B virus (HBV) in adults has traditionally been recommended for those with risk factors (table 2). In March 2023, the United States Centers for Disease Control and Prevention expanded their recommendations to include universal screening for persons ≥18 years of age at least once during their lifetime, regardless of risk [8]. The rationale is the prevalence of chronic HBV infection in the general population (0.4 percent), the low vaccination rates in adults, and the harms of missed infection such as fulminant hepatitis and liver cancer. Testing should include hepatitis B surface antigen, hepatitis B surface antibody (anti-HB), and total hepatitis B core antibody. We support universal screening; however, screening is generally not needed if an HBV vaccine series has been completed and there is serologic evidence of immunity (anti-HBs ≥10 milli-international units/mL). (See "Hepatitis B virus: Screening and diagnosis in adults", section on 'Individuals without known risk for HBV infection'.)

ALLERGY AND IMMUNOLOGY (March 2023, Modified April 2023)

Cow's milk elimination alone for eosinophilic esophagitis

- In patients with eosinophilic esophagitis who opt for a dietary approach to treatment, we suggest elimination of cow's milk (in all its forms) and cross-reacting mammalian milk rather than simultaneous removal of multiple foods (**Grade 2C**).

Dietary treatment of eosinophilic esophagitis (EoE) traditionally has involved removal of multiple foods/food groups simultaneously. However, this approach is associated with poor adherence and can cause nutritional deficiencies. In a multicenter randomized trial of 129 adults with EoE that compared elimination of mammalian milk (1 food elimination diet [FED]) with removal of six foods/food groups (6FED), rates of histologic remission were similar between the two groups at six weeks (34 versus 40 percent, respectively) [9]. Improvements in disease-relatedquality-of-life scores and peak eosinophil counts were also similar. These results confirm earlier findings in a pediatric trial. For most patients with EoE who opt for a dietary approach to treatment, we suggest an initial empiric elimination diet of cow's milk (all forms of dairy/milk) plus cross-reacting mammalian milk (eg, goat's milk). (See "Dietary management of eosinophilic esophagitis", section on 'Efficacy of different dietary approaches'.)

NEUROLOGY (February 2023)

Mechanical thrombectomy for large ischemic core infarcts

- For patients with acute ischemic stroke, we recommend treatment with intra-arterial mechanical thrombectomy (MT), whether or not the patient received treatment with intravenous thrombolytic therapy, if the following conditions are met (**Grade 1B**): Brain imaging using CT without contrast or diffusion-weighted MRI (DWI) excludes hemorrhage and is consistent with an Alberta Stroke Program Early CT Score (ASPECTS) ≥3; CT angiography (CTA) or MR angiography (MRA) demonstrates a proximal large artery occlusion in the anterior circulation as the cause of the ischemic stroke; the patient has a persistent, potentially disabling neurologic deficit (eg, a National Institutes of Health Stroke Scale [NIHSS] score ≥6); the patient can start treatment (femoral puncture) within 24 hours of the time last known to be well. This recommendation applies when thrombectomy is performed at a stroke center with appropriate expertise in the use of endovascular therapy. Benefit may be most likely when imaging confirms the presence of salvageable brain tissue (eg, a mismatch by DAWN or DEFUSE 3 criteria).

Mechanical thrombectomy (MT) for acute ischemic stroke due to a large artery occlusion in the anterior circulation has been limited to patients with a small- to moderate-sized core infarct at baseline. The exclusion of patients with large core infarcts was first challenged in 2022 by results from the RESCUE-Japan LIMIT trial. The recent SELECT2 and ANGEL-ASPECT trials now confirm that MT compared with medical treatment alone improves outcomes for patients with a large ischemic core infarct (defined by an Alberta Stroke Program Early CT Score [ASPECTS] of 3 to 5 or a core volume ≥50 ml) [10,11]. As an example, the SELECT2 trial showed that functional independence for patients with large infarcts was more likely with MT than with medical care alone (20 versus 7 percent) [10]. Based on these results, in addition to previously defined eligible groups, we also recommend MT for patients who have a large ischemic core infarct as defined in these trials and can start treatment within 24 hours of the time last known to be well. (See "Mechanical thrombectomy for acute ischemic stroke", section on 'Benefit for large core infarcts'.)

PULMONARY AND CRITICAL CARE MEDICINE (January 2023)

New GOLD strategy for initial COPD pharmacologic management

- For patients with COPD who are less symptomatic and at low risk of exacerbation (group A), we suggest a long-acting bronchodilator rather than short-acting bronchodilators

alone (**Grade 2B**). For patients with COPD who are more symptomatic or have a high risk of exacerbation (Groups B and E), we suggest initial treatment with dual long-acting bronchodilator therapy rather than a single long-acting bronchodilator alone (**Grade 2C**).

The Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2023 report identifies key changes for patients with COPD [12], specifically more aggressive initial bronchodilator therapy:

- Single-agent long-acting bronchodilator therapy for less severe symptoms and low exacerbation risk (Group A).
- Dual long-acting bronchodilator therapy for more severe symptoms and low exacerbation risk (Group B).
- Dual long-acting bronchodilator therapy for high exacerbation risk, regardless of symptoms (Group E, replacing previous Groups C and D categories).

