TYPE I CLINICAL INQUIRIES

What is the best approach for managing recurrent bacterial vaginosis?

■ EVIDENCE-BASED ANSWER

The best way to prevent recurrent bacterial vaginosis is to treat the initial episode with the most effective regimen. Metronidazole (500 mg orally twice daily for 7 days) has the lowest recurrence rate among antimicrobial regimens for bacterial vaginosis (20% vs 34%–50% for other agents) (strength of recommendation [SOR]: **A**). Women should be treated if they are symptomatic (SOR: **A**), undergoing gynecologic surgery (SOR: **B**), or at risk for preterm labor (SOR: **B**).

When bacterial vaginosis recurs, providers should confirm the diagnosis (**Table 1**) (SOR: **A**), identify and control risk factors for recurrence (**Table 2**) (SOR: **B**), and consider other causes while retreating bacterial vaginosis (SOR: **C**). If the diagnosis is confirmed and retreatment fails, consider suppression with metronidazole 0.75% vaginal gel for 10 days followed by twice weekly administration for 4 to 6 months (SOR: **C**, trial ongoing). No evidence supports treating sexual partners or administering oral or vaginal *Lactobacillus acidophilus*, but recolonization with vagina-specific lactobacilli (*L crispatus* and *L jensenii*) is undergoing Phase III clinical trials.

■ EVIDENCE SUMMARY

No trials have tested or compared specific, comprehensive strategies for recurrent bacterial vaginosis. Given that bacterial vaginosis can also be asymptomatic, recurrence often cannot be differentiated from treatment failure. Accordingly, recurrent bacterial vaginosis may be prevented by using the most effective therapy for the initial episode. A 2002 meta-analysis by the Centers for Disease Control and Prevention's (CDC) bacterial vaginosis working group reviewed the indications

What are Clinical Inquiries?

Clinical Inquiries answer real questions that family physicians submit to the Family Practice Inquiries Network (FPIN), a national, not-for-profit consortium of family practice departments, residency programs, academic health sciences libraries, primary care practice-based research networks, and other specialists.

Questions chosen for Clinical Inquiries are those that family physicians vote as most important through a web-based voting system.

Answers are developed by a specific method:

Type I answers

- FPIN medical librarians conduct systematic and standardized literature searches in collaboration with an FPIN clinician or clinicians.
- FPIN clinician authors select the research articles to include, critically appraise the research evidence, review the authoritative sources, and write the answers.
- Each Clinical Inquiry is reviewed by 4 or more peers and editors before publication in *JFP*.
- FPIN medical librarians coauthor Type I Clinical Inquiries that have required a systematic search.
- Finally, a practicing family physician writes an accompanying commentary.

Type II answers

- FPIN librarians and editors review questions chosen by practicing physicians and identify those that have been recently answered in the highest-quality sources, such as Cochrane Reviews, Clinical Evidence, or the US Preventive Services Task Force report. These sources report evidence that has been gathered through a systematic literature review, critically appraised, and summarized.
- FPIN clinician authors integrate the available evidence, conduct background searches as needed, conduct a structured search dating from the original search to the present, and prepares the evidence-based answer.
- The Type II Clinical Inquiry is reviewed by two or more peers and editors.
- The author(s) of the Clinical Inquiry answer also prepare the clinical commentary.

for therapy and best treatments for bacterial vaginosis.[1] The group found 25 trials evaluating oral metronidazole therapy involving 2742 women. Although cure rates using either 500 mg twice daily for 5 to 7 days or 2 g as a single dose were similar at 2 weeks post follow-up (85%; range 67%–98%), the single-dose regimen led to higher relapse rates 1 month after treatment (35%–50% vs 20%–33%).

