Later school start times and Zzzs to A's

A growing body of evidence demonstrates that growing bodies benefit from more sleep. When districts push back the start of the school day, good things happen.

August 23, 2010 | By Emily Sohn, Special to the Los Angeles Times

As summer winds down, another new school year brings fresh notebooks, sharp pencils and — for many kids — a new cycle of sleep deprivation.

With classes that start as early as 7 a.m. and buses that pull up long before sunrise, some 80% of American kids in grades 6 through 12 are falling short of sleep recommendations during the school year, according to research by the National Sleep Foundation, a sleep advocacy group.

Overtired kids, studies suggest, struggle with depression. They gain weight and get in more car accidents. Their grades suffer. And many turn to caffeine, with questionable results for productivity and unknown effects on the development of young brains.

Now, fueled by accumulating research showing that adolescent bodies are designed to sleep late and that delaying school start times — even by just 30 minutes — makes a huge difference in how well teens feel and perform, an increasing number of schools around the country are ringing morning bells later than they used to. Many more are thinking about it.

At the same time, however, there are strong pockets of resistance to change from administrators and parents who think that bus schedules will get too complicated, that starting later will interfere with after-school programs or that kids simply will stay up later if they know they can sleep in a little more.

Despite the inconveniences involved in district-wide changes, sleep researchers emphasize the need to view sleep, like food and exercise, as a pillar of health. "There are all these other things we do to ensure success for our kids, and getting them to have adequate sleep is probably one of the most important things you can do," says Judith Owens, a sleep researcher at Brown Medical School in Providence, R.I. "Parents need to take this as seriously as eating right, using seatbelts and putting on sunscreen."

Minnesota study

One of the first, longest-lasting and most influential teen sleep experiments started in Minnesota in the mid-1990s. Around that time, Minneapolis high schools shifted start times from 7:15 to 8:40. The nearby suburb of Edina shifted from 7:25 to 8:30.

Even though the two districts couldn't be more different on scales of race, socioeconomics and other factors, results in both places appeared immediately, says Kyla Wahlstrom, director of the Center for Applied Research and Educational Improvement at the University of Minnesota, Twin Cities.

Students were noticeably more alert in the first two periods of the day. The cafeteria was calmer. There were fewer fights in the halls. Students, who were now getting nearly an hour more sleep each night, said they felt less depressed. They were raising their hands instead of falling asleep at their desks. Even parents thought their kids were easier to live with.

Over time, Wahlstrom and colleagues documented, students started getting better grades on homework and quizzes. Schools reported lower tardiness rates. Attendance rates went up. Graduation rates improved.

"We found clear evidence of more kids staying in school and not dropping out," Wahlstrom says. "Every group — principals, teachers, parents and kids — had something to say about it."

Since then, reports from places such as Brazil, Israel and Rhode Island have turned up similar trends. Even small changes in school start times appear to make big differences.

In one of the most recent studies, published last month in the Archives of Pediatric & Adolescent Medicine, Owens and colleagues found that, after a change in start time from 8 to 8:30 a.m., students at a small, private New England high school reported fewer depressed feelings (a shift from 65.8% to 45%), better moods (from 84% reporting irritated and annoyed feelings to 62.6%); and less sleepiness during the day. (Before the shift, 69.1% of students said they rarely or never got a good night's sleep compared with 33.7% after the shift, for example.)

Class attendance improved: Teacher-reported first-class absence and tardiness rates dropped by 45%. Fewer students visited the health center (15.3% of students to 4.6% of students).

"Virtually every single parameter we looked at changed in the positive direction," Owens says. "We still saw substantial percentages of students reporting daytime sleepiness and depression. It wasn't a panacea. But there was a really dramatic improvement in everything."

Sleep seems to beget sleep, the study suggested. Even though the new schedule started just 30 minutes later, students actually went to bed 15 minutes earlier and got 45 more minutes of sleep each day. When interviewed, kids said they felt so much better from even a little bit of extra sleep that they were motivated to go to bed sooner and sleep even more. Owens suspects that the extra sleep also helped them get their homework done more efficiently, affording them extra time in the evening to wind down and get to bed.
"These kids get into a vicious cycle of being exhausted, taking five hours to do three hours of homework and having to stay up later to get it done," she says. "As they're getting less sleep, they have to stay up later and they get even more tired."