It also redefines a COPD exacerbation as an event characterized by dyspnea and/or cough and sputum that worsens over ≤14 days with possible tachypnea and/or tachycardia caused by airway infection, pollution, or other insult to the airways. This new definition decouples exacerbations from their treatment, which had confounded earlier approaches. A new classification for severity of exacerbations was also outlined. (See "COPD exacerbations: Clinical manifestations and evaluation" and "Stable COPD: Initial pharmacologic management", section on 'Assessing disease pattern and severity'.)

PEDIATRICS (November 2022, Modified January 2023)

Semaglutide for obesity in adolescents

- For adolescents with refractory obesity who opt for pharmacologic therapy, we suggest subcutaneous semaglutide rather than other agents (**Grade 2C**).

Glucagon-like peptide (GLP-1) analogs are important options for treatment of type 2 diabetes and/or obesity in adults. In a 68-week randomized trial in 201 adolescents with obesity, patients assigned to weekly subcutaneous semaglutide, a GLP-1 analog, had substantial weight loss compared with lifestyle intervention alone (17.7 kg greater weight loss compared with placebo; 6 kg/m^2 greater decrease in body mass index [BMI]) [13]. Gastrointestinal adverse events were common in both groups but were generally mild and rarely led to treatment discontinuation. While head-to-head trials have not been performed in adolescents, indirect evidence suggests greater weight loss with semaglutide than the alternatives, including liraglutide and metformin. Based on these findings, we now suggest semaglutide over other agents for pharmacotherapy

of obesity in selected adolescents. (See "Prevention and management of childhood obesity in the primary care setting", section on 'Pharmacotherapy'.)

EMERGENCY MEDICINE (ADULT AND PEDIATRIC) (December 2022)

Video laryngoscopy for emergency intubation in adults

- In an adult for whom laryngoscopy is indicated for emergency intubation, we suggest using a video laryngoscope instead of a direct laryngoscope (**Grade 2B**).

Video laryngoscopes (VLs) are rigid devices that allow glottic visualization without a direct line of sight, and they are increasingly being used for rapid sequence intubation in the emergency department. In a meta-analysis of 222 trials in adults (most in the elective surgery setting), Macintosh-style, hyperangulated, and channelled VLs all reduced the rate of failed intubation, increased first-pass attempt success, improved the glottic view, and reduced peri-intubation hypoxia compared with a direct laryngoscope (DL) [14]. Given these findings, we suggest using a VL, if available, instead of a DL when laryngoscopy is indicated for emergency intubation. (See "Overview of advanced airway management in adults for emergency medicine and critical care", section on 'Choice of laryngoscopy technique'.)

INFECTIOUS DISEASES (December 2022)

First trimester treatment of malaria with artemisinin derivatives

- For treatment of uncomplicated chloroquine-resistant *Plasmodium falciparum* malaria during the first trimester, we suggest treatment with artemether-lumefantrine, rather than a quinine-based regimen (**Grade 2B**). We also suggest artemether-lumefantrine for chloroquine-resistant non-*falciparum* malaria during the first trimester (**Grade 2C**).

Artemisinin combination therapy (ACT) has become the preferred treatment for uncomplicated malaria in most patients, but use for treatment of chloroquine-resistant malaria in the first trimester has been avoided because of limited safety data. However, in a 2022 meta-analysis of prospective data from >700 pregnancies with confirmed first trimester exposure to ACT and >1000 pregnancies with confirmed first trimester exposure to non-ACTs, adverse pregnancy outcomes occurred less often among those who received ACT, although the result was not statistically significant (5.7 versus 8.9 percent; adjusted hazard ratio [aHR] 0.71, 95% CI 0.49-1.03) [15]. Artemether-lumefantrine accounted for 70 percent of the ACT exposures and was associated with a lower risk of adverse pregnancy outcome compared with oral quinine (4.8

versus 9.2 percent; aHR 0.58, 95% CI 0.36-0.92). Based on these data, we now suggest artemether-lumefantrine for treatment of chloroquine-resistant malaria during the first trimester. (See "Malaria in pregnancy: Prevention and treatment", section on 'Drug safety'.)

NEPHROLOGY AND HYPERTENSION (November 2022)

Finerenone in patients with diabetic kidney disease

- Among patients with type 2 diabetes who have measured or estimated albuminuria ≥30 mg/day despite an angiotensin inhibitor and a sodium-glucose co-transporter 2 (SGLT2) inhibitor, we suggest treatment with a nonsteroidal selective mineralocorticoid receptor antagonist (MRA, specifically finerenone) (**Grade 2B**), where available.

Sodium-glucose co-transporter 2 (SGLT2) inhibitors and finerenone (a nonsteroidal mineralocorticoid receptor antagonist) prevent important adverse kidney and cardiovascular outcomes in patients with diabetic kidney disease (DKD). The 2022 guidelines from the American Diabetes Association (ADA) and the Kidney Disease: Improving Global Outcomes (KDIGO) on the treatment of patients with DKD advise the use of SGLT2 inhibitors in all patients with DKD; they also advise the use of finerenone in patients who have increased albuminuria despite treatment with an angiotensin inhibitor and an SGLT2 inhibitor [16,17]. We agree with these guidelines and now suggest use of finerenone in patients with albuminuria despite other recommended therapies, except when serum potassium is elevated (serum potassium >4.8 mEq/L or estimated glomerular filtration rate <25 mL/min/1.73 m^2). (See "Treatment of diabetic kidney disease", section on 'Type 2 diabetes: Treat with additional kidney-protective therapy'.)

