



What the research says about **ELEMENTARY SCHOOL START TIMES**

WHY THINK ABOUT RESEARCH ON ELEMENTARY SCHOOL START TIMES?

The American Academy of Pediatrics in 2014 (AAP 2014 in Meltzer 2017) recommended that adolescents should not start school before 8:30 am based on sleep research demonstrating that adolescents are in a stage of development where their circadian rhythms require 8.5/ 9.5 hours of sleep per night and the high quality sleep happens at times that conflict with school start times prior to 8:30 am. Currently 1 in five middle and high school students nationally (U.S.) have changed to later start times for adolescents based on this AAP recommendation. Troxel (2017) contends that “there is no compelling evidence to suggest why elementary school-age children would be adversely affected by early school start times, given that they do not experience the circadian phase delay that is specific to adolescents.”

However, Troxel is not opposed to the study of the impact of school start times on elementary school students. As an editor of the Journal of the National Sleep Foundation Troxel, et al (2017) is calling for studies to be conducted regarding sleep, start times and elementary school students. There are three studies out of the University of Kentucky which directly study the pre and post effects of later school start times on elementary school student academics and behavior (Smith 2014) (American Psychological Association 2014) (Keller 2017). Troxel recognizes these but says they are not enough.

Troxel (2017) recommends reading the case study as a “how-to”. Meltzer (2017) summarizes a case study of how to conduct and implement wide school school start time changes in a big district.

HOW ARE START TIMES DEFINED AND MEASURED?

Sleep habits are measured in terms of self-reported answers on surveys by students, including in the University of KY studies which are the elementary school age studies. These survey responses are then correlated with student behavior measures, attendance rates and standardized test scores.

COMMON PRACTICE OF CONCERN REGARDING SCHOOL START TIMES:

“Many studies cited concerns that school start times are being changed for the middle and high school students at the expense of elementary school start times which are being shifted to times as early as 7:15 a.m.

PRACTICAL TOOLS AND RESOURCES

- https://www.educationworld.com/a_admin/admin/admin314.shtml
- <https://www.nhsd.org/cms/lib/PA01001961/Centricity/Domain/4/SST%20Best%20Practices.pdf>
A very thorough 2017 report prepared by a professional consulting firm for Buck’s County describing best practices for districts/schools considering new school start times.
- http://www.asd103.org/for_students_and_families/school_start_times_discussion
Website for a school district which is moving to different school start times. Does a nice job of summarizing the community engagement process and the foundational science in a way a district will need to if proposing to go this direction.
- School Start Time Study Final Report Summary (<https://conservancy.umn.edu/handle/11299/180352>)
This is a summary report on the Kyla Wahlstrom research (University of MN - Twin Cities) which was at the forefront of the intersection of sleep health and school start time policy

ANNOTATED SOURCE CITATIONS

Appleman, E. R., Gilbert, K. S., & Au, R. (2015). School start time changes and sleep patterns in elementary school students. *Sleep Health, 1*(2), 109–114. <https://doi.org/10.1016/j.sleh.2015.02.004>

- Study: Surveyed the sleep patterns in elementary school students before and after district-wide change.”
- Design: Students Grades 3-5 completed a self-administered sleep survey in the spring of 2009 BEFORE the change in school start time (from 8:20 to 7:45 am for grades 4,5) and again in 2010 AFTER school start time was switched (from 8:20 AM to 7:45 a.m.for grades 4,5) Grade 3 students changed from 9:10 a.m to 7:45 a.m. start time.
- RESULTS: “School start time change did NOT decrease total amount of sleep. This is the first of its kind to report on the effects of a start time change in elementary school students.”

Bowers, J. M., & Moyer, A. (2019). Effects of school start time on students’ sleep duration, daytime sleepiness, and attendance: a meta-analysis. *Sleep Health 3*(6), 423–431. <https://doi.org/10.1016/j.sleh.2017.08.004>

- OBJECTIVE/METHOD: This is a meta-analysis examining the effects of school start times (SST) on sleep duration of students by aggregating the results of five longitudinal studies and 15 cross-sectional comparison group studies. Of the schools in the studies that are included in the meta-analyses, 3 are Elementary Schools and 4 are Middle Schools were included, the remainder were High Schools (13).
- WHY? Many children do not meet recommended sleep guidelines. Recommendations by the National Sleep Foundation for 12-13 yr. Olds = 9 to 11 hours of sleep. Article does not cite recommendations for younger children.
- RESULTS: Later School Start Times were associated with longer sleep durations. Less daytime sleepiness in 7 studies. Tardiness to school in 3 studies. Delaying School Start Times is associated with benefits for students’ sleep and, thus, their general well-being. Need more studies.

Dexter, D., Bijwadia, J., Schilling, D., & Applebaugh, G. (2003). Sleep, Sleepiness and School Start Times: A Preliminary Study. *Wisconsin Medical Journal, 102*(1), 44–47.

