Citizens Advisory Committee
School Year Calendar / School Start Times

School-Based Sleep Deprivation Intervention

"The European custom of beginning school at 7 to 8 o'clock in the morning works great hardship, often causing the pupil to rush away to school in nervous haste and without breakfast. The American practice of beginning at 9 o'clock is far wiser, and should never be changed unless for very special reasons."

— As stated in 1913 by Stanford education psychologist Lewis M. Terman in recognition of the association between start times and sleep sufficiency.

The AAP Report published in the September 2014 issue of Pediatrics — noted that multiple factors contribute to teens' sleep deprivation, including athletics and extracurricular activities, homework, jobs and use of technology, however, "Evidence strongly suggests that a too-early start to the school day is a critical contributor to chronic sleep deprivation among American adolescents."

— Dr. Charles Czeisler, professor and director of the division of sleep medicine at Harvard Medical

School, in discussing components of chronic adolescent sleep deprivation.

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I. Introduction and Summary of Work

A. Citizens Advisory Committee

In March, 2019, the Olympia School District (OSD or "the District") Board of Directors ("the Board") convened a Citizens Advisory Committee (CAC) to develop recommendations regarding potential changes to the academic calendar and school start times. The Board sought these recommendations due to a "growing body of research that suggests changes to bell schedules and academic calendars can have significant, positive impacts on student learning as well as educators' working conditions."

Many people attended the initial meeting for the committee, and the CAC currently has 36 members, including educators, parents, students, and community members in the OSD. The CAC is co-chaired by a Board member and a parent in the OSD. All committee meetings are open to the public and announced on the School District website.

The CAC voted to divide into two subcommittees, one that would examine school start times, and another that would investigate potential changes to the yearly academic calendar. The larger committee agreed that the work of the School Start Times subcommittee would be prioritized, so that any potential changes to school start times could be implemented in the 2020-2021 school year. This proposal represents the work and recommendations of the School Start Times subcommittee of the CAC (for brevity, "the Committee" or "the CAC").

B. Background and Need for Consideration of Later Start Times

Insufficient sleep in adolescents is an important public health issue that significantly affects middle and high school students (collectively, "secondary students"). School start times through the mid-20th century were typically around 9 a.m.; since then, start times have moved much earlier. Currently OSD high schools start at 7:45am, and our middle schools start between 8:00am and 8:30am. Early start times combined with adolescents' biological sleep patterns and needs have resulted in chronic sleep deprivation in this age group. Sleep deprivation has wide-ranging negative effects on

adolescents' physical health and safety, mental health and behavior, and academics and school performance.

Decades of research have evaluated the benefits of later start times for middle and high school students. Moving school start times later has been proven to be an effective intervention that results in more sleep and ameriorates the negative effects of sleep deprivation. The American Academy of Pediatrics, the American Medical Association, and the Centers for Disease Control have issued policy guidelines that say middle and high school students should not have start times before 8:30 am. The National Education Association supports school schedules that follow sleep research-based recommendations. The Washington State Parent Teachers Associations and the Seattle Educators Association have issued position statements or resolutions supporting later school start times. A move to later start times is also consistent with the Healthy People 2020 Objective to increase the proportion of students in grades 9 to 12 who get sufficient sleep. Many schools in this state and across the nation have implemented later start times, and in October of this year, California adopted a statewide law mandating start times later than 8:30am for high schools.

This research and these recommendations make it imperative for our district and our school board to seriously consider delaying start times for our middle and high schools. The research is presented in more detail below.

C. Challenges to Moving Start Times

Moving start times later in our district presents significant challenges. In order for this change to be cost-neutral, elementary schools would need to start earlier. This may have impacts on elementary school students' health or performance (the effects of earlier start times on elementary students are less well studied). If elementary schools were not moved to earlier start times, there would likely be a substantial increase in transportation spending. Regardless of the impact on elementary start times, later start times for middle and high schools will result in changes to middle and high school extra-curricular activities, to established routines, to the amount of time available after school for family, homework and jobs, to family transportation and child-care, and to work schedules for the staff at the schools. The Committee has met with numerous District staff and other stakeholders to discuss anticipated impacts of a schedule change. The findings from these discussions are presented below.