NEPHROLOGY AND HYPERTENSION (November 2022)

SGLT2 inhibitors in patients with nondiabetic proteinuric chronic kidney disease

- In patients with chronic nondiabetic kidney disease with proteinuria (albuminuria ≥300 mg/day or proteinuria ≥500 mg/day), we recommend treatment with a sodium-glucose co-transporter 2 (SGLT2) inhibitor (**Grade 1B**).

Sodium-glucose co-transporter 2 (SGLT2) inhibitors are recommended in patients with diabetic kidney disease; previously, only one large trial examined their effects in nondiabetic chronic kidney disease. In the EMPA-KIDNEY trial, 6609 patients with estimated glomerular filtration rate (eGFR) 20 to 44 mL/min/1.73 m^2 (regardless of albuminuria) or 45 to 89 mL/min/1.73 m^2 (if albumin-to-creatinine ratio was at least 200 mg/g) were randomly assigned to empagliflozin 10

mg daily or placebo [18]. At two years, empagliflozin reduced the incidence of end-stage kidney disease, the incidence of a sustained decline in eGFR to <10 mL/min/1.73 m^2, and the incidence of a sustained decrease in eGFR of 40 percent or more; the risks of all-cause mortality and nonfatal cardiovascular events were similar between groups. The benefit from empagliflozin was larger in patients with albumin-to-creatinine ratio ≥300 mg/g and substantially less in patients with lower albumin excretion. We now recommend SGLT2 inhibitor therapy in patients with nondiabetic chronic kidney disease and albuminuria. (See "Overview of the management of chronic kidney disease in adults", section on 'Patients with proteinuria'.)

NEUROLOGY (October 2022)

Sodium phenylbutyrate-taurursodiol for amyotrophic lateral sclerosis

- For all patients with amyotrophic lateral sclerosis, we suggest treatment with sodium phenylbutyrate-taurursodiol (**Grade 2B**), in addition to riluzole and edaravone.

Sodium phenylbutyrate-taurursodiol (PB-TURSO) is a combination of two orally available drugs that each reduce neuronal cell death in preclinical models of amyotrophic lateral sclerosis (ALS). In a randomized trial of 137 patients with ALS (75 percent also taking riluzole and/or edaravone) who were within 18 months of symptom onset, patients assigned to PB-TURSO showed a slower median rate of monthly functional decline than those assigned to placebo by 24-week follow-up [19]. There were nonsignificant trends toward slower decline in both vital capacity and muscle strength with treatment. In a subsequent analysis of patients who continued open-label treatment (up to 35 months), those originally randomized to PB-TURSO had a longer median time to tracheostomy (26 versus 19 months) and a longer median time to first hospitalization [20]. Based on these results, the combination product received regulatory approval in the United States and Canada [21,22]. We now suggest use of PB-TURSO for all patients with ALS, along with riluzole (prioritized as initial therapy) and edaravone. (See "Disease-modifying treatment of amyotrophic lateral sclerosis", section on 'Efficacy'.)

GENERAL SURGERY (September 2022)

Role of wound packing after drainage of perianal and perirectal abscess

- For most patients with a perianal or perirectal abscess, we suggest not packing the wound after drainage (**Grade 2C**).

After incision and drainage of a perianal or perirectal abscess, it is common practice to pack the wound, under the assumption that this will facilitate further drainage by wicking and prevent premature skin closure. In the PPAC2 trial of 443 patients with a primary perianal abscess, nonpacking, compared with packing, resulted in similar rates of fistula formation (11 versus 15 percent) and abscess recurrence (6 versus 3 percent), differences that were not statistically significant [23]. However, the nonpacking group had lower average pain scores (28 versus 38 on a 100-point visual analog scale). Given these and similar findings from two earlier small trials, we now suggest **not** packing the wound after drainage of perianal or perirectal abscess. (See "Perianal and perirectal abscess", section on 'Role of wound packing'.)

CARDIOVASCULAR MEDICINE (September 2022)

Anticoagulation for rheumatic mitral stenosis with atrial fibrillation

- For patients with rheumatic mitral stenosis requiring anticoagulation (for atrial fibrillation, left atrial thrombus, or a prior embolic event), we recommend chronic anticoagulation with a vitamin K antagonist (eg, warfarin) rather than with a direct oral anticoagulant (**Grade 1B**). The target international normalized ratio is 2.5 (range 2.0 to 3.0).

Limited data have been available to guide anticoagulant choice in patients with rheumatic mitral stenosis and atrial fibrillation. A randomized trial enrolling over 4500 adults with rheumatic heart disease and atrial fibrillation found that the mortality and stroke rates were higher with rivaroxaban than with a vitamin K antagonist (VKA), and major bleeding rates were similar [24]. Based on these findings, for patients with rheumatic mitral stenosis and atrial fibrillation, we now recommend a VKA rather than a direct oral anticoagulant such as rivaroxaban. (See "Rheumatic mitral stenosis: Overview of management", section on 'Choice of anticoagulant'.)