- High School Study

Eds. (2014) Early Elementary School Start Times Tougher on Economically Advantaged Children. *The Education Digest*. American Psychological Association.

- Hypotheses of these researchers at the U of Kentucky: “school start times would be associated with lower standardized test scores, poorer attendance, more students being left back, lower school rank, and school underperformance... that risky start times would be especially risky for more disadvantaged schools, including Appalachian schools and those with a higher percentage [of FRL students]”
- BUT Found: “Middle and Upper class (those districts with lower FRL counts) elementary school students in Kentucky demonstrated worse academic performance when required to start classes early compared with peers whose school day started later, according to the American Psychological Association.” and “Higher rates of students repeating grades in schools with later start times; Every additional minute later a school started increased retention rates by 0.2%”
- Methods: 718 public elementary schools; Looked at student performance on standardized tests on math, science, social studies and writing
- Conclude: “Delaying middle and high school start times at the expense of making elementary school start times earlier might be a bad idea; our findings suggest that these policy changes may simply be shifting the problem from adolescents to younger children.



- Harlow, T. (21 Mar 2018). Edina School Start Times Are Changing//Two Middle Schools, Five Elementary Schools Swap. *Star Tribune*, p. 1B.
- LOCAL Story. After an 18-month study, the Edina school Board voted 5-2 to approve later school start times for middle school students (9:20 a.m. - 4:05 p.m.) and earlier school start times for elementary school students (7:50 am - 2:25 pm)
- Heissel, J. A., Norris, S., Heissel, J. A., & Norris, S. (2018). Rise and Shine : The Effect of School Start Times on Academic Performance from Childhood through Puberty, 53(4), 957–992. <https://doi.org/10.3368/jhr.53.4.0815-7346R1>
- High School Study that “Analyzes the effect of school start time on academic performance.”
 - FINDING: Moving start times one hour later relative to sunrise increases test scores by .08 and .06 standard deviations for adolescents in math and reading, respectively.
- Keller, P. S., Gilbert, L. R., Haak, E. A., Bi, S., & Smith, O. A. (2017). Earlier school start times are associated with higher rates of behavioral problems in elementary schools. *Sleep Health*, 3(2), 113–118. <https://doi.org/10.1016/j.sleh.2017.01.004>
- Key study that is specific to Elementary age (ages 5-12) early school start time. An empirical study which “examines the potential implications for early school start times for behavioral problems in public elementary schools in Kentucky.”
 - Observed associations between early school start time and greater behavioral problems (defined as harassment, in-school removals, suspensions, and expulsions). Some findings only applicable for schools serving non-Appalachian region.
- Keller, P. S., Gilbert, L. R., Haak, E. A., Bi, S., & Smith, O. A. (2017). Response to Troxel commentary: further evidence that school start times are associated with behavioral problems in elementary schools. *Sleep Health*, 3(4), 228–230. <https://doi.org/10.1016/j.sleh.2017.05.002>
- This is a COMMENTARY response to Troxel commentary (see below). Defends the Keller study (2017, see above) which does a cross-sectional study of the impact of early start times on elementary students in 718 schools which is more schools than any other study on ANY school start times (including adolescent age school start time studies). Points out that there are NO studies out there on school start times that have applied an experimental method because such an approach is not feasible. Clarifies that elementary schools in the study which included sixth grade were excluded from the Keller (2017) study.
- Madison School District considers changes to elementary and middle school start times. (2017, October 3). UWIRE Text, pp. 7–8.
- Madison currently has 12 “early start elementary schools” starting between 7:35 am and 7:45 am. Considering looking to moving elementarys to start times between 8:00 am and 8:45 a.m. 2016 survey of parents indicated that “70 % of middle school parents, staff and students supported a later time. Elementary school parent committee proposed a schedule of 9:15 a.m. to 4:17 p.m. District Official concerns include increase to cost of transportation and scarcity of bus drivers
- Meltzer, L. J., McNally, J., Plog, A. E., & Siegfried, S. A. (2017). Engaging the community in the process of changing school start times : experience of the Cherry Creek School District. *Sleep Health* 3(6), 472–478. <https://doi.org/10.1016/j.sleh.2017.08.005>
- 2014 American Academy of Pediatrics (AAP) “recommended middle and high school start no earlier than 8:30 m allowing student the opportunity for 8.5-9.5 hours sleep per night. These sleep practices are correlated with increased attendance and graduate rates, fewer tardies and increased GPA fewer students falling asleep in class, improved health outcomes and fewer auto crashes.” Even though studies (mostly referring to adolescent studies) are showing that later school start times are better for the health of students, many school districts do



not change start times due to “concerns about transportation, child care, and athletics/extracurriculars”. This is a case study of the Cherry Creek School District’s (CCSD, in Denver, CO) successful efforts to change start times which included: community engagement through meetings and a large survey of parents, teachers and students (n=24,574), online feedback, and an iterative project through each stage