Six trials enrolling 946 women assessed the efficacy of various topical vaginal treatments. Metronidazole gel, clindamycin cream, and clindamycin ovules had a wide range of initial cure rates (50%–95%), but all had higher relapse rates at 4 weeks than did oral metronidazole for 1 week (34%–49%).[1] A more complete discussion of the effectiveness of antibiotics for bacterial vaginosis can be found in a recent Clinical Inquiry.[2]

The CDC reviewers identified causal relationships between bacterial vaginosis and plasma-cell endometritis, postpartum fever, and posthysterectomy vaginal-cuff cellulitis. They therefore concluded it is reasonable to try to prevent postprocedure infections by treating women who have asymptomatic bacterial vaginosis before hysterectomy or pregnancy termination. Although bacterial vaginosis has been associated with preterm labor, trials evaluating treatment of bacterial vaginosis to prevent preterm delivery are conflicting. A Cochrane review of bacterial vaginosis and preterm labor suggests treating women at high risk for preterm birth may reduce the risk of low birthweight and preterm prelabor rupture of membranes.[3]

Patients frequently try to self-diagnose vaginal complaints and ask for treatments and retreatments by phone. However, a prospective study of 253 women who underwent a structured telephone interview and subsequent physical exam found a poor correlation between telephone diagnosis and final clinical diagnosis (kappa coefficient of 0.12—very poor agreement).[4] Accordingly, clinical and laboratory evaluation of vaginal discharge and especially recurrent symp-

TABLE 1
Amsel criteria for diagnosis of bacterial vaginosis
Patient must have 3 of the 4 criteria for diagnosis.
1. pH > 4.5 (most sensitive)
2. Clue cells >20% (most specific)
3. Homogenous discharge
4. Positive whiff test (amine odor with addition of KOH)
Source: Based on Amsel et al 1983.[11]

TABLE 2
Risk factors for bacterial vaginosis
Use of vaginal foreign bodies, perfumed soaps, or douching
Cigarette smoking
Intrauterine device
New male sexual partner
Sex with another woman
No condom use (trend toward association)
Source: Based on Marrazzo et al 2002[7]; CDC 2002.[8]

toms is essential for diagnostic accuracy and treatment for bacterial vaginosis (**Table 1**).

For recurrent symptomatic bacterial vaginosis, 1 option is suppressive therapy with metronidazole gel 0.75%. After initial daily retreatment for 10 days, this can be used twice weekly for 4 to 6 months to decrease symptoms. This strategy is based on expert opinion but is currently undergoing clinical trial.

One small crossover randomized controlled trial of 46 women with bacterial vaginosis studied the consumption of live *L acidophilus* cultures.[5] Only 20 of the women had recurrent

bacterial vaginosis. The groups were randomized to eat yogurt with and without live *L acidophilus* cultures. While the results were encouraging (50% reduction in episodes of bacterial vaginosis and increase in detectable vaginal *Lactobacillus*), only 7 women actually completed the study protocol.

Douching is the best-studied risk factor for bacterial vaginosis. A recent multicenter cross-sectional study of 1200 women assessed douching practices and found that recent douching increased the risk of bacterial vaginosis twofold (odds ratio=2.1; 95% confidence interval, 1.3–3.1).[6] Evidence for the other risk factors listed in **Table 2** is based on smaller studies or expert opinion.[7,8]

For women who continue to have recurrent or unresolved vaginal symptoms not explained by candidiasis or sexually transmitted infections such as trichomoniasis, consider less common causes such as atrophic vaginitis, chemical/irritant vaginitis, allergic vaginitis, Behçets disease, desquamative interstitial vaginitis, or erosive lichen planus vaginitis.[9]

■ RECOMMENDATIONS FROM OTHERS

No organizations have developed guidelines for treating recurrent bacterial vaginosis. In 2002, the Association for Genitourinary Medicine and the Medical Society for the Study of Venereal Diseases released national guidelines on the management of bacterial vaginosis,[10] which generally agrees with the previously described CDC recommendations.

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■ CLINICAL COMMENTARY:

Take a detailed history, make sure clinical findings support the diagnosis

Patients with recurrent bacterial vaginosis are often embarrassed, frustrated, or angry with the failure of prior medical therapy. Our challenge is to listen empathetically and avoid blaming the patient for the failure. It is critical to take another detailed history (again reviewing sexual and perineal hygiene habits), consider an expanded differential, and make sure clinical findings continue to support the diagnosis. A discussion about the (current lack of) evidence on pharmacologic therapy for recurrent cases must also be included in the visit. A collaborative plan of action will help the patient regain a sense of control over her health.