D. Intersection with OSD Student Outcomes

We want our students to live healthy, productive, and satisfying lives. The OSD works to build capacity for success through programs and operations that lead to continuous improvement for students. In December, 2018, the Board adopted a set of Student Outcomes as part of its Strategic Planning process. These Student Outcomes are as follows:

> *Our students will:*
>
> *Outcome 1: Be compassionate and kind.*
>
> *Outcome 2: Have the academic and life skills to pursue their individual career, civic and educational goals.*
>
> *Outcome 3: Advocate for the social, physical and mental wellness of themselves and others and be hopeful about the future.*
>
> *Outcome 4: Have the skills, knowledge and courage to identify and confront personal, systemic and societal bias.*
>
> *Outcome 5: Discover their passions, be curious and love learning.*
>
> *Outcome 6: Be critical thinkers who contribute to and collaborate with our local, global and natural world.*

The Committee believes that adopting later start times for middle and high school students in this district can support these Student Outcomes both by directly impacting student health (Outcome 3), and by providing a positive example for students of decision-making that:

- Prioritizes both short- and long-term impacts to health and well-being (Outcome 3)
- Is based on evidence (Outcome 6)
- Addresses and attempts to remedy socioeconomic inequities (Outcome 4)
- Is a result of inclusive problem-solving (all Outcomes)

- Effects change as a result of community engagement and the civic process (Outcomes 3, 4, 5, and 6)

E. Community Support

The CAC has been committed to engaging the OSD community. The Committee conducted a survey in the spring to assess whether the community would be supportive of a later start time for secondary schools that was based on evidence that later start times support student success. The survey showed high community support for a change in start times. There were more than 2,400 responses to the survey, and 86% of the respondents supported pursuing later school start times for adolescents.

In response to these survey results and after receiving a proposed bus schedule from the OSD Transportation Department, and considering extensive input from stakeholders, the Committee issued another, more detailed survey in October.

This second survey sought to evaluate support for a change in start times after consideration of potential negative impacts. This survey received over 4600 responses. After answering detailed questions on the potential challenges and benefits of moving start times, 64% of respondents remained in support of making the change. These results show that although the community recognizes the very real challenges that changing school schedules will present, almost 2/3 of our community believes that it is important to pursue this change.

Results from both surveys are elaborated on below.

D. Summary of Recommendation from the Committee

Due to the overwhelming evidence that later start times increase sleep duration in adolescents, resulting in improved mental and physical health, academic performance, and safety, and with the acknowledgment that the change will present significant challenges, the Committee recommends to the Board that middle and high schools in the OSD start no earlier than 8:30am. In addition, in order to maximize the benefits such a change could have, the Committee strongly recommends the the OSD create and implement a program that will actively educate students, parents, staff, and the community on the effects of sleep deprivation, on healthy sleep habits

and recommended hours of sleep for all ages of students, and on how best to avoid blue/white light before sleep.

E. Note on Sources

This document draws on a large number of research studies that were accessed on the internet. To the greatest extent possible, these sources are listed in the Bibliography, and are referenced within the document by referral to the Bibliography section and number, for example, "Bib. A.5." A major source of information to the CAC has been the 2014 American Academy of Pediatrics policy statement on School Start Times for Adolescents (https://pediatrics.aappublications.org/content/134/3/642/tab-figures-data), which is hereinafter referenced as "AAP 2014" and is attached as Appendix A. Email communications and conversations that the CAC had with stakeholders are not specifically referenced, but all CAC emails and materials are public record.

II. Research

A. Adolescent Sleep Changes

There is an outdated but common belief that adolescents are tired, irritable and uncooperative because they choose to stay up too late, or are difficult to wake in the morning because they are lazy. Such conventional wisdom lies behind the misconception that adolescents need to be "trained" to adapt to the sleep needs and schedule of an adult.

In fact, decades of research show that during adolescence, the brain undergoes significant developmental changes which create a temporary and normal delay of sleep phase and a need for more sleep than adults (AAP 2014). This phenomenon, also found in other mammals (Bib. A.5.), is likely a result of massive brain reorganization that happens in the adolescent years (Bib. B.2.). These biological changes dictate that adolescents tend to be alert until late in the evening and find it difficult to go to sleep before 11 pm, despite needing an average of 9.25 hours of sleep per night (Bib. D.2.). Deep sleep for teens tends to occur between 3:00am and 7:00am (id.) compared to the earlier morning dips of childhood and adulthood which typically occur between 2:00am and 4:00am. Teens' deep sleep can last even longer (until 9:00am or 10:00am) if they are sleep deprived (id.). This

research matches anecdotal experiences of parents and guardians having to drag their teenagers out of bed, even on the weekends when they've "slept in." Sleeping late on weekends, while it helps with overall sleep hours, further offsets adolescents' circadian rhythm, making it harder for them to wake up on weekdays, and results in more sleepiness at school (Bib. D.29.). In sum, as stated by the American Academy of Pediatrics in their policy statement on school start times, "[o]n a practical level, [the] research indicates that the average teenager in today's society has difficulty falling asleep before 11:00pm and is best suited to wake at 8:00am or later" (AAP 2014).

