Sleep Health 3 (2017) 472–478

Contents lists available at ScienceDirect

Sleep Health

Journal of the National Sleep Foundation

journal homepage: sleephealthjournal.org

Engaging the community in the process of changing school start times: experience of the Cherry Creek School District

Lisa J. Meltzer, PhD [a,*], Janise McNally, EdS [b], Amy E. Plog, PhD [b], Scott A. Siegfried, PhD [b]

[a] National Jewish Health, Denver, CO
[b] Cherry Creek School District, Greenwood Village, CO

ARTICLE INFO

Article history:
Received 3 June 2017
Received in revised form 31 July 2017
Accepted 15 August 2017

Keywords:
School start times
Community
Engagement
Stakeholders
Sleep

ABSTRACT

Despite growing evidence of the positive impact of later school start times on adolescent health and academic outcomes, relatively few districts have changed start times due to concerns about transportation, child care, and athletics/extracurricular activities. This paper provides a case study of the Cherry Creek School District's (CCSD) successful efforts to change start times. The CCSD is a diverse district with an enrollment of almost 55,000 students in suburban Denver. As part of CCSD's strategic plan, a multidisciplinary task force was formed to examine the impact of start times on student achievement, and recommend a start time schedule driven by best practices on adolescent sleep patterns, balanced with family and community needs. Over 18 months the task force's work included engaging the community through meetings, as well as conducting a large survey (n = 24,574) of parents, teachers, and students, and gathering online feedback. An iterative process utilized feedback at every stage to refine the final recommendation given to the Board of Education. Survey results, implementation considerations, outcome evaluation plans, and lessons learned are discussed.

Introduction

Insufficient sleep in children and adolescents is common, negatively impacting cognitive functioning, emotion regulation, and health.[1–8] Sleep requirements do not significantly change throughout middle childhood and adolescence, but sleep duration is significantly reduced, with high school seniors commonly obtaining less than 7 hours of sleep per night.[9,10] One factor that contributes to insufficient sleep in older children and adolescents is the intersection between delayed bedtimes and early school start times.[11–18] While many argue that adolescents simply need to turn off technology and go to bed earlier, studies show a biological shift in the timing of melatonin release during puberty.[17,19,20]

In 2014, the American Academy of Pediatrics (AAP) recommended middle and high schools start no earlier than 8:30 AM, allowing students the opportunity for 8.5 to 9.5 hours of sleep per night.[21] This recommendation was based on growing evidence that changing start times results in increased sleep duration and decreased sleepiness,[11,13,16,22–25] increased attendance and graduation rates,[16,26] fewer tardies and increased GPA,[16,25] fewer students falling asleep in class,[16,24,25] improved health outcomes,[16,24] and fewer automobiles crashes.[13,25]

Across the United States, many districts are considering changing start times; however, common concerns (eg, transportation, child care, athletic/extracurricular activities) have limited major policy shifts.[27,28]

Following an extensive process of engaging key stakeholders, including parents and students, Cherry Creek School District's (CCSD) Board of Education voted in March 2017 to change start times beginning August 2017. The purpose of this case study is to describe the CCSD decision-making process, ways the district intends to mitigate common concerns, and plans for outcomes evaluation. Our goal in providing this information is to assist districts considering changing start times.

Case study: The Cherry Creek School District

The Cherry Creek School District (CCSD) is located in the southeast suburbs of Denver, Colorado. During the 2016–2017 school year, CCSD had an enrollment of 54,695 students, serving over 300,000 residents in a 108 square mile area (www.cherrycreekschools.org). The district includes 42 elementary schools (grades K-5), 10 middle

* Corresponding author at: National Jewish Health, 1400 Jackson Street, G311, Denver, CO 80206.
E-mail address: meltzerL@njhealth.org (L.J. Meltzer).

http://dx.doi.org/10.1016/j.sleh.2017.08.005
2352-7218/

schools (grades 6–8), 7 high schools (grades 9–12), 1 magnet school (grades K-8), and 2 charter schools (grades K-8). Student demographics (Table 1) are similar to national averages, and highlight the diversity of CCSD residents. High schools began at 7:10 AM, middle schools between 7:50 and 8:10 AM, and elementary schools at 9:00 AM.