PULMONARY AND CRITICAL CARE MEDICINE (August 2022)

Intravenous magnesium in severe COPD exacerbation

- For patients having an acute COPD exacerbation who experience limited benefit from short-acting inhaled bronchodilators, we suggest intravenous magnesium (**Grade 2C**).

Intravenous magnesium has short-acting bronchodilator activity that is helpful for severe asthma attacks, but it has not previously been recommended for chronic obstructive pulmonary disease (COPD). A new systematic review and meta-analysis found a decrease in hospitalization

rates with emergency department intravenous magnesium administration compared with placebo [25]. The effect size is similar to or better than that seen in the setting of asthma exacerbation. Based on these data, we now suggest intravenous magnesium for patients with severe COPD exacerbations who are not improving with inhaled bronchodilator therapy. (See "COPD exacerbations: Management", section on 'Magnesium sulfate'.)

REFERENCES

1. US Preventive Services Task Force, Mangione CM, Barry MJ, et al. Screening for Anxiety in Children and Adolescents: US Preventive Services Task Force Recommendation Statement. JAMA 2022; 328:1438.
2. US Preventive Services Task Force, Barry MJ, Nicholson WK, et al. Screening for Anxiety Disorders in Adults: US Preventive Services Task Force Recommendation Statement. JAMA 2023; 329:2163.
3. Viswanathan M, Wallace IF, Cook Middleton J, et al. Screening for Anxiety in Children and Adolescents: Evidence Report and Systematic Review for the US Preventive Services Task Force. JAMA 2022; 328:1445.
4. O'Connor EA, Henninger ML, Perdue LA, et al. Anxiety Screening: Evidence Report and Systematic Review for the US Preventive Services Task Force. JAMA 2023; 329:2171.
5. EMERGENCY USE AUTHORIZATION (EUA) for PFIZER-BIONTECH COVID-19 VACCINE, BIVALENT (ORIGINAL AND OMICRON BA.4/BA.5). https://www.fda.gov/media/161327/download (Accessed on September 02, 2022).
6. EMERGENCY USE AUTHORIZATION (EUA) for MODERNA COVID-19 VACCINE, BIVALENT (ORIGINAL AND OMICRON BA.4/BA.5) BOOSTER DOSE FOR 6 YEARS OF AGE AND OLDER. https://www.fda.gov/media/161318/download (Accessed on October 13, 2022).
7. Interim Clinical Considerations for Use of COVID-19 Vaccines Currently Authorized in the United States. https://www.cdc.gov/vaccines/covid-19/clinical-considerations/covid-19-vaccines-us.html (Accessed on April 26, 2023).
8. Conners EE, Panagiotakopoulos L, Hofmeister MG, et al. Screening and Testing for Hepatitis B Virus Infection: CDC Recommendations - United States, 2023. MMWR Recomm Rep 2023; 72:1.
9. Kliewer KL, Gonsalves N, Dellon ES, et al. One-food versus six-food elimination diet therapy for the treatment of eosinophilic oesophagitis: a multicentre, randomised, open-label trial.

Lancet Gastroenterol Hepatol 2023; 8:408.

10. Sarraj A, Hassan AE, Abraham MG, et al. Trial of Endovascular Thrombectomy for Large Ischemic Strokes. N Engl J Med 2023; 388:1259.
11. Huo X, Ma G, Tong X, et al. Trial of Endovascular Therapy for Acute Ischemic Stroke with Large Infarct. N Engl J Med 2023; 388:1272.
12. Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global Strategy for the Diagnosis, Management and Prevention of Chronic Obstructive Pulmonary Disease: 2023 Report. www.goldcopd.org www.goldcopd.org (Accessed on December 13, 2022).
13. Weghuber D, Barrett T, Barrientos-Pérez M, et al. Once-Weekly Semaglutide in Adolescents with Obesity. N Engl J Med 2022; 387:2245.
14. Hansel J, Rogers AM, Lewis SR, et al. Videolaryngoscopy versus direct laryngoscopy for adults undergoing tracheal intubation. Cochrane Database Syst Rev 2022; 4:CD011136.
15. Saito M, McGready R, Tinto H, et al. Pregnancy outcomes after first-trimester treatment with artemisinin derivatives versus non-artemisinin antimalarials: a systematic review and individual patient data meta-analysis. Lancet 2023; 401:118.
16. de Boer IH, Khunti K, Sadusky T, et al. Diabetes management in chronic kidney disease: a consensus report by the American Diabetes Association (ADA) and Kidney Disease: Improving Global Outcomes (KDIGO). Kidney Int 2022; 102:974.
17. Rossing P, Caramori ML, Chan JCN, et al. Executive summary of the KDIGO 2022 Clinical Practice Guideline for Diabetes Management in Chronic Kidney Disease: an update based on rapidly emerging new evidence. Kidney Int 2022; 102:990.
18. The EMPA-KIDNEY Collaborative Group, Herrington WG, Staplin N, et al. Empagliflozin in Patients with Chronic Kidney Disease. N Engl J Med 2023; 388:117.
19. Paganoni S, Macklin EA, Hendrix S, et al. Trial of Sodium Phenylbutyrate-Taurursodiol for Amyotrophic Lateral Sclerosis. N Engl J Med 2020; 383:919.
20. Paganoni S, Hendrix S, Dickson SP, et al. Effect of sodium phenylbutyrate/taurursodiol on tracheostomy/ventilation-free survival and hospitalisation in amyotrophic lateral sclerosis: long-term results from the CENTAUR trial. J Neurol Neurosurg Psychiatry 2022; 93:871.
21. Notice of Compliance with Conditions - Health Canada (Abrioza) https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/notice-compliance/conditions/qualifying-notice-albrioza-253502.html (Accessed on August 01, 2022).
22. US FDA label for Sodium phenylbutyrate and taurursodiol https://www.accessdata.fda.gov/drugsatfda_docs/label/2022/216660s000lbledt.pdf (Accessed on September 30, 2022).

