

THE SCIENCE BEHIND CHANGING SCHOOL START TIMES

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Adolescent Sleep Needs

- Adolescents have a *biological need* of 8.5 to 9.25 hours of sleep per night
- In the United States, almost 75% of adolescents get *7 hours or less* per night
- Sleep is not an optional luxury, but is essential for health, development, and well-being

The Circadian Rhythm (or Internal Clock)

- The circadian rhythm helps to regulate our sleep-wake cycle, but because it runs on a slightly more than 24 hour cycle in humans, we use external cues to keep our clock in rhythm
- The strongest cue for the circadian rhythm is the light-dark cycle
 - Darkness cues the brain to release melatonin which prepares the body for sleep
 - Light suppresses melatonin, helping us to wake in the morning
- During puberty, the timing of the melatonin release is delayed by 1-2 hours for most adolescents
 - ***The biological delay in melatonin onset makes it difficult for adolescents to fall asleep early enough to wake in time for an early school start time***

Insufficient Sleep Impacts All Aspects of Functioning

- Mood and affect
- Behavior problems, including non-compliance, hyperactivity, aggression, poor impulse control
- Neurocognitive deficits, including problems with attention, memory, and executive functioning
- Weight gain

Signs of Insufficient Sleep

- Needing to be awakened in the morning by more than one alarm
- Sleeping 2 or more extra hours on weekends or holidays
- Falling asleep in school or other inappropriate places (e.g., birthday parties, sporting events)
- Behavior or mood change following a night of insufficient or poor quality sleep

Multiple Studies Have Demonstrated the Benefit of Changing to a Later School Start Time

- Students get more than 8 hours of sleep per night
- Better academic outcomes and higher graduation rates
- Better attendance rates and reduced tardiness
- Less depression, reduced caffeine use, fewer car crashes, and less frequent drowsy driving

Recommendation to Start Middle/High Schools No Earlier than 8:30 a.m. From:

- American Academy of Pediatrics, Centers for Disease Control and Prevention, American Medical Association, American Academy of Sleep Medicine, American Academy of Child and Adolescent Psychiatrists, American Psychological Association, American Thoracic Society
- National Education Association, National Parent Teacher Association, National Association of School Nurses

Take Home Message

- Sleep is essential for learning, mood, behavior and health
- Adolescents are significantly sleep deprived, with school start times as one of the strongest contributing factors
- **Changing start times is not coddling students, but setting them up for success in life**

What About Elementary School Students? Won't Starting Earlier Cause Them to Get Less Sleep?

- One study prospectively examined this, finding earlier bedtimes and wake times, with small changes to sleep duration (decrease 4-9 min/night for 4th/5th graders, increase 24 min/night for 3rd graders)
- Minneapolis School District used focus groups to examine impact
 - Students were more alert at start of day, and remained energized throughout the day
 - Students had fewer morning transitions and were ready to learn
 - Teachers and students were more patient and productive in the afternoon
 - Fewer behavior problems reported
 - Increased participation in school activities
 - Buses were on time at the start and end of each day

Why Can Elementary Students Start Earlier Than Middle or High School Students?

- The biological delay in melatonin onset does not occur until puberty, between the ages of 11 and 13
- Thus younger students are able to fall asleep earlier, allowing them to obtain sufficient sleep for an earlier start time

Cherry Creek School District (CCSD): Using Data to Make Changes and Evaluate Outcomes

- The CCSD engaged in an 18 month process prior to changing school start times
 - District engaged teachers, students, parents in community meetings
 - Conducted survey of staff, students, parents with almost 25,000 responses
 - For 2017-2018 school year the following changes were implemented:
 - ES: 9:00 a.m. → 8:00 a.m.; MS: 7:50-8:10 a.m. → 8:50 a.m.; HS: 7:10 a.m. → 8:20 a.m.
- 360 degree evaluation of outcomes that includes:
 - (1) pre-post quantitative surveys of students, parents, teachers/staff/transportation employees
 - (2) cohort with parent consent to link survey data year-over-year, as well as to district-level data
 - (3) qualitative focus groups with students, parents, teachers, coaches, before/after care staff, nurses
 - (4) district-level data (i.e., attendance, tardy, test scores)
 - (5) school nurse visits (time of day, presenting problems)
 - (6) biennial anonymous surveys of health and risk behavior
 - (7) community data from Colorado Department of Transportation and local law enforcement