Working committee/task force formation

In January 2015, a committee was formed to examine the impact of start times on student achievement, and recommend a start time schedule driven by best practices on adolescent sleep patterns, balanced with family and community needs. The committee's work was included in the CCSD strategic plan (April 2016), and a formal task force was formed (September 2016). Task force members (Table 2) met regularly to study, review, and identify rationale and constraints regarding an adjustment to start times.

Engaging the community

In person meetings

Starting in the fall of 2016, almost 30 meetings were held with different groups representing school administration, parents, students, staff, and community members. During each meeting information was provided on adolescent sleep and the AAP recommendations. In addition, preliminary recommendations were presented and feedback obtained, allowing for early planning on how to mitigate the most common concerns.

Community survey

A survey was created by the task force and was reviewed and revised based on feedback from early community meetings. The goal of the survey was to seek community input on "tolerance" and "preference" for change. In November 2016 an automated telephone message was sent to all parents/guardians and school-based staff notifying them of the upcoming survey. The next day the survey (Appendix A) was emailed to all parents/guardians (via emails used to register every student Pre-K through 12th grade), to all school-based staff, and to all students in the 8th to 12th grades. Parent surveys were available in both Spanish and Arabic. Survey data were collected by Survey Monkey (San Mateo, CA) and remained open for 10 days. Instructions clearly stated, "the survey is not a vote, but will be used to inform the district's decision making."

Respondents

Surveys were completed by 24,574 individuals (36% response rate). Respondents included 12,862 parents/guardians (33% response rate), 8488 students (40% response rate), and 3224 staff (45% response rate). This response was unprecedented for CCSD, which regularly seeks community input through surveys (eg, changes to standardized testing). There was district-wide representation, and a proportional distribution of parents, students, and staff. The following summarizes some of the key results, with all results (broken down by respondent) presented in Table 3.

Table 1
Demographic Information for Students in the Cherry Creek School District

Demographic	%
American Indian or Alaskan Native	1%
Asian	8%
Black	11%
Native Hawaiian or Pacific Islander	0.2%
White	73%
More than One Race	7%
Hispanic	20%
Free and Reduced Lunch Qualification	29%

Table 2
CCSD Start Times Task Force Members

Position	n
Superintendents	
Associate Superintendent	1
Assistant Superintendent	2
Executive Directors	
High School	1
Middle School	1
Elementary Education	3
Inclusive Excellence	1
Curriculum & Instruction	1
School Principals	
High School	3
Middle School	2
Elementary School	4
Adaptive Programs	1
Program Directors/Coordinators	
Assessment and Evaluation	1
Health and Wellness	1
Research and Data	1
Science	1
Food and Nutrition Services	1
Teachers	
High School	1
Middle School	1
Elementary School	1
Teacher Association President	1
Transportation	
Director	1
Route Planning Manager	1
QA/Personnel Resources Manager	1

Importance of issue

Eighty percent of respondents said it was "Very" or "Relatively Important" to change start times to align with recommendations from the AAP.

Ideal start and end times

Almost two-thirds of respondents (65%) supported a start time for high school students between 8:00 and 8:30 AM, with only 8% of participants supporting a start time of 8:45 AM or later. However, follow-up conversations with parents, students, and staff revealed that many people answered this question based on dismissal time, not start time.

For middle school, 81% of respondents stated the latest reasonable dismissal time was between 3:45 and 4:00 PM. This was consistent regardless of role (parent, staff, student) or level (elementary, middle, high school). Similarly, 78% of respondents stated the latest reasonable dismissal time for elementary schools was between 3:45 and 4:00 PM.

Changes to order and length of school day

Significant support (73%) was found for dismissing elementary or middle schools prior to high schools. However, 57% of respondents stated it was important for older students to be dismissed first to supervise younger students. Upon further review, this response was a result of 76% of students stating this was important, compared to 47% of parents and staff. There was also overwhelming support (approximately 85%) to increase middle school days by up to 20 minutes and elementary school days by up to 15 minutes.