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Should we screen women for hypothyroidism?

■ EVIDENCE-BASED ANSWER

Though evidence is insufficient to recommend screening all women for hypothyroidism, women aged >50 years are at increased risk. Screening is most likely to detect subclinical hypothyroidism. Studies evaluating treatment of subclinical hypothyroidism in women aged >50 years offer a mix of potential benefits and harms but without long-term outcome information. No studies address asymptomatic women aged <50.

Testing for thyroid-stimulating hormone (TSH) finds more cases of unrecognized hypothyroidism than history and physical examination (strength of recommendation [SOR]: **A**, based on cohort studies). Women with an initial screening TSH >10 mU/L are more likely to develop complications of hypothyroidism and to benefit from treatment (SOR: **A**, based on prospective cohort studies).

Treating women who have asymptomatic hypothyroidism and a screening TSH >10 mU/L prevents progression to symptomatic overt disease (SOR: **A**, based on prospective cohort studies) and reduces serum lipid levels (SOR: **A**, based on randomized controlled trials).

Treating women who have subclinical hypothyroidism found by screening does not reduce symptoms (SOR: **A**, small randomized controlled trials), and its effect on cardiac disease remains controversial. Treatment may increase bone loss in premenopausal women (SOR: **A**, based on randomized controlled trials and controlled cross-sectional studies), and it may cause symptoms in certain individuals (SOR: **C**, based on observational studies).

■ EVIDENCE SUMMARY

Screening for hypothyroidism is more likely to detect the elevated TSH and normal free thyroxine level (FT4) of subclinical hypothyroidism than it is to detect overt hypothyroidism with a high TSH and a low FT4. We reviewed the accuracy of detection, natural history, and benefits and harms of treating subclinical hypothyroidism.

Detection. Subclinical hypothyroidism is found in 7% to 26% of women (with increasing prevalence as women reach age 60 and 70 years); overt hypothyroidism occurs in approximately 5%.[1–4] Two studies assessed the ability of the history and physical to detect hypothyroidism.

The first study evaluated 1154 women (aged 50–72) in a primary care setting using both history and physical and TSH testing. TSH testing found 3 women with overt hypothyroidism not identified by history and physical. History and physical identified 286 women with indications for TSH testing, 2 of whom had mild hypothyroidism and 1 with mild hyperthyroidism.[5]

In the second study, 2000 adults from a primary care population underwent history and physical and TSH testing. The TSH screen identified 19 cases of hypothyroidism not found by history and physical, while the history and physical prompted evaluation of 35 patients without abnormal TSH.[6]

Natural history of subclinical hypothyroidism. Among 1210 primary care patients (700 women) aged >60 years, 73 women with subclinical hypothyroidism were identified and followed for 12 months. Of these, 13 (18%) progressed to overt disease.[7] Another prospective study of 30 patients (6 women) with subclinical hypothyroidism found 16 (3 women) who progressed to overt disease within 24 months. The remaining patients maintained normal FT4 levels for at least 15 years despite persistently elevated TSH.[8] A third study followed 2779 adults (1494 women) with all types of thyroid disease for 20 years and found that 55% of women with TSH >6 and a positive antibody test developed overt hypothyroidism. Ninety percent of patients with an initial TSH >10 eventually progressed to overt disease.[2]

Serum lipid reduction. A retrospective study of 709 women referred to an endocrine clinic for evaluation of abnormal lipoprotein levels identified 34 (4.8%) with undiagnosed hypothyroidism.

Thyroid hormone treatment reduced total and LDL cholesterol in patients with an initial TSH greater than 10

Thyroid hormone treatment significantly reduced total cholesterol and low-density lipoprotein (LDL) cholesterol in patients with initial TSH >10, but not in those with a TSH <10.[9]

A randomized trial involving 42 women with subclinical hypothyroidism measured lipid levels before and after 6 months of levothyroxine treatment. Levothyroxine reduced total cholesterol and LDL significantly compared with placebo. Additionally, the subclinical hypothyroidism patients had higher baseline lipid levels when compared with 27 euthyroid controls.[10]

A meta-analysis combined 13 studies, involving 247 patients with subclinical hypothyroidism, all of whom were given thyroid replacement. All studies reported a decrease in total cholesterol (mean −7.9 mg/dL), and 9 reported a decrease in LDL (mean −10 mg/dL).[11] A second meta-analysis with 278 hypothyroid patients given thyroid replacement also found a reduction of total cholesterol (mean −15 mg/dL). LDL effects were not reported.[12] The clinical significance of lipid changes in these circumstances is unknown.

