

# Adolescent Health Update

A Clinical Guide  
for Pediatricians

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## Back Pain in the Adolescent A User-Friendly Guide

by Jordan D. Metzl, MD, FAAP

*“Jodie,” a 15-year-old female volleyball player, comes to the office complaining of steadily increasing low back pain of 4 weeks’ duration. She cannot recall any specific injury, and instead describes an aching pain in her lumbar spine that has developed over the course of the season and has worsened every time she plays. “The past month has been terribly painful,” she says.*

*When asked specifically, Jodie describes a “dull ache at the bottom of my spine,” that hurts, “especially when I serve.” She denies paresthesia or radiculopathy into the feet or toes as well as pain that awakens her in the night. The pain is clearly worse after volleyball, she says, and is worst when she serves the ball. “I can barely serve it hurts so*

*much,” she says.*

*When they arrive in the office for further evaluation, Jodie and her mom say that they want to figure out what’s wrong and take care of it right away. “I love playing volleyball and I have to get back as soon as possible,” she says.*

The pediatrician in this fictional vignette must quickly sort out the many possible causes of Jodie’s back pain. The most common sources of back pain in adolescence are bone-related, muscular, and discogenic, although other etiologies must be considered.

This article will discuss the most common types of back pain and briefly address less typical etiologies. The text will give clues for appropriate evaluation, treatment, and referral of adolescents who present to the medical office with back pain.

### HOW COMMON IS IT?

Studies suggest that between 70% and 80% of the general population will experience low back pain at some point in their lives.<sup>1</sup> In the majority of adult cases, pain is located in the lumbar spine and is termed “mechani-

cal.” This type of back pain is largely related to muscular weakness, inflexibility, cartilaginous disk abnormality, and arthritic degeneration of the lumbar spine.

Back pain is also common in adolescents. Retrospective school-based surveys of 1700 and 1400 adolescents found that 27% and 30%, respectively, had experienced low back pain at some time in the past.<sup>1</sup> Another study

### Goals and Objectives

After reading this issue, pediatricians who care for patients with back pain will be better prepared to:

- List the types of back pain most commonly seen in adolescents
- Do a comprehensive assessment
- Perform an appropriate physical examination
- Complete a differential diagnosis
- Identify criteria for further diagnostic evaluation
- Discuss the role of imaging and other diagnostic tools
- Develop a management plan for treatment of the most common forms of back pain
- Delineate criteria for referral

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of 100 student athletes ages 12 to 18 who presented to the sports medicine clinic of a children's hospital for evaluation of back pain attributed the pain to spondylolysis in 47%, disk problems in 11%, lumbosacral strain of muscle-tendon units in 6%, and lordotic or mechanical causes in 26%.<sup>2</sup>

## TAKING THE HISTORY

In evaluating back pain in an adolescent, the history is a key part of the equation.

Listen closely to ascertain the mechanism of injury. Elicit information about types of movement and activities associated with pain. Ask about prior injuries or periods of back pain. Inquire as to the site of pain and whether or not it radiates. (See *Checklist for the Clinical Encounter*)

## THE PHYSICAL EXAMINATION

Physical examination of the patient with back pain includes observation of gait and posture followed by active motion, strength, and neurosensory tests.

To begin the physical examination of the spine, ask patients to let you watch them walk across the room. Ideally, they should be in a gown that is open in back, dressed in shorts, with no top and no brassiere. Look to see whether they have a normal gait. Are they comfortable? Are they tilted to one side? Next, look at the spine. Is the hip height equal on both sides? Are the shoulders equal on both sides? If there is a fold of skin above the hips, does one side look more creased than the other?

### Active Motion Tests

Ask the patient to move as directed while you observe the lumbar spine.