23. Newton K, Dumville J, Briggs M, et al. Postoperative Packing of Perianal Abscess Cavities (PPAC2): randomized clinical trial. Br J Surg 2022; 109:951.

24. Connolly SJ, Karthikeyan G, Ntsekhe M, et al. Rivaroxaban in Rheumatic Heart Disease-Associated Atrial Fibrillation. N Engl J Med 2022; 387:978.

25. Ni H, Aye SZ, Naing C. Magnesium sulfate for acute exacerbations of chronic obstructive pulmonary disease. Cochrane Database Syst Rev 2022; 5:CD013506.

Topic 16722 Version 12094.0

GRAPHICS

Moderate to severe immunocompromising conditions that may result in suboptimal COVID-19 vaccine response[1]

Active treatment for solid tumor and hematologic malignancies
Hematologic malignancies associated with poor responses to COVID-19 vaccines regardless of current treatment status (eg, chronic lymphocytic leukemia, non-Hodgkin lymphoma, multiple myeloma, acute leukemia)
Receipt of solid-organ transplant or an islet transplant and taking immunosuppressive therapy
Receipt of chimeric antigen receptor (CAR)-T cell therapy or hematopoietic cell transplant (HCT) (within 2 years of transplantation or taking immunosuppressive therapy)*
Moderate or severe primary immunodeficiency (eg, common variable immunodeficiency disease, severe combined immunodeficiency, DiGeorge syndrome, Wiskott-Aldrich syndrome)
Advanced HIV infection (HIV and CD4 cell counts less than 200/microL, history of an AIDS-defining illness without immune reconstitution, or clinical manifestations of symptomatic HIV) or untreated HIV infection
Active treatment with: ▪ High-dose corticosteroids (ie, ≥20 mg prednisone or equivalent per day for ≥2 weeks) ▪ Alkylating agents ▪ Antimetabolites ▪ Transplant-related immunosuppressive drugs ▪ Cancer chemotherapeutic agents classified as severely immunosuppressive ▪ TNF blockers ▪ Other biologic agents that are immunosuppressive or immunomodulatory (eg, B cell-depleting agents)

In the United States, the Centers for Disease Control and Prevention lists the above conditions as examples of immunocompromising conditions that warrant additional COVID-19 vaccine doses. This list is not exhaustive; other immunocompromising conditions, such as impaired splenic function, may also warrant the same vaccine adjustments. Refer to other UpToDate content for specifics of vaccine doses and intervals.

CAR: chimeric antigen receptor; TNF: tumor necrosis factor; ACIP: Advisory Committee on Immunization Practices.

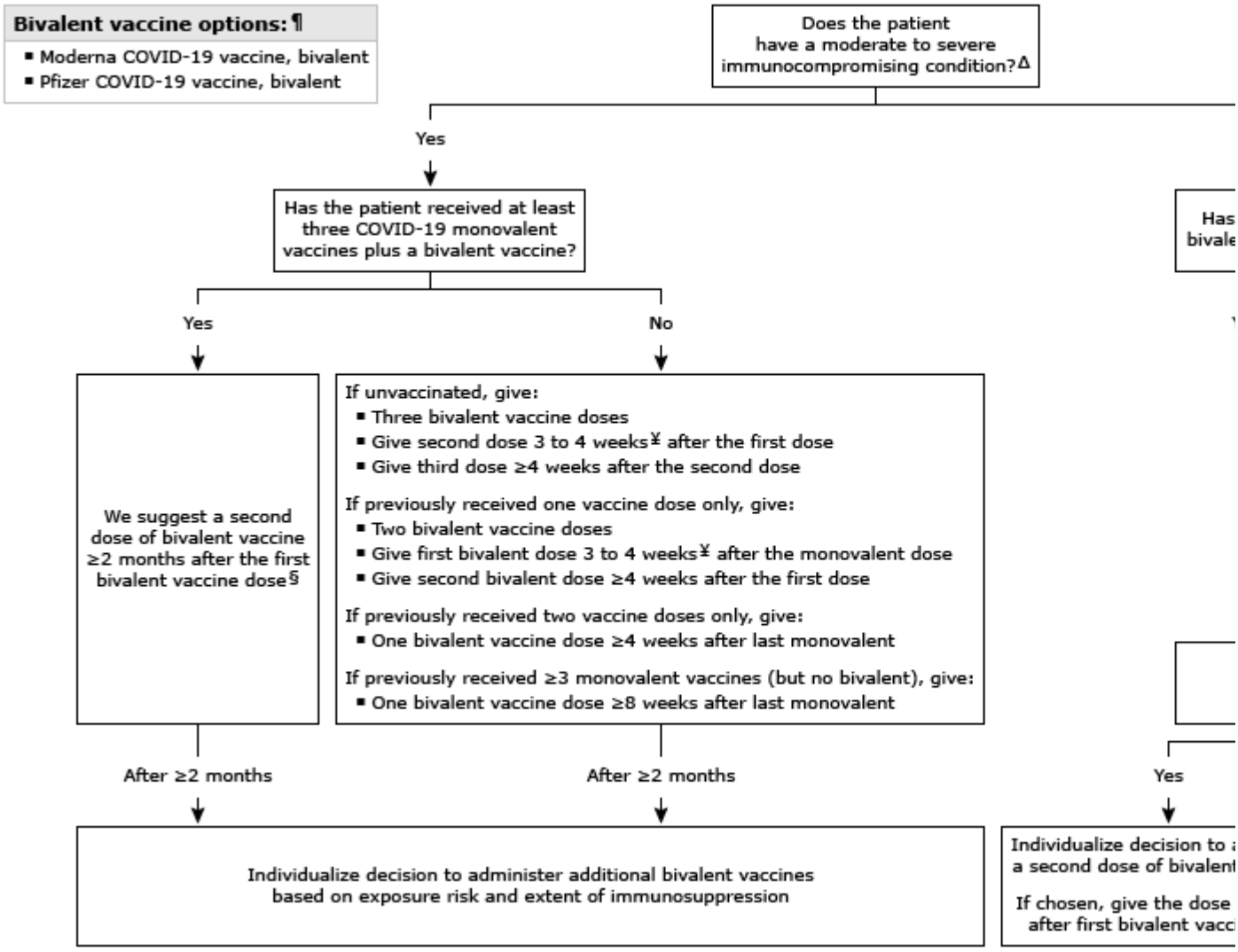
* For those who received COVID-19 vaccination prior to hematopoietic stem cell transplant or CAR-T cell therapy, repeat vaccination is recommended at least 3 months after the transplant or therapy.