Symptom relief. Four small randomized controlled trials used symptom-rating scales to measure symptom relief with treatment of subclinical hypothyroidism. One study involved patients found by screening; the other 3 did not indicate means of diagnosis. Three studies found no significant improvement.[13–15] The most recent, involving 33 unblinded patients, found that those taking thyroid replacement had lower symptom scores (number needed to treat [NNT]=3.5).[16]

Cardiac manifestations. Subclinical hypothyroidism may be associated with ventricular dysfunction, myocardial infarction, and atherosclerosis.[18–20] A randomized controlled trial of 20 people with subclinical hypothyroidism found significantly improved left ventricular function assessed by echocardiography after 6 months of treatment with levothyroxine vs placebo.[18] Whether treatment prevents myocardial infarction and atherosclerosis is unknown.[19,20] A cohort study, involving 2779 adults studied aged >20 years, did not find an association between subclinical hypothyroidism and ischemic heart disease.[2]

Risks of replacement. A meta-analysis of 41 controlled, cross-sectional studies involving 1250 women treated with thyroid replacement for all causes (ie, not specifically subclinical hypothyroidism) found that replacement therapy (mean duration of treatment, 7 to 9 years) was associated with bone loss in premenopausal women, but not in postmenopausal women.[17]

A randomized trial of 37 patients over 55 with subclinical hypothyroidism (28 of whom were women), found that thyroid hormone reduced bone mineral density, as assessed by dual-energy x-ray absorptiometry (DEXA) scans over a 10-month period.[14] In several trials, patients withdrew due to adverse effects. Two of 37 patients receiving L-thyroxine in 1 study withdrew because of new atrial fibrillation and worsened angina, and 2 of 20 patients in another study withdrew because of nervousness and palpitations.[13,14]

■ RECOMMENDATIONS FROM OTHERS

The US Preventive Services Task Force concluded the evidence is insufficient to recommend for or against routine screening for thyroid disease in adults. The yield of screening is greater in high-risk groups such as postpartum women, people with Down syndrome, and the elderly; however, there is poor evidence that screening these groups leads to clinically important benefits.[21]

The American Thyroid Association recommends screening men and women beginning at age 35 and every 5 years thereafter.[22] The American Academy of Family Physicians recommends screening for men and women over age 60.[23] The American College of Physicians states screening may be indicated in women over age 50.[24]

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■ **CLINICAL COMMENTARY:**

Consider screening all female patients, particularly those over age 50

In my practice, there recently seems to be increased pressure from patients to screen for hypothyroidism, perhaps based on media or Internet information. I have used an individual "risk factor" approach when patients ask me for testing, based on their age, family history, and current symptoms. Based on the data, using the history and physical examination to tailor screening is an ineffective method of detecting hypothyroidism.

Until we have more evidence, I believe a reasonable approach is to offer screening to all of our female patients, particularly those over age 50, along with a careful acknowledgment of the lack of data for or against screening.

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Based on the data, using history and physical exam to tailor screening is ineffective for detecting hypothyroidism

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When should patients with stroke receive thrombolytics?

Treating patients with rtPA outside the strict protocols increases morbidity and mortality

■ EVIDENCE-BASED ANSWER

Thrombolytic therapy should be limited to patients with acute ischemic stroke who meet strict inclusion and exclusion criteria (**Table**) and who can adhere to strict treatment protocol. Patients treated under these conditions have improved combined mortality and disability outcomes at 1 year when treated with recombinant tissue plasminogen activator (rtPA) (number needed to treat [NNT]=18; 95% confidence interval [CI], 11–56) (strength of recommendation [SOR]: **B**, meta-analysis of randomized controlled trials with significant heterogeneity).[1]

Treating patients with rtPA outside the strict protocols definitely increases morbidity and mortality (SOR: **A**). A recent meta-analysis[2] on this topic and the Cochrane review[1] of eligible studies found the statistical heterogeneity and lack of precision in the analyses bothersome. These authors believed additional data were needed to more precisely define the circumstances in which thrombolysis could be recommended, if ever, for acute ischemic stroke.