B. Sleep Deprivation and Effects

"Failure to adjust education timetables to this biological change leads to systematic, chronic and unrecoverable sleep loss. This level of sleep loss causes impairment to physiological, metabolic and psychological health in adolescents while they are undergoing other major physical and neurological changes" (Bib. D.19.).

The effects of sleep deprivation are myriad and serious. They include effects on:

- Physical health and safety, including
  - Increased obesity risk
  - Metabolic dysfunction
  - Increased cardiovascular morbidity
  - Increased rates of motor vehicle crashes ("drowsy driving")
  - Higher rates of caffeine consumption; increased risk of toxicity/overdose
  - Nonmedical use of stimulant medications; diversion
  - Lower levels of physical activity
- Mental health and behavior, including
  - Increased risk for anxiety, depression, suicidal ideation
  - Poor impulse control and self-regulation; increased risk-taking behaviors
  - Emotional dysregulation; decreased positive affect
  - Impaired interpretation of social/emotional cues in self and others
  - Decreased motivation
  - Increased vulnerability to stress

- Academics and school performance, including
    - Cognitive deficits, especially with more complex tasks
    - Impairments in executive function (working memory, organization, time management, sustained effort)
    - Impairments in attention and memory
    - Deficits in abstract thinking, verbal creativity
    - Decreased performance efficiency and output
    - Lower academic achievement
    - Poor school attendance
    - Increased dropout rates

(AAP 2014). Summarizing the effects on kids' safety, Dr. Maida Lynn Chen, director of the Pediatric Sleep Disorders Center at the Seattle Children's Hospital, states that "[t]eenagers who don't sleep enough do stuff like ride bicycles without helmets, jaywalk more, carry guns to school more, have more undesired sexual encounters that they later regret[.] [T]hey text and drive more. They will get into a car with a drunk driver more. And these are all proven statistics." In school district in Kentucky, a delayed start time resulted in a reduction of teen driver crash rates by 16.5% in 2 years, while the rest of the state saw an increase in teen crash rates of 8%.

Deep sleep is critical for the body and mind; the adolescent brain is building the prefrontal cortex (Bib. B.11.), and carrying on important and necessary functions:

- memories are consolidated
- learning and emotions are processed
- physical recovery occurs
- blood sugar levels and metabolism balance out
- the immune system is energized
- the brain detoxifies

Perhaps most importantly, sleep deprivation in adolescence can also have permanent effects on mental health. The prefrontal cortex is developing during adolescence. Maturation of this part of the brain is what allows upper level thinking, self-control, and decision making abilities to be created (Bib. B.1.). Studies have shown that sleep deprivation in adolescence can "have concrete effects on even the most resilient kids and potentially devastating ones on those who have a predisposition toward mood disorders like depression" (Bib. B.9.).

C. Positive Effects of Delaying School Start Times for Adolescents

1. Sleep duration

Delaying secondary school start times brings students closer to reaching the recommended sleep duration. Contrary to many adults' assumptions, moving start times a certain number of minutes later does not mean that adolescents will stay up later for the corresponding number of minutes. The American Academy of Pediatrics states that "studies have now clearly demonstrated that delaying school start times...results in a substantive increase in average sleep duration." Seattle Public Schools adopted later start times in 2017, and meticulously studied the effects on students' sleep (Bib. D.30.). The research showed that moving the start time 55 minutes later — from 7:50am to 8:45am — yielded a 34-minute median increase in regular sleep (id.). While 34 minutes of extra sleep per day may not seem significant to some, it means that the average high or middle school student in Seattle is now getting almost 3 hours more sleep per week, or a whopping 510 more hours of sleep over the course of an academic year. In the CAC's second survey, 75% of secondary student respondents said that they believed that a later start time would help them get more sleep.