- Lessons learned include: Change is not always welcome and facts alone were not enough to convince the community. While the district remained steadfast that school start times would need to move to later, healthier start times, they needed to be flexible in what that looked like based on the feedback received from the community.
- Cited sources from other districts which have gone to earlier start times in the states of KY, AR and MN).
- Outcome of the process: Elementary School 7:55 am -2:40 pm; High School 8:15 am -3:30 pm; Middle School 8:50 am - 3:45 pm
- Superintendent comments: “It would be negligent to NOT make the changes given the overwhelmingly clear [sleep] science”; Recognition that although changes will have a significant impact on many families routines, there is not a single schedule that works for every family. This proposal was made in the best interest of student learning; while 70% of students participate in athletics, activities and work, 100% of students are involved in academics.

Miller, Y. (2017, December 14). New school start times spark angry response. *The Boston Banner*, p. 1,14.

- Newspaper article about parents in Boston angry over change of school start time for elementary schools to 7:15 a.m. so that high schools could start after 8:30 am per AAP 2014 recommendations

Millman, R. P., Boergers, J., & Owens, J. (2020). Healthy School Start Times : Can We Do a Better Job in Reaching Our Goals?, 39(2), 12–14. <https://doi.org/10.5665/sleep.5422>

- Analytical commentary suggesting that changing start times may not be enough, even for adolescents, to change their sleep habits. Cites a study which showed that sleep patterns of students in a district which went to later start times, returned to pre start time levels after two months on the later start time schedule.

Smith, O. A., Buckhalt, J. A., Bi, S., Keller, P. S., Haak, E. A., & Gilbert, L. R. (2014). Earlier school start times as a risk factor for poor school performance: An examination of public elementary schools in the commonwealth of Kentucky. *Journal of Educational Psychology*, 107(1), 236–245. <https://doi.org/10.1037/a0037195>

- A study which “examines the potential implications of early school start times for standardized test scores in public elementary schools in Kentucky.” “Associations between early school start time and poorer school performance were observed primarily for schools serving FEW students who qualify for free or reduced-cost lunches. Study controlled for teacher-student ratio, racial composition and whether the school was in the Appalachian region.”

Troxel, W.; Wolfson, A. (2017). The intersection between sleep science and policy : Introduction to the special issue on school start times. *Sleep Health: Journal of the National Sleep Foundation*. 3(2017), 419–422. <https://doi.org/10.1016/j.sleh.2017.10.001>

- A summary of the research on the intersection between school start time policy and sleep health. Cites most of the articles in this summary. Cites Wahlstrom’s (U of M) study and Edina’s implementation of later start times for high schools students in 1996-7. Contends that from a developmental and physiological perspective, there is no compelling evidence to suggest why elementary school-age children would be adversely affected by early school start times, given that they do not experience the circadian phase delay that is specific to adolescents.

Valentine, D. (2012). BEFORE THE FIRST BELL; As many school start-times change, before-school care programs get busy. *Tampa Bay Times*, pp. 1–2.

- Short newspaper article which describes the Tampa Bay area spike in before school care enrollment and cost for parents due to the change in school start times.



Troxel, W., Wolfson, A., & Wolfson, A. (2017). Sleep science and policy : a focus on school start times. *Sleep Health: Journal of the National Sleep Foundation*. Edited by Troxel, W. and Wolfson, A. *SLEH*, 2(3), 186. <https://doi.org/10.1016/j.sleh.2016.07.001>

- Calls for more research on the connection between school start times and sleep health; identifies specific questions they want answered

Wheaton, A., Chapman, D., & Croft, J. (2015). School Start Times, Sleep, Behavioral, Health, and Academic Outcomes: A Review of the Literature. *Journal of School Health*, 86(5), 363–381.

- “Insufficient sleep in adolescents has been shown to be associated with a wide variety of adverse outcomes, from poor mental and physical health to behavioral problems and lower academic grades. However, most high school students do not get sufficient sleep. Delaying school start times for adolescents has been proposed as a policy change to address insufficient sleep in this population and potentially to improve students’ academic performance, reduce engagement in risk behaviors, and improve health.
- METHODS: This article reviews 38 reports examining the association between school start times, sleep, and other outcomes among adolescent students.
- RESULTS: Most studies reviewed provide evidence that delaying school start time increases weeknight sleep duration among adolescents, primarily by delaying rise times. Most of the studies saw a significant increase in sleep duration even with relatively small delays in start times of half an hour or so. Later start times also generally correspond to improved attendance, less tardiness, less falling asleep in class, better grades, and fewer motor vehicle crashes.
- CONCLUSIONS: Although additional research is necessary, research results that are already available should be disseminated to stakeholders to enable the development of evidence-based school policies.”