■ EVIDENCE SUMMARY

The 2003 American Heart Association guidelines recommend rtPA for acute ischemic stroke "for carefully selected patients" who also need crucial "ancillary care."[3] The evidence for these guidelines comes primarily from large double-blind placebo-controlled studies using rtPA. However, these studies—including NINDS,[4] ECASS,[5] and ATLANTIS[6]—differ in their dosing regimen, timing, and other exclusion criteria, and outcome measurements.

The NINDS study, often employed as a benchmark,[3,7,8] used a slightly lower dose of rtPA than other studies and "required that no anticoagulants or antiplatelet agents be given for 24 hours after treatment and that blood pressure be maintained within prespecified values."[4] Patients were evaluated for inclusion according to strict criteria, similar to those shown in the **Table**.

Patients in research studies who were treated outside protocol guidelines, and patients treated in community hospitals, have not fared as well as the patients in NINDS. In Connecticut,[9] a review of thrombolysis in acute ischemic stroke revealed protocol deviations in 67% of the patients treated. The number needed to harm (NNH) for death was only 4 (in other words, there was an additional patient death for every 4 patients treated with rtPA), and significant extracranial hemorrhage had an NNH of 8. In Cleveland,[10] 50% of patients treated had at least 1 major protocol violation, and the NNH for symptomatic intracranial hemorrhage was 6. A quality improvement program in the Cleveland area lowered protocol violations to 19% and the NNH rose to 15.[11]

Improved outcomes similar to NINDS have been noted where there are stroke units or teams with personnel such as neurosurgeons, strict adherence to protocols, and facilities available to give accurate and expedient interventions and imaging (eg, neuroradiologic interpretations of CTs).[1] These limits restrict the practical and safe use of rtPA to few of the millions of stroke victims.

The net positive outcome found in the Cochrane review[1] results from subtracting the significant increase in symptomatic intracranial hemorrhage (NNH=16; 95% CI, 11–25) from the larger primary decrease in disability/death (NNT=10; 95% CI, 6–22).[1] The overlapping confidence intervals of the outcomes was bothersome to the Cochrane reviewers.

■ RECOMMENDATIONS FROM OTHERS

Recommendations from the American Heart Association,[2] the American Academy of Neurology,[6]

TABLE	

Inclusion and exclusion criteria for using thrombolytics for patients with acute ischemic CVA

Inclusion criteria

Patient aged 26–79 years with a diagnosis of ischemic stroke, with consistent, measurable, new neurologic deficit that is not clearing spontaneously and causes impairment
Onset of symptoms ≤3 hours
Informed consent obtained from patient, appropriate family member, or power of attorney
Neuroradiologist and neurosurgeon on hand
Stroke unit or equivalent team/bed available

Exclusion criteria

Major neurological deficits
Onset of symptoms >3 hours before starting treatment
Head trauma or myocardial infarction in previous 3 months
Gastrointestinal or urinary tract hemorrhage in previous 21 days
Major surgery in previous 14 days
Arterial puncture at a noncompressible site in previous 7 days
History of intracranial hemorrhage
Blood pressure >185 mm Hg systolic or >110 diastolic at time thrombolytic therapy is given
INR >1.5
On heparin, or aPTT outside normal range
Platelet count <100K mm^3
Blood glucose <50 mg/dL (2.7 mmol/L)
Seizure with postictal neurological impairments
Radiologic evidence that more than one third of cerebral hemisphere (by volume) is involved
Inability to maintain adherence to treatment guidelines
(Current aspirin use is not an exclusion criterion.)