Comments

Respondents had the opportunity to provide comments throughout the survey, with 3685 comments provided. Of these, 40% were supportive of the change, 15% did not want to see a change, and 39% were unrelated to the specific start time questions (ie, homework, block schedules, off periods).

Table 3
Results from Community Survey (Percent of Respondent Group)

	Parents (n = 12,862)	Staff (n = 3224)	Students (n = 8488)
Q2. Level of School			
High School	36.6	36.8	74.4
Middle School	28.7	24.0	25.6
Elementary School	34.8	39.2	
Q4. Importance of Issue			
Very Important	59.7	39.0	54.8
Relatively Important	23.0	30.5	24.1
Neutral	9.8	18.3	13.2
Low Importance	3.2	6.3	3.1
Not Important	4.3	6.0	4.8
Q5. Ideal High School Schedule			
7:45 am – 3:15 pm	22.6	34.0	29.1
8:00 am – 3:30 pm	32.1	30.4	30.9
8:15 am – 3:45 pm	17.4	13.8	15.0
8:30 am – 4:00 pm	19.9	14.1	14.4
8:45 am – 4:15 pm	2.6	2.6	2.9
9:00 am – 4:30 pm	5.4	5.1	7.6
Q6. Latest Middle School Dismissal			
3:45 pm	43.8	42.3	51.5
3:50 pm	10.1	12.1	9.9
3:55 pm	5.8	8.0	5.8
4:00 pm	23.7	19.6	18.8
4:05 pm	1.4	2.4	1.6
4:10 pm	15.2	15.6	12.4
Q7. Latest Elementary School Dismissal			
3:45 pm	50.4	37.8	40.4
3:50 pm	7.5	9.8	9.5
3:55 pm	4.3	6.9	6.5
4:00 pm	22.7	23.7	23.4
4:05 pm	0.9	2.5	1.8
4:10 pm	14.3	19.2	18.4
Q8. Okay to Change Order Schools Start			
No	25.3	24.3	25.8
Yes	74.7	75.7	74.2
Q10. Increase Middle School Up To 20 min			
No	10.5	14.3	19.7
Yes	89.5	85.7	80.3
Q11. Increase Elem. School Up To 15 min			
No	10.5	16.9	18.1
Yes	89.5	83.1	81.9
Q9. Important for Older Students to Dismiss First to Provide Supervision			
No	51.6	52.6	23.6
Yes	48.4	47.7	76.4

Recommendations

Initial recommendation

Based on the work of the task force, community meetings and presentations, and survey results, the initial schedule recommendation was:

Elementary School: 7:55 AM to 2:40 PM
High School: 8:15 AM to 3:30 PM
Middle School: 8:50 AM to 3:45 PM

Although this did not meet the AAP's recommendation of an 8:30 AM start time for high schools, it represented a significant improvement over the current 7:10 AM start.

In January 2017, automated voice and email messages were sent to all households and staff, directing them to the CCSD Start Times website to view an overview of the process, survey results, and the draft recommendations. A 23-day open comment period followed.

There were 31,805 visits to the CCSD Start Times website, with an average of 4.5 minutes spent on the page, and 2067 comments were provided. All feedback was publicly posted on the CCSD Start Times website two days after the comment period closed. In addition to comments supporting the change, multiple questions and concerns were raised, including:

- Elementary start and end times are too early
- What will middle school students do before school starts?
- Impact on sports, jobs, and after school routines
- Daycare – ability to use, cost, does not align with work schedules

Final recommendation and presentation to Board of Education

In February 2017, a two part presentation was made to the CCSD Board of Education. First, a pediatric sleep psychologist presented the science behind changing start times, and outcomes research highlighting the benefits for students of changing start times. Second, the Associate Superintendent (and head of the Start Times Task Force) presented the final recommendation for changing start times:

Elementary School: 8:00 AM to 2:45 PM
High School: 8:20 AM to 3:30 PM
Middle School: 8:50 AM to 3:45 PM

This aligned with sleep science addressing adolescent sleep and circadian rhythm need, along with survey responses supportive of the change in order, the latest acceptable dismissal time for high school, and a middle school end time earlier than the most commonly selected acceptable dismissal times. Notably the recommendation was budget neutral.