2. Health and Safety

Accumulated hours of sleep will inevitably have significant positive impacts on brain health (Bib. B.3., D.6.). By 2014, according to the AAP, more than 38 studies had been conducted to examine the effects of delaying school start times. Delayed start times result in reduced stress, better physical health, fewer indicators of depression, greater motivation, better ability to control impulses, and decreases in teenage traffic accidents (AAP 2014). In addition, an improvement in athletic performance has been observed in student populations that have later start times (Bib. A.5.). In our district, 65.5% of student survey respondents thought that they would be more awake when driving to school with later start times, and 60% said that they believed they would have a happier, more positive attitude.

3. Academics

Numerous studies have shown an improvement in academics resulting from a delay in start times. The American Academy of Pediatrics cites several studies that have documented improvements in academic performance associated with later start times (AAP 2014):

> In a study focusing on middle school students, a 1-hour later shift in school start times was associated with an increase in reading test scores by 0.03 to 0.10 SD and in math test scores by 0.06 to 0.09 SD. The author concluded that an increase in start times by 1 hour would result in a 3 percentile point gain in both math and reading test scores for the average student. In a more recent middle school study by the same research group, *the results suggested that moving school start later by 1 hour can have an impact on standardized test scores comparable to decreasing the class size by one-third.* Finally, in a recent 3-state study, 5 of the 6 high schools in which grade point average was assessed showed a significant pre–post increase in grade point average in core subjects of math, English, science, and social studies (emphasis added).

In the Seattle public schools, the 55-minute later start time correlated with an average 4.5% increase in grades (Bib. D.30.).

In our district, of those that took the survey, 328 students agreed, and 109 somewhat agreed, that later start times would help them meet graduation requirements. 52% said later start times would make them like school more (19% were neutral on this question); 71% said they would be able to focus better in morning classes; and 59% said they would do better in school.

Later start times can positively impact teens' ability to do homework effectively. Studies have shown that teens are more alert for homework and more engaged in academics when school starts later, leading to higher achievement (Bib. D.32.). Another study found that students whose schools start one hour later watch roughly fifteen minutes less TV per day and spend roughly seventeen minutes more per week on homework, providing context on how start times can impact achievement (Bib. D.15.). In our survey, 60% of students said being better rested would help them do homework more efficiently.

In our district, some high school students attend what are known as "zero hour" classes. These classes occur before the normal school day; as it

currently stands, they start at 6:45am. Moving start times later would move these classes to a start time of 7:45am. This could have positive academic impacts because of students' ability to attend these classes, teachers' willingness to teach them, and both groups' greater alertness and focus. Zero hour classes also provide an opportunity for highly motivated students, or students who naturally wake earlier, to use this morning time for academics. 61% of our students said that later start times would better allow them to participate in zero hour classes. However, it is important to note that new participation in zero hour would eliminate any additional sleep time gained by students who had not previously participated.

4. Absences and Tardies

There is ample evidence, and it is logical, that later start times reduce absences and tardies (see, i.e., AAP 2014). Fewer absences and tardies increases academic achievement (id.). Well-rested kids can make it to school on time, leading to fewer tardies, and they have fewer illnesses and better mental health, resulting in fewer absences. 65% of students in our district said later start times would help them get to school more easily.

5. Unsupervised Time in Afternoons

Unsupervised time in the afternoon is directly reduced when start and end times are later. Anecdotal evidence suggests that the time period from 3:00pm to 5:00pm in the afternoon is when the most problematic behavior from adolescents is seen. In Olympia, staff at the Boys and Girls club and staff at OHS both reported that this is true in their experience, and the director of the Boys & Girls club said that kids having less time to get in trouble after school would be "fantastic."[1]

[1] One commenter on the survey said "Later start times would result in fewer unsupervised hours for adolescents/teens after school. The majority of teen pregnancies happen between the hours of 3-5." (The CAC has not confirmed this statistic, but it seems plausible.)

6. Equity and Achievement Gaps

Many of these above benefits of later start times have been proven to help socioeconomically disadvantaged[2] students at a greater rate than their more privileged peers. Private schools rarely start before 8:00am.[3] It's easier for wealthier families to accommodate their sleep-deprived teenagers by moving school districts, buying their teenager a car for transportation, being home to make sure they get up, writing notes for their tardies and absences, or driving them to school after they miss the bus.

The OSD has 5350 students in secondary school. Of those students, 32% are low income, 29% are ethnic minorities, 2% of the students are homeless, and over half of the students are male.[4]

Children in socioeconomically disadvantaged families are more likely to experience fixed work schedules and to lack reliable transportation, resulting in more absences and tardies. They have higher dropout rates, lower test scores, and show an achievement gap[5] compared to their more well-off peers. They are more likely to experience moving schools frequently, lack of access to a stable sleep environment, lack of continuity of parental/guardian involvement (including lack of supervision in the afternoon), having to choose between more sleep and getting a free school breakfast, lack of continuity with general access to food, and lack of continuity of health care (Bib D.35., 36.).