INR, international normalized ratio; aPTT, actived partial thromboplastin time

and the 6th American College of Chest Physicians Consensus Conference on Antithrombotic Therapy[7] substantially agree. With minor variations, all recommend rtPA with inclusion/exclusion criteria similar to those outlined in the **Table**.

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■ CLINICAL COMMENTARY:

Respect the accepted inclusion and exclusion criteria for using thrombolytics

Acute ischemic stroke has always posed the dilemma of giving treatment that may be either beneficial or harmful. Now the stakes of success or failure are dramatically higher. Family physicians must be knowledgeable about treatment options, as the 3-hour window for using rtPA after symptom onset is a diagnostic and logistic challenge for physicians and staff.

Our radiology colleagues help by using the unenhanced head CT to exclude lesions that mimic ischemic infarct and to confirm that true stroke victims do not have identifiable infarction greater than one third of the middle cerebral artery territory. Clinicians involved in the rtPA decision must know and respect fully and without deviation the accepted inclusion and exclusion criteria for using thrombolytics for acute ischemic stroke, to promote recovery and minimize death and disability due to intracranial hemorrhage.

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Is methylphenidate useful for treating adolescents with ADHD?

■ **EVIDENCE-BASED ANSWER**

Methylphenidate (Ritalin) is effective in the short-term treatment of attention deficit/hyperactivity disorder (ADHD) (strength of recommendation [SOR]: **A**, multiple randomized control trials).

Though the immediate-release preparation is the best studied of methylphenidate formulations, extended-release methylphenidate (Concerta) has similar benefits, with a dosing regimen that may better suit an adolescent lifestyle (SOR: **B**, based on extrapolation of 1 randomized controlled trial and expert opinion).

■ **EVIDENCE SUMMARY**

The subjects of most ADHD medication studies have been school-age children. Most children with ADHD will have symptoms persisting into teenage years, and methylphenidate has been increasingly prescribed for them.[1,2] Various systematic reviews and meta-analyses have demonstrated the effectiveness of short-term methylphenidate in the treatment of adolescents with ADHD.[3–5] Most participants in these studies are males aged <13 years. Therefore, any conclusions about the effectiveness of methylphenidate in older adolescents must be inferred.

The most comprehensive systematic review found 8 well-controlled crossover trials with an average sample size of 24.8 (range, 9–48).[6] The average duration of the studies was 6 weeks. The majority of the participants were white males with a mean age of 13 years. Each study showed statistically significant improvement from treatment with methylphenidate. Average effect sizes were calculated for 3 domains: ADHD symptoms (0.94), social behavior (1.06), and academic performance (1.25). Effect sizes were calculated using a modified Cohen's d, which is the difference between the treated and

untreated means divided by the standard deviation in the untreated condition. It is difficult to translate these changes in effect size into clinically meaningful outcome measures, although one rule of thumb estimates an effect size of 0.8 is moderate to large.

Of the 3 studies that reported the proportion of subjects with clinically significant improvement, the modal result was about one half showings improvement with methylphenidate. Of trials assessing dosing levels, <50% found significant differences between "low" and "high" doses. However, the researchers did not give their definition of low and high doses. Also, diminishing clinical improvement was noted with higher methylphenidate doses.

A single study on the once-daily stimulant preparation, extended-release methylphenidate, shows statistically significant improvement in adolescent ADHD.[7] In this multicenter, randomized, double-blind, placebo-controlled trial of 177 adolescents, subjects were given placebo (n=87) or extended-release methylphenidate (n=90) at titrated doses from 18 mg/d to 72 mg/d. Following a subsequent 2-week randomization phase, clinical investigators found extended-release methylphenidate significantly superior to placebo ($P=.001$) on the ADHD scale. Subjects also rated it significantly superior to placebo ($P=.001$) on the Conners-Wells' Self-Report Scale. Mean dose and average age were not reported. This study has been presented as an abstract and is not yet published.

■ RECOMMENDATIONS FROM OTHERS

The American Academy of Child and Adolescent Psychiatry (AACAP) supports the prescribing of methylphenidate in adolescents with ADHD.[8] Given the unique psychosocial, environmental, and scheduling challenges of adolescence, the AACAP mentions extended-release methyl-phenidate as "well-suited for treatment of adolescents."