Additional self-study on elementary school start times

One of the primary concerns raised at the February meeting was the impact of the proposed change on elementary school students. Because CCSD had a history of starting elementary schools at both 8:00 AM and 9:00 AM, it was possible to compare outcomes for CCSD elementary school students. Additional data were presented to the Board of Education highlighting no differences between these start times for standardized scores on reading and math exams; the percent of elementary students meeting benchmarks in reading, writing, and math; and attendance.

Outcome

In March 2017, the CCSD Board of Education unanimously approved the final recommendation to change start times for the 2017–2018 school year. Among comments made by the Superintendent and board members were: (1) it would be negligent to *not* make the changes given overwhelmingly clear science; (2) recognition that although changes will have a significant impact on many families routines, there is not a single schedule that works for every family; (3) 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.

Implementation considerations

Implementing significant changes in a large school district involves many logistical issues and moving parts; thus, working to mitigate concerns raised during the community engagement process is crucial. In this section, we share implementation considerations that address concerns raised within CCSD.

Transportation

Transportation is one of the most commonly cited reasons why districts are unable to change start times.[28] In CCSD, different transportation options were considered based on each start time scenario,

including having all three levels of students ride on the same bus (supporting a similar start time across levels) or having middle and high school students share buses. When the final determination for start times was made, it allowed for an extremely efficient model of transportation to be developed without adding additional assets.

In the current program, the tiered morning start times (110 minute window) allow for maximum efficiency; however, due to the varying length of day (by level) all schools dismiss within 40 minutes during the afternoon. With elementary schools dismissing last, and utilizing 100% of the district assets, students frequently experience delayed school drop-off times and secondary schools were not able to utilize district buses for activities and athletics.

With the implementation of the new start times and adjustment in the length of the school day a much greater level of efficiency was found. 100% of the district buses will start the day on time for elementary students and then move to high schools that only require two-thirds of the fleet (ie, fewer high school students ride buses due to a longer walk-in distance of 2 miles, as well as increased student drivers, carpooling, and fewer overall students). The district will utilize the unused buses to shorten historically long bus rides and reduce capacity issues for other stops, while some will stage for longer middle school routes. In the afternoon, again starting with elementary students, the district can guarantee on-time status for the youngest students and then move to the high school and middle school routes. Additionally, at the end of the day, district buses will now be available for activities and athletics, saving the cost of chartered buses.

Athletics

From the outset, Athletic Directors were involved in the process of determining changes. In addition, meetings were held with parents of athletes to hear and address their concerns. It was helpful to present the science that shows increased sleep duration contributes to improved athletic performance to both groups and to discuss how other districts that have made changes (eg, Wilton, CT; Edina, MN) have found practice quality improves when students are not sleep deprived.[11,29] Thus, while practices may need to be shortened, there should be no negative impact. Because increased sleep duration is a primary goal of changing start times, it was made clear that any sport not already practicing in the morning would not be allowed to switch practices to before school.

Because of CCSD's size, many athletic events are within district, reducing concerns about students missing school for intra-district competition. However, interdistrict events will still require a small percent of students to miss a handful of classes each semester. When weighed against the fact that *all* students would benefit from increased sleep duration across the school year, this was determined to be a small price to pay for the greater good. Finally, the change in dismissal times means elementary school teachers and more working professionals will be able to coach at the high school level, while later sporting event times will increase the availability of officials.

Middle school students

Middle school parents who work outside the home frequently raised concerns about their child's ability to wake independently in time to catch the morning school bus. To address this concern school cafeterias will open at 8:00 AM (approximately the current start time) and provide supervised breakfast and study hall. An additional FTE will be provided for increased supervision. Due to the size of the middle schools (900–1700 students each) and fixed facilities, staggered lunches between 10:30 AM and 1:30 PM are required. This raised another concern in that lunch time for some students will occur soon after they arrive at school; thus, schools will implement an afternoon snack program for students.