Reference:

1. *Centers for Disease Control and Prevention. Interim Clinical Considerations for Use of COVID-19 Vaccines Currently Authorized in the United States. Available at: https://www.cdc.gov/vaccines/covid-19/clinical-considerations/covid-19-vaccines-us.html (Accessed on April 24, 2023).*

Graphic 132490 Version 8.0

COVID-19 vaccination for adults, adolescents, and children age 6 years and old



CDC: Centers for Disease Control and Prevention; FDA: Food and Drug Administration

* For children who are 5 years old, the approach depends on the vaccine administered. For Pfizer COVID-19 outlined here. For Moderna COVID-19 vaccine, the approach is as outlined for children ages 6 months throu UpToDate content for details.

¶ Dosing of the bivalent mRNA vaccines varies by age. Refer to other UpToDate content for details. For indiv older who cannot or will not take an mRNA vaccine, Novavax COVID-19 vaccine (NVX-CoV2373) is an alternat 3 to 8 weeks apart; for individuals age 18 years or older, a booster dose is given at least 6 months after the

Δ Moderate to severe immunocompromising conditions include:

- Active use of chemotherapy for cancer
- Hematologic malignancies
- Hematopoietic stem cell or solid organ transplant
- Advanced or untreated HIV infection with CD4 cell count <200 cells/microL
- Moderate or severe primary immunodeficiency disorder
- Use of immunosuppressive medications (eg, mycophenolate mofetil, rituximab, prednisone >20 mg/

However, this list is not exhaustive, and other conditions, such as impaired splenic function, may also warra
Refer to other UpToDate content for details.

◇ Individuals in this age group are considered up to date on vaccination if they have received a bivalent CO
individuals have the option for additional bivalent vaccine doses.

§ If the patient has already received more than one bivalent vaccine dose (following a series of monovalent
to give additional doses is individualized.

¥ The interval between these doses is 3 weeks for Pfizer COVID-19 vaccines and 4 weeks between Moderna