Socioeconomically disadvantaged students are nearly twice as likely to make improvements in tardies and absences with a change to a later start time (Bib. D.30.). After school start times were moved later in Seattle, students at Franklin High School had significantly fewer tardies and absences, whereas Roosevelt High School students showed no difference. Franklin has many more economically disadvantaged students (88%) and ethnic

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[2] "Socioeconomically disadvantaged" may refer to low income students, ethnic minority students, and/or students without a fixed and regular sleep residence. These groups are measurable within our district and are usually identified in sleep and start time research.

[3] Nova School in Olympia (middle school) starts at 8:30, and many private schools in Seattle have later start times for secondary students.

[4] Girls score approximately .3 standard deviations higher than boys in English Language Arts, a significant achievement gap.

[5] References to achievement gap are to any group of students who show a significant gap when compared to a higher performing group of students.

minorities (68%) than Roosevelt (31 and 7%, respectively)(id.). Test scores for socioeconomically disadvantaged students are also more likely to be positively impacted by later start times (id.). The AAP reports that in one middle school study, students performing in the lower end of the test score distribution benefited most from a start time delay, with gains roughly twice those in above-average students, and the effects persisted into high school. In addition, later start times have been proven to positively affect the achievement gap between girls and boys in English Language Arts scores (Bib. D.21.,23.), and as noted above, later start times directly minimize the amount of unsupervised time in the afternoon, which may have a greater impact on socioeconomically disadvantaged teens.

Moving school start times later can have a direct effect on students' stress levels. Students from low socioeconomic backgrounds have been found to particularly high levels of stress and performance anxiety during evaluative assessments in school (Bib. D.10.). Stress can burden the cognitive resources that students rely on to perform well, and well-rested students are less stressed.

The OSD and school districts across the nation are desperately seeking to help mitigate achievement gaps and have a positive impact on socioeconomically disadvantaged students. Moving start times later is a definitive action that can be taken by school districts for little to no cost (although it does require significant family and community adjustments) that has been proven to help with these goals.

III. Transportation, Expected Challenges and Potential Negative Effects of Delaying Start Times

A. Transportation and Possible Bus Schedules

Given the overwhelming evidence that adolescents are chronically sleep deprived, to the detriment of their short and long term physical and mental health, and that delaying start times is an effective intervention to help them get more sleep, in the spring of 2019 the CAC met with the OSD Transportation Department ("Transportation") to determine whether it was possible to reconfigure bus schedules so that middle and high schools would start no earlier than 8:30am. The CAC's original question was whether *all*

schools in the District could start between 8 and 9 am, and at what cost. Transportation indicated that such a radical tightening of the bus schedule would involve an astronomical cost. The CAC then requested that Transportation propose a cost-neutral new bus schedule in which middle and high schools would start after 8:30am. The original cost-neutral schedule provided by Transportation was as follows:

Elementary Schools times:
- 7:38am - 2:00pm
- 7:48am - 2:10pm
- 8:08am - 2:30pm
- 8:18am - 2:40pm
- 8:28am - 2:50pm
- 8:38am - 3:00pm

Middle School times:
- 9:08am - 3:40pm (Reeves MS)
- 9:18am - 3:50pm (Marshall, Jefferson, and Washington MS)

High School times:
- 9:23am - 4:00pm

This schedule, along with a preliminary report and the results of the first survey (see below) were presented to the Board at the June 24, 2019 meeting. Following that meeting, and concurrently with the information-gathering that is described in the next section, the CAC requested a new schedule from Transportation in which middle and high schools would start between 8:30am and 9:00am. That new proposed schedule is here:

Elementary Schools times:
- 7:30am - 1:52pm (five elementary schools)
- 8:00am - 2:22pm (four elementary schools)
- 8:30am - 2:52pm (three elementary schools)

Middle School times:
- 9:00am - 3:32pm (Marshall, Jefferson, and Washington MS)
- 9:05am - 3:37pm (Reeves MS)

High School times:
- 8:50am - 3:27pm

This fall, anticipating that a 7:30am start time for elementary schools would be very difficult to adjust to, the CAC asked the Transportation Department what the cost of eliminating these earliest start times would be. The rough estimate given was a yearly added cost to the District of between $2 million dollars for general education students only and $6.8 million for both general education and special education students, due to the cost of purchasing more busses and employing more drivers. The CAC has not fully investigated this option, but has instead gathered feedback on the cost-neutral proposal, so that the Board would have some indication of whether this was a viable option for the community.