Elementary school students

Similar to other districts where parents of younger children were the most vocal opponents (eg, Wilton, CT; Fayette, KY), the concern of whether this change would negatively impact the sleep duration of elementary school students was also commonly raised.[29,30] Thus we turned to the research to inform the recommendations. Studies have shown an increased or similar sleep duration after changes to elementary school start times, with students also being more alert in the morning.[31,32] Elementary-aged children are also more likely to have an advanced circadian rhythm, waking earlier in the morning and having the ability to go to bed earlier. Further, the readiness to learn research suggests that younger children are more successful earlier in the school day. Finally, the self-study showing no differences in CCSD academic outcomes and attendance for 8:00 AM and 9:00 AM start times was considered.

Another common concern was before and after school child care. To address this, school-based before and after care programs will reduce costs in the morning to account for the shorter duration and provide a tiered pricing structure for early (eg, 4:30 PM) and late (6:00 PM) pick-up times. For high school students who are employed by these programs, their position may be designated as an internship or a mutually assisted learning class, allowing them to leave school early for this purpose. In addition, school activities (eg, choir, art club, chess club) that are currently offered before school will be moved to after school, allowing for an increased number of options for students. Some schools will also be partnering with community groups to offer free or low-cost after-school activities for students.

Outcomes evaluation

While the evidence supporting start time changes for middle and high school students is growing, it is essential to ensure that changes in CCSD provide similar positive outcomes, as well as examine the impact of changes for elementary school students, a significantly understudied group.[28,33] Thus a mixed-method, multi-year evaluation process was designed and implemented through a partnership between CCSD and National Jewish Health, a medical research center in Denver. The outcomes evaluation includes data collection pre-change (spring 2017), and is planned for post-change in spring 2018 and spring 2019 as follows:

1. Quantitative surveys of students, parents, teachers/staff/transportation (described below).
2. District-level data, including attendance, tardiness, and standardized test scores, as well as anonymous surveys of health and risk behavior (measured biannually, including fall 2018 and fall 2020).
3. Linked survey data and district-level data when parental consent provided, as well as linked student and parent survey year-over-year.
4. Qualitative focus groups and surveys to capture aspects of how start times changes impact students, families, and teachers/staff that cannot be measured with a survey (described below).
5. Records from student visits to school nurses. All visits to CCSD school nurses are captured in an electronic medical record. This system was modified in early 2017 to collect data on the frequency of presenting problems related to sleep, including sleepiness and fatigue.

Spring 2017 surveys

Student survey

All students completed a brief survey (available from the authors by request) that was distributed via email to all 3rd through 11th

grade students in April and May 2017. Schools were asked to dedicate time for students to complete these surveys using computers and tablets in classrooms or learning centers. Sleep, mood, and health were measured using items from the Patient Reported Outcomes Measurement Information System (PROMIS, http://www.healthmeasures.net/explore-measurement-systems/promis). These items were developed and validated as self-report measures for children ages 8–17 years, allowing us to compare the same concepts across all grades. Additional items asked about routines/activities, meals, and caffeine use. While the majority of questions were consistent across grades, middle and high school students were asked about circadian preference (morningness/eveningness), and high school students were asked about employment and driving.

Parent survey

The parent survey included parent-proxy items from PROMIS that asked about the child's sleep, mood, and health, as well as questions about routines/activities. Additional questions were included for parents of younger children (K-2nd grades) who served as proxy reporters for their child. Parent-focused questions asked about before/after care for elementary school children and transportation to/from school. Finally, parents answered questions about their own sleep and work schedules.

All parents received an email with an invitation and link to participate in the survey, with several email reminders and one phone call reminder to complete the survey. Parent emails and surveys were available in 10 languages.

Teacher/staff/transport survey

Separate surveys were created for teachers, staff, and transportation employees. All staff were invited to participate by email, with all surveys including questions about employees' own sleep, work schedules, and child care utilization. Additional questions were asked about student engagement in the classroom (teachers), general impression of student functioning (teachers/staff), and behavior on buses (transportation).

Qualitative data

Focus groups were held with 70 CCSD school nurses in the spring of 2017 to consider benefits/challenges for students, families, and nurses, as well as strategies to address concerns. Groups were divided by school level (elementary, middle, high), and included up to 10 nurses each. Similarly, before and after care employees were asked to complete a qualitative survey focused on benefits/challenges for students, families, and child care employees. Additional focus groups will be held with students, parents, teachers, nurses, athletic coaches, and before/after care employees in the spring of 2018 and 2019.