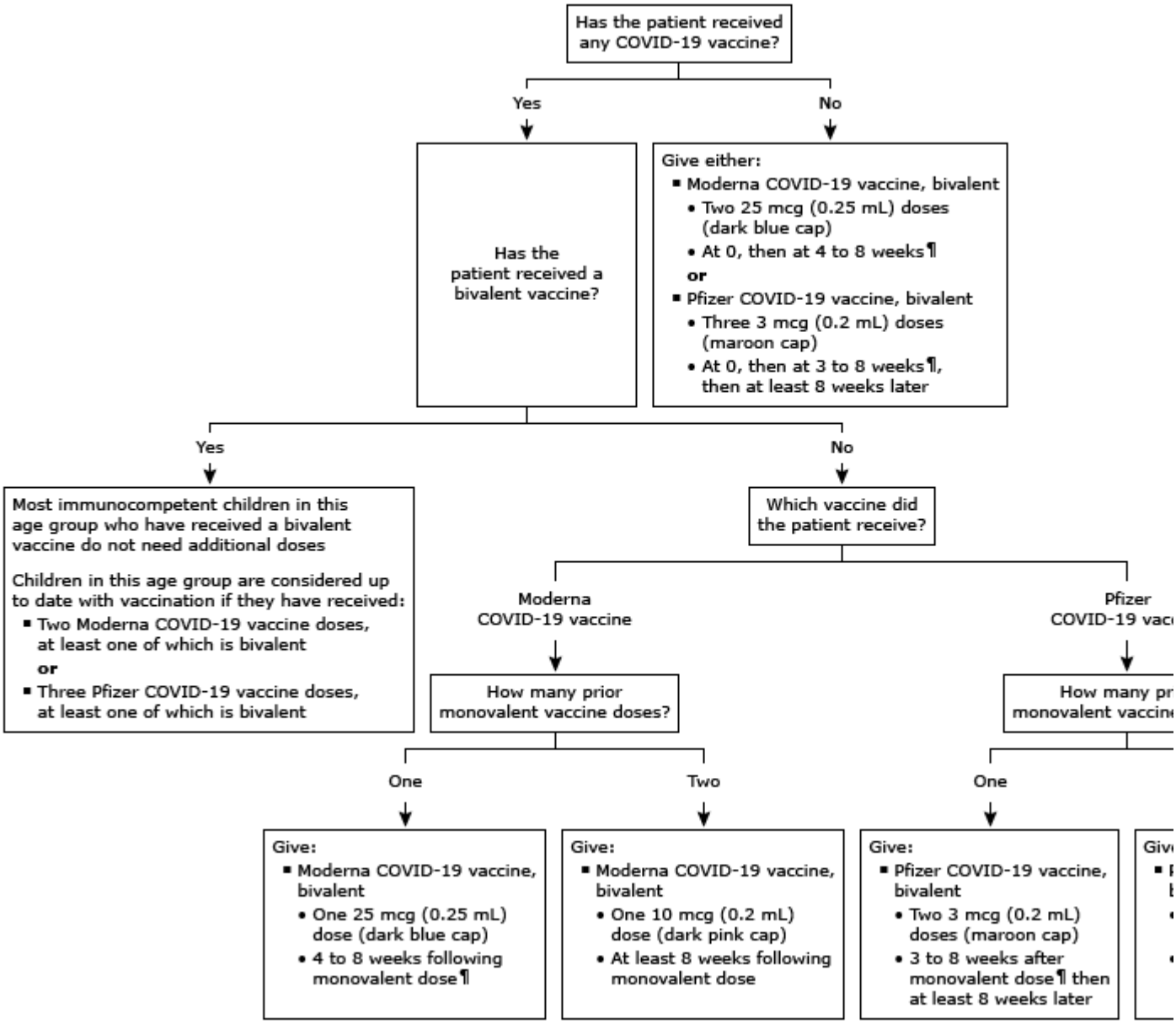
‡ For individuals ≥65 years old without an immunocompromising condition, we base the decision to admini
vaccine dose on personal risk for severe COVID-19, history of SARS-CoV-2, current exposure risk, and patien
individuals who live in areas where the rate of SARS-CoV-2 transmission is low may reasonably decide to for
contrast, we are more likely to recommend a second dose for an individual with multiple comorbidities asso
who has not previously had COVID-19 disease and has potential for ongoing exposure.

References:

- *Emergency Use Authorization of Moderna COVID-19 vaccine, bivalent (Original and Omicron BA.4/BA.5) https://www.fda.gov/m on April 20, 2023).*
- *Emergency Use Authorization of Pfizer COVID-19 vaccine, bivalent (Original and Omicron BA.4/BA.5) https://www.fda.gov/medi April 20, 2023).*
- *Interim Clinical Considerations for Use of COVID-19 Vaccines Currently Authorized in the United States https://www.cdc.gov/va considerations/interim-considerations-us.html#table-03 (Accessed on April 24, 2023).*

Graphic 138969 Version 11.0

COVID-19 vaccination for immunocompetent children 6 months through 4 year



CDC: Centers for Disease Control and Prevention; FDA: Food and Drug Administration.

* For children who are 5 years old, the approach depends on the vaccine administered. For Moderna COVID approach is as outlined here. For Pfizer COVID-19 vaccine, the approach is as outlined for individuals 6 years to other UpToDate content for details.

¶ Although the US FDA authorized intervals for the second doses of the Moderna and Pfizer COVID-19 vacci weeks after the first dose, respectively, the CDC suggests an interval up to 8 weeks. Extending the interval t vaccine doses may be preferable for those who do not need to maximize protection within a shorter period older individuals suggested a possible lower risk of myocarditis and slightly improved effectiveness.

References:

- *Emergency Use Authorization of Moderna COVID-19 vaccine, bivalent (Original and Omicron BA.4/BA.5) https://www.fda.gov/media/167208/download (Accessed on April 20, 2023).*

- *Emergency Use Authorization of Pfizer COVID-19 vaccine, bivalent (Original and Omicron BA.4/BA.5) https://www.fda.gov/medi (Accessed on April 20, 2023).*
- *Interim Clinical Considerations for Use of COVID-19 Vaccines Currently Authorized in the United States https://www.cdc.gov/va 19/clinical-considerations/interim-considerations-us.html#table-03 (Accessed on April 24, 2023).*

