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## SPECIAL ARTICLES

# Delaying Middle School and High School Start Times Promotes Student Health and Performance: An American Academy of Sleep Medicine Position Statement

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During adolescence, internal circadian rhythms and biological sleep drive change to result in later sleep and wake times. As a result of these changes, early middle school and high school start times curtail sleep, hamper a student's preparedness to learn, negatively impact physical and mental health, and impair driving safety. Furthermore, a growing body of evidence shows that delaying school start times positively impacts student achievement, health, and safety. Public awareness of the hazards of early school start times and the benefits of later start times are largely unappreciated. As a result, the American Academy of Sleep Medicine is calling on communities, school boards, and educational institutions to implement start times of 8:30 AM or later for middle schools and high schools to ensure that every student arrives at school healthy, awake, alert, and ready to learn.

**Keywords:** health, high school, middle school, performance, student

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The American Academy of Sleep Medicine (AASM) is the leading professional society dedicated to the promotion of sleep health. As the leading voice in the sleep field, the AASM improves sleep health and promotes high-quality, patient-centered care through advocacy, education, strategic research, and practice standards. The AASM has a combined membership of more than 10,000 accredited member sleep centers and individual members, including physicians, scientists, and other health care professionals, many of whom are involved in higher education. The AASM is dedicated to advancing sleep health policy to improve the health and well-being of the general public.

- Adolescent mental health and psychological well-being
- Adolescent driving safety

## POSITION

The AASM asserts that middle school and high school start times should be 8:30 AM or later to support:

- An adequate opportunity for adolescents to obtain sufficient sleep on school nights
- Optimal alertness in the classroom environment to facilitate peak academic performance
- Reduced tardiness and school absences to foster improved opportunities for learning

## DISCUSSION

As children progress into their teenage years, they experience delayed patterns of melatonin secretion and a slower build-up of homeostatic sleep pressure during wakefulness.<sup>1</sup> These changes reflect a delayed circadian rhythm that contributes to later sleep onset and later morning awakening, with teenagers typically struggling to fall asleep before 11:00 PM.<sup>2</sup> The AASM recommends that teenagers 13 to 18 years of age should sleep 8 to 10 hours per 24 hours on a regular basis to promote optimal health, and this recommendation has been endorsed by the American Academy of Pediatrics, Sleep Research Society, and American Association of Sleep Technologists.<sup>3–6</sup> Because sleep onset is not instantaneous, and it is normal to spend some time awake in bed during the sleep period, a teenager who goes to bed at 11:00 PM would need to sleep until 7:30 AM or later in order to obtain sufficient sleep. Early middle school and high school start times work contrary to this change in adolescent circadian physiology and truncate students' sleep

opportunity, resulting in chronic sleep loss.<sup>7</sup> Presently, 68.4% of United States high school students sleep 7 hours or less on school nights, while only 23.2% sleep 8 hours, 6.0% sleep 9 hours, and 2.4% sleep 10 hours or more.<sup>8</sup>

Short sleep in adolescents is associated with poor school performance, obesity, metabolic dysfunction and cardiovascular morbidity, increased depressive symptoms, suicidal ideation, risk-taking behaviors, athletic injuries, and increased motor vehicle accident risk.<sup>9–17</sup> Increased motor vehicle accident risk is particularly concerning because young, novice drivers have a higher crash risk when sleep deprived, and motor vehicle crashes account for 35% of all deaths and 73% of deaths from unintentional injury in teenagers.<sup>18–20</sup>

Importantly, a delay in school start time has beneficial impacts on teenage students. Studies show that implementation of later school start times for adolescents is associated with longer total sleep time, reduced daytime sleepiness, increased engagement in classroom activities, and reduced first-hour tardiness and absences.<sup>7,21–23</sup> Delayed school start times also are associated with reduced depressive symptoms and irritability.<sup>21,22</sup> Reaction time improves, and crash rates decline by 16.5%, following a school start time delay of 60 minutes.<sup>12,13</sup> Extension of sleep time also facilitates behavioral weight loss interventions in adolescents.<sup>24</sup>

While an operational change in school start times does not automatically assure longer sleep durations, this change, coupled with inclusion of relevant and targeted educational materials regarding the importance of sleep into middle school and high school curricula, will help motivate students, teachers, and parents to prioritize sleep and implement healthy sleep practices. This includes a cool, dark, quiet sleep environment; adequate time for 8 to 10 hours of sleep per night; consistent bedtimes and wake times on weekdays and weekends; a regular bedtime routine to cue the body that sleep is imminent; and morning light exposure. Furthermore, the use of sleep-disrupting electronic devices near bedtime or during the night should be avoided, because light emitted from electronic devices, particularly blue wavelengths, can suppress the production of melatonin and contribute to difficulty falling asleep.<sup>25</sup> These practices will benefit the student regardless of school start time.

The compelling rationale for delayed school start times must be conveyed to all stakeholders including students, families, teachers, school administrators, school boards, athletic directors, coaches, and transportation workers. These efforts should focus on the importance of sleep for health, safety, performance, and student well-being in order to maximize the desired effect of helping adolescents get the sleep they need. Middle school and high school administrators also need to understand the importance of preventing extracurricular activities, including team practices and workouts, from being scheduled before 8:30 AM.

Although adequate sleep duration is necessary, it alone is insufficient to ensure optimal student performance. Good sleep quality, appropriate timing and regularity of sleep, and the effective treatment of sleep disorders also are essential. Parents of students who are experiencing extreme difficulty awakening to arrive at school on time, or who experience significant

daytime sleepiness, should consider scheduling a consultation with the adolescent's primary care provider or a sleep medicine specialist to evaluate for a sleep disorder, regardless of the student's school start time.

## CONCLUSIONS

Every middle school and high school student deserves the opportunity to start school awake, alert, and ready to learn. The benefits of later school start times have gained attention in recent years in the eyes of the public, school boards, educators, researchers, and physician organizations.<sup>26</sup> However, there are substantial gaps between published scientific knowledge and public awareness of the untoward consequences of early start times and, conversely, the important benefits of later start times. Based on the available evidence, the AASM calls on primary academic institutions, school boards, parents, and policy makers to raise public awareness and improve education in order to promote a national standard of middle school and high school start times of 8:30 AM or later. The AASM also encourages a collaborative and participatory approach among all stakeholders to support school boards as they overcome a variety of real and perceived barriers to the implementation of delayed school start times.

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## DISCLOSURE STATEMENT

The authors comprise the 2016–2017 board of directors of the American Academy of Sleep Medicine, with the exception of Dr. Wise, who completed his term on the board in June 2016.