Lessons learned

We offer this case study as one successful approach to changing start times in a large suburban school district (almost 55,000 students). There is not a single solution or approach that will work for every family, school, or district in the United States. However, similar to other large districts that have made changes to start times (eg, Minneapolis, MN) the following summarizes some of the lessons we learned through this process.

First, change is hard. Changing school start times can have a major impact on the routines and work schedules of families and staff, as well as the greater community (eg, traffic patterns).[28] Similar to other large suburban districts (eg, Brevard, FL; Arlington, VA), we actively sought community input through an interactive process and involvement to help identify areas of greatest impact, allowing us to mitigate many of these concerns.[28,34] While it is not possible to identify every potential consequence of changing start times, the open dialogue through community meetings, survey data, and online comments allowed us to consider a number of factors that can be addressed, implementing solutions that directly benefit our students and their families.

Second, facts alone are not enough to change minds and build support. There is no doubt that later school start times lead to increased sleep for middle and high school students, which in turn contributes to improved mood, health, and academic outcomes. However, in addition to providing the facts, it was essential to spend time listening and, when possible, responding to the many valid concerns of community members.

Third, flexibility (and a sense of humor) is critical. Although there was a steadfast goal of working to change school start times, it was essential to be flexible in what this change would look like.[33,35] Our community is large and diverse, and a significant amount of time was spent understanding the different needs of all community members. The feedback along the way helped to refine the final proposal.

Finally, from the smallest detail to the largest system, it all matters. The process of making a large organizational change is complex, and the possibility of details getting lost along the way is great. Like other districts, part of our success can be attributed to strong leadership and a dedicated, multi-disciplinary working group, that identified the many factors that go along with such a significant change (eg, Jessamine, KY; Bentonville, AR; Minneapolis, MN).[11,28,36] Translating these factors into actual practice also involves a creative and dedicated implementation team that is working to identify solutions to potential problems, as well as a collaborative research team evaluating outcomes. Just as it takes a village to raise a child, a partnership between schools, parents, and the community is required for successful changes to start times.

Disclosure

The authors have no conflicts of interest to report.

Acknowledgements

The authors wish to thank the CCSD Start Times Task Force, Implementation Team, and Research Team; the parents, family, and staff who provided feedback and completed the surveys; and Gincey Mansfield for all her support throughout this process.

Appendix A. Community Survey

1. Demographics – Please check all that apply
   a. I am a parent/guardian
   b. I am a staff member
   c. I am a student

2. I am, I work with, or I have children in:
   a. Elementary school
   b. Middle school
   c. High school

3. The high school my children attend or will attend, I work at, or I attend is:
   a. Cherokee Trails High School
   b. Cherry Creek High School
   c. Eaglecrest High School
   d. Endeavor Academy
   e. Grandview High School
   f. Overland High School
   g. Smokey Hill High School

4. How important is it to you that high school start times are adjusted to align more closely with the research from the American Academy of Pediatrics on Adolescent Sleep Patterns?
   a. Very important
   b. Relatively important
   c. Neutral
   d. Low importance
   e. Not important

5. The length of the high school day is 7 hours, 30 minutes and is not a variable that can change. Given the length of the day is set, we can determine, based on start time, when the day would end and predict potential impact on after school activities.
   Which of the following scenarios best represents for you the ideal balance for a later start time and associated afternoon dismissal time?
   a. 7:45 a.m. – 3:15 p.m.
   b. 8:00 a.m. – 3:30 p.m.
   c. 8:15 a.m. – 3:45 p.m.
   d. 8:30 a.m. – 4:00 p.m.
   e. 8:45 a.m. – 4:15 p.m.
   f. 9:00 a.m. – 4:30 p.m.

6. Currently, middle schools dismiss between 2:50 and 3:10 p.m. Which is the latest time that you believe middle schools could reasonably dismiss?
   a. 3:45 p.m.
   b. 3:50 p.m.
   c. 3:55 p.m.
   d. 4:00 p.m.
   e. 4:05 p.m.
   f. 4:10 p.m.