- Instruct the patient to bend all the way forward. Pain bending forward is most often discogenic. Do the

Adams test for scoliosis, asking the patient to extend her arms and put both palms together, then slowly bend forward from the waist. Stand behind the patient and position your field of gaze at the level of the spine. Look for asymmetry of the thoracic cage or lower back. Curvature in the spine suggests scoliosis, which may

### Checklist for the Clinical Encounter

The following questions can help structure history-taking for back-related problems:

1. What was the mechanism of injury (eg, acute traumatic injury, overuse injury, specifics that led to injury)?
2. (If not injury-related): When did this pain begin? How did it begin? Do you remember what you were doing the day before the onset of pain? Was the onset acute or insidious? Have you had pain like this before?
3. What activity makes the pain worse (eg, pressure, movement in a given direction, rest)? Do any sports activities make it worse (eg, serving a volleyball, bending backward in dance class, twisting in basketball)?
4. Does the pain awaken you at night?
5. What eases the pain?
6. Are there neurological or radicular symptoms?
7. What is the prior history of injuries or problems?
8. Where is the pain located (lumbar, upper/lower thoracic, midline, paraspinal)?
9. Are there any other symptoms on the review of systems (eg, bowel or bladder problems, abdominal pain, fever, weight loss)?
10. Are there symptoms not related to the back that suggest systemic infection, neoplasm, or a collagen vascular problem (eg, fever or painful joints)?
11. Is there a family history of back stiffness or spondyloarthritis?

be further assessed by x-ray.

- Ask the patient to bend backward. Pain on bending backward often suggests spondylolysis or a stress fracture.
- Instruct the patient to put hands on hips and twist back to left and right, looking for any pain on either side of the spine. Pain with twisting would be consistent with muscle spasm or muscle pain.
- Ask the patient to sit on the examining table with legs dangling for a straight leg raise test. Straighten out one leg, then the other, and look for any pain associated with one side or the other. If there is pain bending forward and with a leg raise on a specific side, consider a disk problem on that side.

### Further Examination

After the active motion tests, examine the patient further via palpation, strength testing, and a neurosensory examination.

- Palpate the spine and look for areas of tenderness along spinal processes (bones).
- Palpate the iliac crest, specifically cartilaginous apophyses or growth plates.
- L5 disk herniation would cause weakness of the hallucis longus muscle. To test for that, ask the patient to extend the great toe upward against your resistance.
- Test quadriceps and hamstring muscles, asking the patient to push the leg out as if to kick, then pull it back, both times against your resistance.
- L4 weakness would be detected with inversion of the foot. To test for this, ask the patient to evert the foot against resistance.
- Check for L4 nerve root involvement by assessing dorsal and plantar flexion of the foot.
- Check reflexes in the patellar tendon,

the L4 nerve root. A diminished reflex in the L4 nerve root suggests a possible disk herniation between the L3 and L4 vertebrae.

- Look for a diminished Achilles reflex, which would indicate disk herniation at the L5 level.

Findings from the physical examination will direct the clinician's next steps, which may include further diagnostic tests, physical therapy, and/or referral to a specialist. Weak or diminished reflexes may suggest a nerve problem or a herniated disk. Consider referral to an orthopedic or sports medicine specialist if there is pain on bending forward or backward, pain on the straight leg test, diminished deep tendon reflexes, or apophyseal pain on palpation.

## **MOST COMMON TYPES OF BACK PAIN**

Most adolescent back pain will fall into 3 general categories: muscular, bone-related, and discogenic. (See Table 1)

### **Muscular back pain**

Roughly 30% of all cases of back pain in adolescents is muscular in origin. When an adolescent comes to the office with a complaint of back pain, what clues would suggest muscular pain?

Muscular pain in the adolescent back tends to occur on one or both sides of either the thoracic or lumbar spine, most often during or after

#### **Keys to Diagnosis and Treatment of Muscular Back Pain:**

- 1) Location of pain is generally paraspinous, not midline
- 2) Radicular symptoms are absent
- 3) Scoliosis has been ruled out
- 4) Physical therapy should be started as soon as possible

twisting or lifting. Sometimes there is a history of acute injury, as in the case of a teen who twists during a baseball game and develops an acute back spasm with a sharp pain along the side of the lumbar spine in the paraspinous muscles. More often, however, the scenario for muscular back pain is an overuse injury, as in the adolescent who lugs a 60-pound backpack to school daily and then complains of an ache in the paraspinous muscle group.