B. Expected Impacts of Changing Bus Schedules

The CAC is well aware that delaying secondary school start times in our district will have many impacts in our community. The CAC has engaged in extensive information-gathering over the past 6 months in an attempt to ascertain what these likely impacts will be, who they will affect, and whether they are so serious as to recommend against delaying start times. The CAC has surveyed community members twice, first asking general questions, and then asking more specific questions about impacts from a changed school schedule. For additional information, the Committee has consulted with the OSD Superintendent, the Transportation Department, school principals, teachers, and administrative staff, deans of students, heads of special academic programs (including the music and International Baccalaureate programs), heads of the athletic departments, and representatives from supplemental programs such as food services, Y-care, and the Thurston County Boys & Girls Club.

1. Impacts on Primary School Children and Families

The most obvious and likely most problematic impact of a new cost-neutral bus schedule is that at least some of the District's elementary-age children will need to start school significantly earlier. The latest proposed schedule would have five elementary schools start at 7:30am, four elementary schools start at 8:00am, and three elementary schools start at 8:30am. Conventional wisdom and sleep research tells us that younger children fall asleep earlier in the evening (given the opportunity), and wake earlier in the morning than adolescents. However, while there is a huge amount of research showing the benefits of later start times for adolescents, there is

significantly less research that has looked directly at the impacts of starting school *earlier* for younger children. What research is available can be contradictory, some with pros (Bib. C.9.) and some with cons (Bib. C.10.), although the research leans toward non- or minimally- significant impacts to younger children (Bib. C.1., 2., 3., 8.).

The most significant/common concerns with starting elementary students earlier are:

- Loss of sleeping time
- An inability to get children to school on time, resulting in more tardies or absences
- Pedestrian safety in the early morning hours
- Greater need for afternoon childcare (more hours)
- An inability of older siblings to pick up/care for younger siblings after school

However, some concomitant benefits to younger students and their families have also been identified:

- No or lesser need for before-school childcare
- Greater alertness/ability to learn/attentiveness when school begins
- Fewer disciplinary issues, which tend to happen later in the afternoon when young children are tired (Bib. C.9.)
- Young children will be in a lower-stress environment (after school care or home, rather than school) when they are tired at the end of the day
- Later on, these same children will directly benefit from the later start times of middle and high school

The available research on younger children is mostly focused on their natural sleep cycles (Bib. C.6.,C.11.,C.12.,D.9.). The research is clear that circadian rhythms are developmental and change with growth from childhood to adolescence and then adulthood (Bib. C.5., D.2., D.3.). Younger children typically fall asleep early and wake early; with the onset of puberty, the sleep-wake pattern moves later, as described above. Research shows that primary students (ages 6-12) need 9-12 hours of sleep, depending on the individual child. For a child who needs 10.5 hours of sleep, a bedtime of 8:00pm and a wake time of 6:30am would meet this need (research also

indicates that a wake time of 6:00am will not typically impact a younger child's deep sleep phase of 2:00am - 4:00am). However, it is clear that some children need more sleep, and that not all families and not all younger children would be able to follow this sleep schedule. Adjusting to a new, earlier schedule will present significant challenges to them.

The difficulty of adjusting to a much earlier schedule was borne out in the survey results. The first survey did not specifically ask about the impacts of elementary students starting earlier, since a new schedule had not yet been proposed. The second survey asked directly about expected impacts of starting elementary schools at 7:30am, 7:45am, and 8:00am.[6] The survey first asked if starting at these times would be "manageable". Most (62%) responses indicated that a 7:30am start time would be very difficult for families to adjust to (45% said this time would be "unmanageable" and 15.6% said it would be "somewhat unmanageable"). Parents were more amenable to 8:00am and 8:30am start times, with 36% of respondents saying 8:00am was somewhat- or un-manageable, and only 12% saying that 8:30am was. Elementary families also strongly supported (67%) additional transportation spending that would eliminate the 7:30am start time (this is higher than the overall support at 55.5%).[7] Notably, though, when elementary parents were asked if they could adjust to the logistical challenges of starting elementary schools earlier knowing it means their children will benefit academically and mentally from getting more sleep when they are middle and high schoolers, only 29.5% of respondents said they could not.