7. Currently, elementary schools dismiss at 3:30 p.m. If the order of schools' start was not changed, and elementary school continued to start and dismiss last, which is the latest time that you believe elementary schools could reasonably dismiss?
   a. 3:45 p.m.
   b. 3:50 p.m.
   c. 3:55 p.m.
   d. 4:00 p.m.
   e. 4:05 p.m.
   f. 4:10 p.m.

8. Currently, high schools start first, followed by middle schools, and then elementary schools. We could change the order of school start times to begin with elementary schools, then high schools, and then middle schools.
   Would you support the concept of changing the order of start times for schools as described?
   a. Yes
   b. No

9. Part of the difficulty in adjusting the start time of schools is the length of each pupil contact day. To operate an efficient system and not spend additional money on transportation, it is necessary to stagger both start and dismissal times. Due to the current length of the school day, we are not able to accomplish this. If the length of the school day were increased, we could develop a more efficient transportation model in support of adjusted start times.
   Would you support changing the length of the middle school by up to 20 minutes? This could mean 20 minutes shorter or 20 minutes longer depending on other variables. Time would be evenly adjusted across all periods.
   a. Yes
   b. No

10. Would you support increasing the length of the elementary school by up to 15 minutes? This time would be primarily utilized to increase physical activity time/recess?
    a. Yes
    b. No

11. We received feedback that some families utilize older siblings to provide daycare/supervision to elementary students. This only works if high schools and middle schools dismiss earlier than elementary schools, but limits the opportunity to adjust start times by dictating the order of dismissal. Is it important that older siblings dismiss earlier than elementary students in order to provide daycare/supervision?
    a. Yes
    b. No

12. If additional time were added to the school day, it would allow us to reduce by one the number of pupil contact days and add a professional development day for teachers. This change would support adjustments in the calendar to start the annual school year slightly later in August.
    Would you support adding time to the day and reducing the year by one pupil contact day to start the school year slightly later in August?
    a. Yes
    b. No