Graphic 141343 Version 2.0

Groups at increased risk for hepatitis B virus

Individuals at risk for HBV due to vertical transmission (ie, mother to child transmission)
▪ Individuals born in regions with high (≥8%) or intermediate (≥2%) prevalence rates for HBV, including immigrants and adopted children* ▪ Infants born to pregnant persons who are HBsAg-positive¶ ▪ US-born persons not vaccinated as infants whose parents were born in regions with high HBV endemicity (≥8%)*
Individuals at risk due to horizontal transmission (ie, percutaneous or mucosal exposure to blood or body fluids contaminated with blood)Δ
▪ Household contacts of HBsAg-positive persons ▪ Needle sharing or sexual contacts of HBsAg-positive persons ▪ Individuals who have ever injected drugs ▪ Individuals with multiple sexual partners and/or history of sexually transmitted infections ▪ Men who have sex with men ▪ Inmates of correctional facilities or other detention settings ▪ Individuals with HIV infection◇ ▪ Individuals with current or past HCV infection§ ▪ Individuals with end-stage kidney disease on maintenance renal dialysis
Other individuals
▪ Individuals with elevated alanine aminotransferase or aspartate aminotransferase levels of unknown origin ▪ Individuals who request HBV testing

In the United States, screening for HBV includes[4]:

- **Risk-based screening** – For all individuals (including children and adolescents), screen those who have any of the risk factors listed in the table if they might have been susceptible during the period of increased risk¥. For those with ongoing risk factors (ie, for horizontal transmission) who remain susceptible, continue to test periodically.Δ
- **Universal screening** – For individuals ≥18 years of age, screen at least once in a lifetime. However, for those without risk factors for HBV, screening is generally not needed if there is documentation of completing a hepatitis B vaccine series and evidence of immunity (anti-HBs ≥10 milli-international units/mL) after vaccination.‡
- **Pregnancy screening** – Screen all pregnant people during each pregnancy, regardless of vaccination status of history of prior testing.

Refer to UpToDate content on screening and diagnosis of HBV, HBV immunization, and HBV and pregnancy for more detailed information on screening and vaccination.

HBV: hepatitis B virus; HBsAg: hepatitis B surface antigen; US: United States; HIV: human immunodeficiency virus; HCV: hepatitis C virus; anti-HBs: hepatitis B surface antibody; anti-HBc: hepatitis B core antibodies; HBIG: hepatitis B immune globulin.

* If HBsAg-positive persons are found in first-generation immigrants of a family, subsequent generations should be tested.

¶ To reduce the risk of perinatal transmission, infants born to HBsAg-positive mothers should receive HBIG and hepatitis B vaccine as soon as possible and within 12 hours of birth and then complete the hepatitis B series. Post-vaccination serology should be obtained at 9 to 12 months. Refer to the UpToDate topic that discusses HBV immunization in infants.

Δ In unvaccinated individuals with ongoing HBV risk through percutaneous or mucosal exposure, hepatitis B vaccine should be initiated at the time of screening; the need for subsequent doses will depend upon the results. Post-vaccination serology should be performed to ensure immunity. For at-risk persons who do not complete the vaccine series, repeat testing should be performed periodically (eg, every 1 to 2 years).

◇ The presence of HBV coinfection informs the choice of antiretroviral regimen. In addition, patients with HIV who are not immune should be vaccinated regardless of age or risk factors, since HBV infection has an accelerated course in coinfected patients.

§ Patients with chronic HBV are at risk for HBV reactivation with direct-acting antiviral therapy for hepatitis C. Refer to the UpToDate topic that provides an overview of the management of hepatitis C infection.

¥ Susceptible persons include those who have never been infected with HBV (ie, HBsAg-negative, total anti-HBc-negative, and anti-HBs-negative) and either did not complete a HepB vaccine series per the Advisory Committee on Immunization Practices recommendations or who are known to be vaccine nonresponders.

‡ For most patients who remain without risk factors for acquiring HBV, repeat screening is not warranted. However, screening prior to blood, plasma, organ, tissue, or semen donation is routinely performed, regardless of the person's prior history. In addition, screening is warranted prior to initiating immunosuppressive therapy (eg, corticosteroids, biologics, cancer chemotherapy, anti-rejection therapies) since persons with HBV are at risk for HBV reactivation. Refer to the UpToDate topic on HBV reactivation.

References:

1. *Recommendations for identification and public health management of persons with chronic hepatitis B virus infection. MMWR Recomm Rep 2008; 57:1.*
2. *Abara WE, Qaseem A, Schillie S, et al. Hepatitis B vaccination, screening, and linkage to care: Best practice advice from the American College of Physicians and the Centers for Disease Control and Prevention. Ann Intern Med 2017; 167:794.*
3. *Terrault NA, Lok ASF, McMahon BJ, et al. Update on prevention, diagnosis, and treatment of chronic hepatitis B: AASLD 2018 hepatitis B guidance. Hepatology 2018; 67:1560.*
4. *Conners EE, Panagiotakopoulos L, Hofmeister MG, et al. Screening and testing for hepatitis B virus infection: CDC recommendations – United States, 2023. MMWR Recomm Rep 2023; 72:1.*

Graphic 55052 Version 18.0

Contributor Disclosures

April F Eichler, MD, MPH No relevant financial relationship(s) with ineligible companies to disclose. **Sadhna R Vora, MD** No relevant financial relationship(s) with ineligible companies to disclose.

Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting through a multi-level review process, and through requirements for references to be provided to support the content. Appropriately referenced content is required of all authors and must conform to UpToDate standards of evidence.

Conflict of interest policy

→