The specific findings on physical examination of the adolescent with muscular back pain include tenderness to palpation along the paraspinous muscles and the feeling of a "knot" in the back.

Adolescents with muscular back pain generally will not have pain with forward flexion (bending forward) or extension (bending backward). Rather, muscular back pain tends to occur with spinal rotation. To best elicit this finding, the examiner should have the patient slowly twist from side to side while stabilizing the hips. The slow twist will cause the muscles to hurt because they are tight and in spasm.

#### A word about scoliosis

Although scoliosis does not directly produce back pain, muscular back pain is a common secondary finding in adolescents who have a scoliotic curve, which is why it is important to rule out scoliosis if a diagnosis of muscular back pain is entertained. Patients with both scoliosis and pain are candidates for referral because one cannot assume the pain is due to scoliosis and must therefore pursue other causes.

Evaluation for possible scoliosis is best done by performing the forward-flexion maneuver known as the Adams test, described above. If physical findings suggest scoliosis, a Scoliometer can help to confirm the diagnosis. An inclination reading between 5 and 7 degrees indicates that further evalua-

tion is required. Definitive diagnosis is made through a spine radiograph.

#### Diagnosis and treatment of muscular back pain

In general, the physical examination is sufficient for diagnosis and evaluation of muscular back pain. However, if there is scoliosis associated with the pain, spinal radiographs are recommended for measurement of the curve.

While anti-inflammatory agents are sometimes helpful for temporary pain management, steroids and muscle relaxants generally are not indicated. Treatment of muscular back pain involves muscular stretching and strengthening, which may include referral to a physical therapist. The referral should stipulate a diagnosis of muscular back pain and recommend a plan for evaluation and treatment including ultrasound, electrical stimulation, heat, and ice. With physical therapy, muscular back pain will usually resolve within 4 to 6 weeks. In our office, we encourage patients to remain active when being treated and schedule an interim check at 3 weeks. For student athletes, this includes return to sports as soon as they can. More activity does not typically cause increased problems with muscular back pain, so these patients can be encouraged to use their judgment.

### **Bone-related back pain**

Bone-related back pain accounts for roughly 25% to 50% of back pain in adolescents and is most often seen in more athletic teens. The most common scenario for this presentation is the adolescent athlete who comes in complaining of pain in the lumbar spine with extension. This is generally an athlete who uses the spine for repetitive extension maneuvers, such as the gymnast, figure skater, ballerina, or volleyball player.

Bone-related back pain is most

often a result of overuse. In overuse or repetitive stress injury, edema in the bone signals stress that may progress to an overt stress fracture known as a *spondylolysis*, a crack in the pars interarticularis.

Micheli and Wood found that nearly half of young athletes who presented to a sports medicine clinic with back pain had spondylolysis.<sup>2</sup> However, spondylolysis is often asymptomatic. A study of 145 Indiana University football players screened for spondylolysis in the 1970s revealed that 47% of those with spondylolysis were asymptomatic when they started college and 40% remained pain-free at graduation.<sup>3</sup> Spondylolysis is not uncommon and patients with spondylolysis who are

pain-free require no treatment.

The most common location for spondylolysis is in the fifth lumbar vertebrae at the base of the spine. Either through congenital causes or through bilateral spondylolysis, the affected vertebrae can slip. When this occurs, the patient has a condition known as *spondylolisthesis*.

#### Physical examination, work-up, and treatment

The specific physical exam findings of an adolescent with suspected bone-related back pain include pain with extension maneuvers (bending backward). This is in contrast to muscular pain, which worsens with twisting. The neurological examination for patients with bone-related back pain is usually normal, although abnormalities are seen when the spondylolisthesis has slipped to where it is compressing the spinal nerve roots.