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■ CLINICAL COMMENTARY:

Patients with childhood ADHD usually benefit from continuing their medication

Adolescents must face the challenge of becoming more organized and independent to be successful in middle school and high school. Those with childhood ADHD may have a particularly difficult transition, and will usually benefit from continuing to take their stimulants. Some adolescents, who were not previously identified as having ADHD, may declare themselves at this age due to school performance issues. Careful evaluation and treatment of these patients will contribute to their success.

Physicians should use the lowest effective dose of methylphenidate, as the studies seem to indicate that higher dosages do not improve performance in adolescents. Teens often prefer long-acting preparations, which obviate the need to take medication at school. The studies reviewed do not define long-term academic or vocational success, which is a more important outcome than symptom control for adolescents.

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Does yoga speed healing for patients with low back pain?

■ EVIDENCE-BASED ANSWER

The use of yoga is consistent with recommendations for activity, as tolerated, for patients with low back pain. Literature evaluating the effectiveness of yoga for low back pain is scant, so it is unclear if yoga is equivalent to, or superior to, standard therapies (strength of recommendation: **C**, based on 1 randomized pilot study and limited case series).

■ EVIDENCE SUMMARY

Yoga, through static physical postures (or *asanas*), uses stretching to improve muscular strength and flexibility, which could be beneficial for low-back-related pain management.[1] Hatha yoga, which incorporates breathing and movement, has provided limited benefit in musculoskeletal-related pain.[2] Hatha yoga is distinguished from other yoga practices in that it is based on the knowledge, development, and balance of psychophysical energies. A large systematic review of yoga used for various medical conditions found over 120 studies.[3] Anecdotal reports were excluded. The authors reported no studies directly evaluating effect of yoga on back pain.

A randomized controlled trial studied a 6-week modified hatha yoga protocol with 22 patients.[4] The yoga group spent an hour with a certified instructor twice weekly, while the control group received the same intervention delayed until the study phase was completed. This underpowered pilot study found trends in functional measurement scores for improved balance and flexibility, as well as decreased disability and depression in the yoga group, but the sample size was too small to detect significant changes.

Patients who practice hatha yoga say it is valuable for preventing and managing stress-related chronic health problems, including low back pain. In a survey of 3000 people receiving yoga for health ailments (1142 [38%] with back pain), 98% claimed that yoga benefited them.[5]

In a case series of 16 patients using various *asanas* for rehabilitation, 11 (69%) reported significant improvement, with near normal mobility and absence of pain.[6] Those who reported recurring back pain also reported irregular practice of yoga. In another case series, 21 women aged ≥ 60 years (mean age, 75) with hyperkyphosis, participated in twice-weekly 1-hour sessions of hatha yoga for 12 weeks. Measured height increased by a mean of 0.52 cm, forward curvature diminished, patients were able to get out of chairs faster, and they had longer functional reach. Eleven patients (48%) reported increased postural awareness/improvement and improved well-being; 58% perceived improvement in their physical functioning.[7]

Clearly, more studies are required to determine the effects of yoga on lower back pain. Larger randomized sample sizes, group and individualized formats, and longer follow-up are needed. Control groups should involve both group and nongroup settings, to detect any benefit that may be derived from group support. No reports of harm from yoga in low-back pain therapy were reported in the few studies found.

■ RECOMMENDATIONS FROM OTHERS

The Philadelphia Panel formulated evidence-based guidelines for selected rehabilitation interventions in the management of low back pain for outpatient adults.[8] Continuation of normal activity improves rate of return to work compared with enforced bed rest. Randomized controlled trials demonstrate no clinically important effect (15% improvement compared

with control) with stretching or strengthening exercises, mechanical traction, or TENS. The panel found insufficient evidence to support the use of mechanical traction for patient global improvement and return to work. Therapeutic exercise—including stretching, strengthening, and mobility exercises—significantly reduces pain and improves function for chronic low back pain (longer than 12 weeks); but there was no clinical benefit in facilitating return to work. No specific comments on yoga appeared in their recommendations.