Budgetary constraints may force the district to do a cost-benefit analysis around this issue. At least some research has shown that "adjusting school start times so that high school students have the latest start time would significantly increase achievement for older children at a very low academic cost for younger children—who will more than make up for this cost when they grow older." (Bib. C.8.) Another consideration is whether most objections to starting school earlier for elementary school students stem from *logistical* concerns for parents, that could be overcome with (admittedly painful) schedule adjustments, rather than from any potential negative physical, mental, and academic impacts to young children.

[6] Responses to these questions were limited to parents/family members/guardians that currently had children in elementary school.

[7] Lower income respondents and those of two or more races also showed higher support for increased transportation spending, at 59-60%.

2. Challenges for Secondary Students

Starting school later means ending school later. The amount of after-school time that middle and high school students have available for athletics, other extra-curricular activities, homework, caring for younger siblings, and jobs will necessarily be lessened. In addition, timing of after-school events will be compressed, and time available for school facilities to share space with the community will be decreased.

a. Athletes and Participants in other Extracurricular Activities

The greatest concern expressed to the CAC regarding these effects came from athletic departments, who are rightly concerned that students will miss more class time when they need to leave school earlier for "away" games. Currently, Olympia High School (OHS) and Capital High School (CHS) are in two different athletic leagues, the placement in which is based on the size of their student bodies. These leagues encompass large geographic areas and require extensive travel for student athletes. If the other schools in these leagues keep their early start times, and our district moves start times later, student athletes may be required to miss as many as two class periods on days when there are away games. Many of the survey respondents commented on the distance that our high school teams have to travel for away games and hoped the district could find a better solution to this issue. Indeed, the Board may wish to consider whether the competition provided by belonging to these geographically sprawling leagues is worth the impacts to students from travel time, exposure to road hazards, and exposure to pollutants; to the district from added transportation costs and added employee hours; and to the environment from added carbon expenditures.

The high school athletic directors provided estimates of seat time loss for student athletes assuming that the schools stay in their current leagues and the leagues do not modify the existing game schedules. In their estimation, delaying high school start times to 8:30am[8] would increase total seat time loss for all student athletes at CHS by 5192 hours (or around 6500 hours if the start times was 9:00am), and at OHS by 5471 hours. This added seat

[8] The losses would increase by 20 minutes as the ADs calculated the data with an 8:30am start time (instead of 8:50am).

time loss amounts to approximately 1/200th of a student athlete's total seat time over the course of the year, with this time being mostly concentrated in the last two class periods. If averaged over the last two class periods only, student athletes would lose an additional 3% of instructional hours for those two class periods, receiving 97% of the class instruction time that they had received in previous years. These hours vary by sport; some athletes will have more seat loss (e.g., Cross Country athletes) and others will likely have no additional seat loss (e.g., Varsity Volleyball players).

A detailed breakdown of how away games will affect student athletes' seat time by sport (assuming that no change is made to leagues and the current timing of games) is included in Appendix B, *Outside of School Traveling Activities and Seat Time*.

These seat time concerns also affect students other than athletes who participate in extracurricular activities. Some extracurriculars are a part of associations or leagues that have events or competitions scheduled earlier in the afternoon. A later start time may also mean that these students will need to leave school early in order to participate in these activities.

Overall, 53% of students who said the question applied to them were worried about leaving school early for sports or extracurriculars. 40% of parents were worried about their students needing to leave early.

In addition, middle school representatives expressed concern that later start/end times would mean that it was getting dark by the time their teams were practicing and competing. There is a significant shortage in the OSD of lighted middle school fields, and practices and competitions at unlit fields may need to be moved either temporally or geographically, or the District would need to invest in installing lighting.

b. Homework, Jobs, and Caring for Younger Siblings

Many District staff raised concerns about students having enough time for homework if their afternoon schedules were compressed. When asked in the survey, almost half the students said they were concerned about having enough time for homework. However, as stated above, 60% thought that they would be able to complete their homework more efficiently.

Undoubtedly teens will need to strategically plan their afternoons if they have an hour less for all of the things they need to get done.