The work-up and treatment for bone-related back pain in the adolescent depends upon the type of pain. In the case presented at the beginning of this article, an adolescent volleyball player came in with a complaint of back pain with extension that had worsened over the past several months until she could no longer play volleyball without significant pain. The history of pain with extension that limits the adolescent's ability to participate in sports should immediately trigger the presumptive diagnosis of spondylolysis in the mind of the health practitioner.

*The work-up for suspected spondylolysis* includes four radiographs: AP, lateral, and two oblique views. The AP view is important to assess the curvature of the spine and the lateral view is important to investigate for spondylolisthesis, slip of the vertebrae. The oblique views, taken at 45 degree angles from the midline on either side of the lumbar spine, are used to investigate for a crack across the pars

interarticularis (often described as the neck of the “Scotty dog”), the hallmark of long-standing spondylolysis.<sup>4</sup>

X-ray and physical examination are usually sufficient for diagnosis of spondylolysis, but if in doubt an MRI can show edema in the bone before it cracks. The quality of MRI magnets can vary, which is why SPECT (CT plus bone scan) is sometimes used to confirm the diagnosis.

Treatment is indicated when the patient has persistent pain bending backward. If this occurs, the patient should be referred to a sports medicine specialist or sports-oriented pediatric orthopedist. Patients with spondylolysis should also be referred for physical therapy with a sports-oriented physical therapist. Physical therapy will strengthen abdominal or core muscles, correct the mechanical problem of overloading the spine, and reduce discomfort. If the patient has back pain but not pain when bending backward and the x-ray indicates spondylolysis, many clinicians will allow a month of physical therapy before referring the patient for evaluation by a specialist.

Treatment for spondylolysis depends upon the age of the patient and age of the lesion. It may include a period of bracing, physical therapy, and the use of a bone stimulator to

### **Keys to Diagnosis and Treatment of Bone-Related Back Pain**

1. What seems to make it worsen? Pain on bending backward (extension) should be considered bone-related pain until proven otherwise.

2. Back pain that awakens an adolescent from sleep and worsens at night but does not worsen with activity is suspicious for neoplasm, most commonly benign osteoid osteoma.

3. The treatment of bone-related back pain most commonly involves bracing, physical therapy, and rarely, surgery.

4. Patients are most often referred to a sports medicine specialist or sports-oriented pediatric orthopedist.

5. Physical therapy should be initiated promptly. The ideal physical therapy referral will be to someone who understands the patient's sport and can address the specific athletic maneuvers that may have precipitated or exacerbated the condition.

6. In most cases, patients can resume normal activities as soon as they are pain-free, with bracing as indicated.

### **TALKING POINT**

#### **Explaining the plan for diagnosis and treatment**

To explain spondylolysis, tell patients that there has been too much pressure on the bones of their spine and those bones have started to crack. Emphasize that their condition is not uncommon and can be treated. Stress that complying with the regimen for physical therapy will strengthen core muscles so that these injuries do not remain symptomatic.