The US Preventive Services Task Force reports that evidence is insufficient to recommend for or against counseling patients to exercise to prevent low back pain; it makes no mention about yoga.[9]

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■ CLINICAL COMMENTARY:
Information suggests yoga—and all exercise—effective for low back pain

Good evidence supports the concept that activity is more effective than bed rest for acute low back pain. Recent studies in the rehabilitation and physical therapy literature have emphasized core stability exercises for acute and chronic back pain. As balance, strength, and flexibility improve, the episodes and intensity of acute low back pain diminish.

It stands to reason that activities such as hatha yoga that improve muscular strength, flexibility, and balance would similarly improve function and decrease low back pain. The available information would lead me to recommend yoga for my patients with low back pain. Yoga may well be effective, and no reports in the literature show harm.

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TYPE II CLINICAL INQUIRIES

Do inhaled beta-agonists control cough in URIs or acute bronchitis?

■ EVIDENCE-BASED ANSWER

Patients who receive inhaled beta-agonists for cough due to acute upper respiratory infections (URI) are just as likely to report a productive cough at 7 days compared with patients treated with placebo (strength of recommendation [SOR]: **A**, based on a systematic review).

One trial, however, showed a reduction in overall cough at 7 days (number needed to treat [NNT]=3, SOR: **B**, a small randomized controlled trial), and another trial found a reduction in overall symptom score in smokers and those with wheezing on initial exam (SOR: **B**, based on a small randomized controlled trial).

■ EVIDENCE SUMMARY

No studies of inhaled beta-agonists have been conducted with patients who have an explicit diagnosis of acute cough due to URI. While some clinicians feel a distinction between URI and acute bronchitis should be made, there is significant overlap between these diagnoses in clinical practice, as well as in the available studies.

A systematic review looking at beta-agonists for acute bronchitis included the clinical diagnoses of both acute bronchitis and acute cough because a standard definition of bronchitis is lacking.[1] Only two trials in this review examined inhaled beta-agonists. When results from these trials were combined for the outcome of productive cough at 7 days, inhaled beta-agonists showed no benefit. However, the authors note that details of the individual trials may help to clarify the effect of inhaled beta-agonists.

One trial, a randomized controlled trial of adult patients with acute bronchitis in 2 community-based family practices, compared 23 patients receiving albuterolin a multidose inhaler (MDI) with 23 patients receiving placebo inhaler.[2] Patients were also randomized to receive erythromycin or placebo tablets. Patients with pneumonia or a history of asthma or chronic obstructive pulmonary disease (COPD) were excluded. At 7 days, 61% of patients in the albuterol group reported cough compared with 91% in the control group (P=.02, NNT=3). No statistically significant difference was seen in productive cough or night cough. Smokers responded to inhaled albuterol similarly to nonsmokers. Erythromycin had no effect on cough and side effects were similar among all groups.

The other trial was a randomized controlled trial of 80 adults with cough due to acute respiratory infection; it compared fenoterol aerosol 4 times daily with placebo.[3] Inhaled fenoterol is not available in the US but is similar to albuterol. This study showed no difference in cough at 7 days (relative risk [RR]=0.83; 95% confidence interval [CI], 0.52–1.30). In a sub-

group analysis, however, smokers and those wheezing on initial exam had lower overall symptom scores when treated with fenoterol.

> **With beta-agonists, outcomes such as need for OTC medications and return to work do not improve**

■ RECOMMENDATIONS FROM OTHERS

We were unable to find any guidelines on the use of albuterol via MDI for cough from bronchitis or URIs.

■ CLINICAL COMMENTARY:

Inhaled beta-agonists may aid symptoms; other outcomes may not be improved

Even without a history of lung disease, patients presenting with cough due to acute respiratory illness and with evidence of airflow obstruction (wheezing) appear to receive symptom relief from inhaled beta-agonists. Smokers may be another subgroup who benefit from treatment. However, important patient-oriented outcomes (such as reduced need for over-the-counter medicines, general well being, and return to work) do not improve. If using inhaled albuterol to treat acute cough in practice, one must also consider the financial costs and adverse effects associated with treatment.

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