13. Please let us know any additional comments you might have on this subject.

References

1. Gradisar M, Gardner G, Dohnt H. Recent worldwide sleep patterns and problems during adolescence: a review and meta-analysis of age, region, and sleep. *Sleep Med*. 2011;12(2):110–118.
2. Galland BC, Taylor BJ, Elder DE, Herbison P. Normal sleep patterns in infants and children: a systematic review of observational studies. *Sleep Med Rev*. 2012;16:213–222.
3. Beebe DW. Cognitive, behavioral, and functional consequences of inadequate sleep in children and adolescents. *Pediatr Clin North Am*. 2011;58(3):649–665.
4. Fallone G, Owens JA, Deane J. Sleepiness in children and adolescents: clinical implications. *Sleep Med Rev*. 2002;6(4):287–306.
5. Sadeh A, Gruber R, Raviv A. Sleep, neurobehavioral functioning, and behavior problems in school-age children. *Child Dev*. 2002;73(2):405–417.
6. Drake C, Nickel C, Burduvali E, Roth T, Jefferson C, Pietro B. The pediatric daytime sleepiness scale (PDSS): sleep habits and school outcomes in middle-school children. *Sleep*. 2003;26(4):455–458.
7. Gibson ES, Powles AC, Thabane L, et al. "sleepiness" is serious in adolescence: two surveys of 3235 Canadian students. *BMC Public Health*. 2006;6:116.
8. Nixon GM, Thompson JM, Han DY, et al. Short sleep duration in middle childhood: risk factors and consequences. *Sleep*. 2008;31(1):71–78.
9. Wolfson AR, Carskadon MA, Acebo C, et al. Evidence for the validity of a sleep habits survey for adolescents. *Sleep*. 2003;26(2):213–216.
10. National Sleep Foundation. 2006 Sleep in America Poll; 2006.
11. Wahlstrom K. Changing times: findings from the first longitudinal study of later high school start times. *NASSP Bull*. 2002;86(633):3–21.
12. Dexter D, Bijwadia J, Schilling D, Applebaugh G. Sleep, sleepiness and school start times: a preliminary study. *WMJ*. 2003;102(1):44–46.
13. Danner F, Phillips B. Adolescent sleep, school start times, and teen motor vehicle crashes. *J Clin Sleep Med*. 2008;4(6):533–535.
14. Hansen M, Janssen I, Schiff A, Zee PC, Dubocovich ML. The impact of school daily schedule on adolescent sleep. *Pediatrics*. 2005;115(6):1555–1561.
15. Wolfson AR, Spaulding NL, Dandrow C, Baroni EM. Middle school start times: the importance of a good night's sleep for young adolescents. *Behav Sleep Med*. 2007;5(3):194–209.
16. Owens JA, Belon K, Moss P. Impact of delaying school start time on adolescent sleep, mood, and behavior. *Arch Pediatr Adolesc Med*. 2010;164(7):608–614.
17. Carskadon MA, Vieira C, Acebo C. Association between puberty and delayed phase preference. *Sleep*. 1993;16(3):258–262.
18. Moore M, Meltzer LJ. The sleepy adolescent: causes and consequences of sleepiness in teens. *Paediatr Respir Rev*. 2008;9(2):114–120.
19. Carskadon MA, Harvey K, Duke P, Anders TF, Litt IF, Dement WC. Pubertal changes in daytime sleepiness. *Sleep*. 1980;2(4):453–460.
20. Carskadon MA. When worlds collide: adolescent need for sleep versus societal demands. *Phi Delta Kappan*. 1999(January):348–353.
21. American Academy of Pediatrics. School start times for adolescents. *Pediatrics*. 2014;134(3):642–649.
22. Carskadon MA, Wolfson AR, Acebo C, Tzischinsky O, Seifer R. Adolescent sleep patterns, circadian timing, and sleepiness at a transition to early school days. *Sleep*. 1998;21(8):871–881.
23. O'Malley EB, O'Malley MB. School Start Time and Its Impact on Learning and Behavior. In: Ivanenko A, editor. Sleep and Psychiatric Disorders in Children and Adolescents. New York, NY: Information Healthcare Publisher; 2008. p. 28–72.
24. Boergers J, Gable CJ, Owens JA. Later school start time is associated with improved sleep and daytime functioning in adolescents. *J Dev Behav Pediatr*. 2014;35(1):11–17.
25. Wahlstrom K, Dretzke B, Gordon M, Peterson K, Edwards K, Gdula J. Examining the Impact of Later School Start Times on the Health and Academic Performance of

High School Students: A Multi-Site Study. St. Paul, MN: Center for Applied Research and Educational Improvement: University of Minnesota; 2014.
26. McKeever PM, Clark L. Delayed high school start times later than 8:30 a.m. and impact on graduation rates and attendance rates. *Sleep Health*. 2017;3(2):119–125.
27. Troxel WM, Wolfson A. Sleep science and policy: a focus on school start times. *Sleep Health*. 2017;2:186.
28. Owens JA, Drobnich D, Baylor A, Lewin D. School start time change: an in-depth examination of school districts in the United States. *Mind Brain Educ*. 2014;8(4):182–213.
29. National Sleep Foundation Adolescent Sleep Initiative. Changing School Start Times: Wilton, Connecticut; 2005.
30. National Sleep Foundation Adolescent Sleep Initiative. Changing School Start Times: Fayette County, Kentucky; 2005.
31. Appleman ER, Gilbert KS, Au R. School start time changes and sleep patterns in elementary school students. *Sleep Health*. 2015;1:109–114.
32. Wahlstrom K. Elementary Feedback on Changed Start Times. Minneapolis, MN: Center for Applied Research and Educational Improvement, University of Minnesota; 1998.
33. Hanover Research. Impact of School Start Time on Student Learning; 2014.
34. National Sleep Foundation Adolescent Sleep Initiative. Changing School Start Times: Arlington, Virginia; 2005.
35. Payne P. Report from SLEEPinFairfax: successful practices and approaches to changing school start times. http://www.startschoollater.net/successful-approaches-thanks-to-sleepinfairfax.html; 2017.
36. National Sleep Foundation Adolescent Sleep Initiative. Changing School Start Times: Jessamine County, Kentucky; 2005.