**Table 1 Common Causes of Back Pain**

<b>Clues to Pathophysiology</b>	<b>Muscular</b>	<b>Bone-Related</b>	<b>Discogenic</b>
<b>Site of pain</b>	Localized to paraspinous muscles	Localized to center of spine	
<b>Pain during activity</b>	X	X	X
<b>Pain after activity</b>	X	X	X
<b>Pain bending forward</b>			X
<b>Pain bending backward</b>		X	
<b>Straight raised leg test elicits pain</b>			X
<b>Pain with twisting</b>	X		
<b>Radiating pain</b>		May occur if there is spondylolisthesis and the degree of slip is sufficient to impinge on the nerve root	X
<b>Strength testing</b>			Strength tests involving the great toe, inverted foot, thigh, and hip flexor may show weakness
<b>Neurosensory exam</b>	Unremarkable	Reflex deficiencies may signal spondylolisthesis that has progressed to compress spinal nerve roots.	Reflex deficiencies may signal disk herniation; tingling toes may suggest spinal cord compression
<b>Radiologic Tests</b>	Consider x-ray only if pain persists more than 6 weeks, occult fracture is suspected, or scoliosis is also present	X-rays - 1 AP, 1 lateral, and 2 oblique views. Consider MRI if concerned about fracture. If spondylolysis is suspected but not clear on x-ray, MRI will reveal edema	X-rays - 1 AP and 1 lateral. MRI considered gold standard; rarely CT if MRI not clear.
<b>Activity modification</b>	Patients should be encouraged to return to play as soon as they can, using their judgment and taking nonsteroidal anti-inflammatory drugs as needed.	Sports hiatus for younger patients with spondylolysis that may heal with rest. Older patients can play with or without a brace once they are pain-free, but must postpone return to play until nerve-related symptoms resolve.	Bed rest is not recommended
<b>Indications for referral</b>	Associated scoliosis	Spondylolysis, spondylolisthesis, or pain that persists for more than a month despite physical therapy, regardless of x-ray findings	Always
<b>Treatment plan</b>	Physical therapy, which may include referral to a sports-oriented physical therapist	Referral to a sports-oriented physical therapist and either a sports medicine specialist or a sports-oriented pediatric orthopedist	Referral to a sports-oriented physical therapist and sports medicine specialist or sports-oriented pediatric orthopedist. Their options will include bracing or steroid injection and, if all else fails, microdiscectomy

facilitate healing. In patients with spondylolysis who are younger than 10 or 11 years of age, it is possible to attain bone healing. These patients take a respite from sports for a few months while they continue with physical therapy and are followed with CT or MRI. Older adolescents can generally return to sports as soon as they are pain-free. Continued physical therapy, bracing, and judicious use of NSAIDs will usually be all that is needed to return to their sport.

*The work-up for suspected spondylolisthesis* is generally finished after the radiographs. MRI can be used to evaluate adolescents with discogenic symptoms that might accompany spondylolisthesis when spinal stenosis, a narrowing of the spinal canal, is present, or when the degree of slip is sufficient to cause nerve root compression.

Spondylolisthesis is a graded entity most often described in terms of

### **Making a Referral**

Most adolescents with back pain are ideally referred to sports medicine physicians, pediatric orthopedists, and physical therapists who enjoy working with student athletes. One way to find these specialists is to find out who helps out with the school teams, cares for the instructors at the local dance studio, or advises volunteer parents for the youth soccer league. The most common reasons for referral are as follows:

- To clarify the diagnosis
- To pursue next steps when an exercise regimen with physical therapy has not brought improvement of musculoskeletal pain
- When there is evidence of spondylolysis, spondylolisthesis, scoliosis, or disk herniation on x-ray or MRI

Adolescents with evidence of neoplastic, rheumatologic, or infectious disease processes should be referred to appropriate specialists.

H.W. Meyerding's 5-category classification system. To measure the degree of slippage, the examiner takes a lateral view of the lumbosacral junction, then measures the slip as a percentage of the length of the superior border of the sacrum. Meyerding's grade I is a 1% to 25% slip. Grade II is a 26% to 50% slip. Slips of 50% or more (grade III or more) are considered high-grade. Grade III is a 51% to 75% slip, grade IV is a 76% to 100% slip, and grade V, spondyloptosis, is a slip greater than 100%.<sup>5</sup>

The treatment for spondylolisthesis is rarely surgical. Symptoms generally improve with physical therapy. Occasionally, surgery is necessary if the symptoms persist and the degree of slippage is sufficiently severe.