The melatonin shift

Blame biology — not laziness — for making teens push the snooze button over and over again. As kids approach puberty, scientists now know, there is a two-hour shift in when their bodies release melatonin, the hormone that causes sleepiness. As a result, teens and preteens find it impossible to fall asleep until about 11 p.m., even if they try to go to bed earlier. Yet teenagers still need an average of 9.25 hours of slumber each night.

On top of the shift in natural sleeping and waking times, Owens says, there is also a delay in when a severe dip in alertness occurs during the early morning hours. In adults, this low point hits between 3 a.m. and 5 a.m.; in adolescents, it falls between about 5 a.m. and 7 a.m. That means that, while their alarm clocks are telling teens to get out of bed and demanding that their brains perform, their bodies are screaming at them to keep sleeping.

"There's no doubt that schools starting before 8 or 8:15 are too early if you just do the simple math," says Amy Wolfson, who studies adolescent sleep at the College of the Holy Cross in Worcester, Mass. "You're not going to speak to anyone in my field who is going to say they think starting at 7:15 makes any sense at all."

And it's not just high school students who suffer from alarm clocks that blare at what feel like ungodly hours, Wolfson says. The melatonin shift may happen as early as age 10 or 11.

In a 2007 study in the journal Behavioral Sleep Medicine, Wolfson and colleagues found that middle school students in urban New England whose schools started at 7:15 were getting much less sleep, exhibiting more behavior problems and were tardy four times as often as kids who started school at 8:37. The eighth-graders at the earlier-starting school also got worse grades than their peers who slept more. (In this study, and others like it, researchers make sure that comparison schools are similar in size, socioeconomics, race and other factors that could affect outcomes.)

On average, sixth-graders get 8.4 hours of sleep on school nights, according to the 2006 report on adolescent sleep habits by the National Sleep Foundation. High school seniors get just 6.9 hours.

In addition to the mood, behavior and learning issues, scientists are starting to uncover more subtle ways that such chronic sleep loss can hurt kids. Some studies, for example, show that sleep deprivation compromises the immune system. Others suggest that, with too little sleep, the body releases higher levels of hormones that induce hunger, possibly contributing to growing rates of obesity.

Tired teens may also be more vulnerable to falling asleep at the wheel. In two studies — one out of Kentucky published in 2008 and one done in Virginia that was presented at a sleep meeting earlier this year — scientists linked early high school start times with higher rates of car accidents. (In the Virginia study, there were 65.4 car crashes for every 1,000 teen drivers in the city with an early start time and 46.2 per 1,000 in a neighboring city with a later start time — a difference of 40%.)

To stay awake, young people often turn to coffee, soda, energy drinks and other caffeinated beverages. In a public high school in Massachusetts, 95% of polled students reported drinking caffeine in the prior two weeks, mostly in the form of soda and most often in the afternoon and evening, Wolfson and a colleague reported in June in the journal Health Education and Behavior.

There are no published guidelines for how much caffeine is too much for adolescents, Wolfson says, but the substance stays in the body for up to five hours. Even if caffeinated kids manage to fall asleep, caffeine worsens the quality of their sleep. Finally, no one knows how caffeine might affect developing brains — although plenty of experts are concerned about the link between sugar in soda and weight gain.

Schools respond

As the sleep research piles up, a growing number of schools are moving toward later start times. No one has kept track of how many schools have made the change. But experts say they are fielding a growing number of calls from districts around the country asking for advice about whether and how to switch to later start times. And this spring, Wolfson says, the Centers for Disease Control and Prevention hosted a meeting of interdisciplinary sleep researchers to talk about school start times and teen sleep deprivation as national health issues.

Since the discussion on school start times began more than a decade ago, not a single district that has moved to later start times has gone back. In districts where schools still start early, sleep experts suggest that students start preparing their bodies for sleep at 10 p.m. by turning off electronics and avoiding the stimulation of social media. They encourage parents and kids to establish a calming bedtime routine that might include a warm bath or a book under lights that aren't too bright. And they advise trying not to go to bed much more than an hour later than normal on weekends: Many teenagers shift their schedules by three or four hours on Friday and Saturday nights, Owens says, essentially creating a weekly battle with jetlag.

Whatever it takes, teenagers need to get enough sleep, says Mary Carskadon, director of sleep research at the E.P. Bradley Hospital at Brown Medical School. During the second decade of life, she says, the brain reorganizes and rewires itself to strengthen signals that matter, retain information and consolidate learning. Much of that happens during sleep.

"The brain is probably going through as rapid development during the adolescent years as it does during the first year of life," Carskadon says. For kids, she adds, "sleep is brain food."

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