### **Discogenic (nerve-related) back pain**

Discogenic back pain, which accounts for 50% of back pain in adults, accounts for roughly 10% of back pain in adolescents.<sup>2</sup> Discogenic pain is caused by the herniation of an intervertebral disk and subsequent impingement on either a central or peripheral nerve. These teens will often present to the office complaining of lumbar spine pain that worsens with bending forward, and may sometimes be accompanied by radiating pain into the hip or thigh.

Unlike muscular or bone-related back pain, which is acute, discogenic pain tends to wax and wane, and does not always follow a typical activity-pain correlation. For this reason, discogenic back pain can persist for months and even years without proper diagnosis or treatment.

The typical patient with adolescent variant discogenic back pain comes to the office complaining of pain with bending forward. Occasionally, nerve impingement symptoms are the cause for concern, as in the patient who

presents with thigh weakness and may also be suffering from undiagnosed lumbar radiculopathy. Discogenic back pain can cause radicular pain into the feet as it does in adults, but in adolescents, radicular pain more commonly stops at the level of the thigh and upper leg.

### **Evaluation and treatment**

The evaluation and treatment of discogenic lumbar spine pain in the adolescent patient begins with a good history. The presence of nerve-related findings on the physical exam, classically a worsening of pain with forward flexion, will confirm clinical suspicions. Straight leg testing, raising the leg to an extended position while the patient is seated at the edge of the examination table, is the best way to identify discogenic pain because straightening the affected leg impinges the nerve root. The diminution of either the patellar or Achilles reflex on the affected side reinforces a preliminary determination that the pain is nerve-related.

Radiographs are important. Generally, AP and lateral views of the lumbar spine are sufficient to show any underlying bone causes of discogenic back pain. The classic finding is spondylolisthesis, in which slippage of the vertebra weakens the disk, mak-

### **Keys to Diagnosis and Treatment of Discogenic Back Pain**

- 1) Have a proper index of suspicion if evaluation reveals pain with forward flexion and radicular pain
- 2) Rule out underlying spondylolisthesis with x-rays.
- 3) Initial management is nonsurgical. Refer the patient for physical therapy and also to a sports-oriented pediatric orthopedist.

ing it prone to herniation and nerve root impingement. In higher grades of spondylolisthesis, the spinal canal can become narrowed by the vertebrae themselves, causing unremitting radicular pain.

Physical findings are corroborated via MRI, the gold standard for diagnosis. Imaging will show bone, nerve, and disc. MRI is used in combination with physical exam and x-ray findings to chart the best course for treatment. In adolescents, the first step is generally physical therapy to strengthen the core abdominal musculature. Bed rest is no longer recommended. Occasionally, a temporary back brace is used to augment core stability during the strengthening phase. If this treatment fails, epidural spinal injection of steroids at the level of the disk herniation has been used with moderate success. If this fails, surgical microdiscectomy, in which the surgeon removes a little piece of the disk, is the surgical treatment of choice for most adolescents. It must be stressed, however, that the vast majority of adolescents will not require surgery.

## **LESS COMMON CAUSES OF BACK PAIN**

### **Neoplasm-related back pain**

Back pain can result from bone tumors. A significant aspect of bone pain caused by neoplasm is that it does not seem to worsen after activity. Instead, the pain is constant and worsens at night. When adolescents complain of back pain that awakens them from sleep, neoplasm should be strongly suspected. These patients should be evaluated with both radiographs and an MRI of the spine, as x-rays alone may miss a lesion. Only an MRI is fully diagnostic for neoplastic disease.

An extremely common neoplasm in the adolescent age group is osteoid osteoma, a small, benign tumor that appears in the second decade of life,

hurts more at night than during the day, and most often occurs in the femur, tibia, extremities, and lumbar spine. The pain from osteoid osteoma initially responds well to nonsteroidal anti-inflammatory drugs (NSAIDs); a history of night pain that is successfully treated with NSAIDs should raise clinical suspicion for this entity.

Neoplastic disease should be considered when the history and symptomatology do not fit any of the classic patterns and the patient's condition does not improve over time. There are a number of uncommon tumors and cysts of the spinal canal and extraspinal area that may be present. Although MRI evidence is diagnostic, not all MRIs are equally reliable. When symptoms persist over 6 to 8 weeks, fit no pattern, and worsen at night, consider referral to a specialist.

### **Systemic causes**

Systemic causes, such as infectious or rheumatologic diseases should be suspected when the history is unclear, there is no trauma, the pain is not consistent with the physical examination, and systemic symptoms such as fever or fatigue are present. Pain can occur with all activities and may not be limited to the back. The intensity of the pain experience may seem to be out of proportion to the physical examination. Listen for reports of pain in multiple joints and the extremities; these patients are typically referred either to a pediatric rheumatologist or infectious disease specialist.

X-ray may reveal inflammation. Laboratory tests should include CBC with differential, erythrocyte sedimentation rate, HLA B27, and C-reactive protein. Consider screening patients who live in or travel to areas endemic for Lyme disease. Results may show elevated HLA B27, indicating possible spondyloarthropathy, which is the most common systemic cause of back

pain. Spondyloarthropathy is signaled by sacroiliitis, or inflammation of the sacroiliac space, and peripheral arthritis, often in the lower extremity.

## **CONCLUSION**

With a proper history, physical exam, and testing, diagnosis of adolescent patients with back pain can be accomplished efficiently. Successful treatment will be rewarding for both the patient and pediatrician.

## **ACKNOWLEDGEMENT**

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## A Note from the Editor

*Adolescent Health Update*, now in its 17th year of publication, seeks to provide useful clinical tools for office-based care of adolescents. Our goals are to enhance the general pediatrician's ability to care for adolescents and to share our enthusiasm for working with these patients.

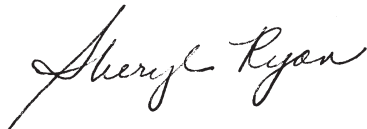
The Nestlé Nutrition Institute™ has sponsored *Adolescent Health Update* for more than 2 years now. Their generous educational grant has enabled us to continue to pursue our mission. We greatly appreciate Nestlé's commitment to the Academy.

This summer and fall marked a number of transitions within our editorial and advisory boards and the greater AAP leadership. We bid farewell to Paula K. Braverman, MD, FAAP who has completed two 3-year terms on our editorial board. It has been a true pleasure working with Paula. We will miss her commitment, expertise, and unfailing sense of humor. With Paula's departure, we welcome our newest editorial board member, Patricia K. Kokotailo, MD, FAAP. Dr. Kokotailo is an associate professor of pediatrics and head of the adolescent medicine division, University of Wisconsin-Madison Medical School. Pat, who is also a member of the AAP Committee on Substance Abuse, brings a wealth of experience in clinical issues and resident education.

Our editorial advisory board is comprised of six general pediatricians who contribute to long-range planning and critique manuscripts in development. We will miss the unfailingly thoughtful comments of David Y. Rainey, MD, FAAP, who has completed his 6-year term on the advisory board. At the same time, we welcome to our advisory board Paul Neary, MD, FAAP, a clinical associate professor of pediatrics at the University of Wisconsin-Madison Medical School who maintains a private practice in Fort Atkinson, Wisconsin.

Finally, we marked a major transition at the executive level of the Academy with the recent retirement of Executive Director Joe Sanders, MD, FAAP. Dr. Sanders, an adolescent medicine specialist, was a founding member of our editorial board. His contributions to this publication and support of its mission have meant a great deal to us.

The reader's satisfaction is the measure of success of any publication. We plan to do our best to continue to satisfy the interests and needs of general pediatricians who care for adolescents. You can help us by sharing any ideas you might have for topics and format. If you have any thoughts to share about *Adolescent Health Update*, please do write to us at [adolhealth@aap.org](mailto:adolhealth@aap.org).



Sheryl A. Ryan, MD, FAAP  
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### Adolescent Health Update

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