Older students' ability to earn money, and their ability to provide childcare for their younger siblings, are areas of real concern, because they will disproportionately affect the lower-income members of our community. 62% of students surveyed responded that they would have less time for a job because of a school start time change. In addition, 273 students who answered the survey said they were concerned about their ability to provide childcare for younger siblings after school. This is a significant number, especially considering that only a portion of students responded to the survey. A salient comment stated: "You underestimate the amount of children affected when older siblings are not available to watch them in the afternoon. This will cause the poorest members of our community the most disruption. Many lower wage earners do not have the flexibility in their schedules as higher income earners. Therefore, elementary kids will have to fend for themselves more and that is not safe. Also only a fraction of our students can attend Boys and Girls Club which is somewhat affordable. All other day care situations are not." The Board will need to carefully consider how to mitigate these impacts to affected groups.

3. Other Impacts

a. District Employees

District employees will clearly be affected by schedule changes. Employees that also have students in the school system may have to make significant changes in order to adjust to new schedules for both themselves and their students. Transportation employees will have entirely new schedules, which may impact their hours worked. The CAC has not specifically investigated effects on union contracts that may be affected by school schedule changes, but these will obviously need to be addressed by the OSD prior to making changes.

b. Food Services

The Food Services Department believes a later start time will increase the number of secondary students who voluntarily participate in breakfast; it is

our understanding that elementary school students will continue to receive their breakfast if they are enrolled in the program, regardless of whether they arrive at school on time. (This information needs to be confirmed.)

c. After-School Programs

When discussing the bell time shift with Y-care and the Boys & Girls Club, representatives indicated they could accommodate the shift with some concerns of their own: location, logistics, and staffing. Representatives indicated that once the District has finalized the new start and end times, they will be able to move forward with the decisions they need to make to deal with these challenges.

d. New Market Skills Center, McCleary and Griffin Districts, Running Start, and Freedom Farmers

The CAC has sought input on impacts to students who attend New Market Skill Center, McCleary and Griffin Districts, Running Start, and Freedom Farmers. At the time of this report, we have not received detailed feedback regarding impacts to these programs/districts. The Griffin District has acknowledged that they know that the OSD is contemplating the change, but has not given input. McClearly has not responded. New Market Skills Center has not responded for requests for input; however, the Transportation Department has indicated that it would be possible to run a bus from each high school to New Market in order to get students to New Market on time; families would be responsible for getting their students to school in time for the buses to leave. The only input the CAC received regarding Running Start students was that later start times could impact Running Start students' ability to fit in zero hour or 1st period classes if they start their college classes early in the day. Freedom Farmers' schedule may be impacted, as their day currently includes a seventh period, which might run later than daylight hours after the schedule change.

IV. Community Support

A. First Survey (Spring 2019)

In late spring 2019, the CAC conducted an initial, 6 question survey survey to gauge general support for the idea of delaying start times and to begin identifying areas of concern for stakeholders. The detailed responses to the first survey were presented to the Board on June 24, 2019. This section will provide an overview of the survey results; an in-depth breakdown by role (e.g. student, parent, community member, etc.) including some comment examples is available in Appendix C, *First Survey Results*.

86% of the overall survey respondents agreed that it was important or very important to pursue a change in school start times because of adolescent sleep needs.

The percentages of respondents who said that the change was extremely or somewhat important, broken down by role in the District, was as follows:

- 89% of students (94% of students who responded were middle and high schoolers)
- 74.6% of staff
- 80% of respondents who were both staff and a parent, family, guardian of a current student
- 93% of parents/family members/guardians
- 89% of community members
- 91% of parents/family members/guardians of a future student

The next questions were general questions about the impacts of moving school start times. The survey did not state that elementary schools would be starting earlier if secondary start times moved later. The questions asked about expected impacts to work, before- and after-school childcare, extracurricular activities, and transportation. The most common response to these questions was “No Impact," with more overall positive than overall negative impacts shown in every area except extracurricular activities.

The survey allowed for important concerns to be raised, which the CAC attempted to follow up on and address. These included concerns about:

- Childcare
- How changing start times affects students in extracurricular activities and those attending New Market Skills Center
- How delayed secondary school start times would impact elementary school start times

- What the changes in transportation to and from school for students would look like
- Potential impacts on local traffic patterns

B. Second Survey (Fall 2019)

This fall (2019), after researching likely impacts from a start time change, meeting with numerous staff throughout the District, and receiving a proposed schedule from the Transportation Department, the CAC issued another, more detailed survey. This second survey sought to inform the community about the process that had been undertaken by the CAC, to educate survey-takers about the proven benefits of later school start times, and to gather detailed information from survey-takers about the impacts that a later school start time for secondary schools *and* earlier school start times for elementary schools would have on them. The survey also sought to ascertain whether, given a chance to consider both the benefits and the challenges of changing start times, the community was still supportive of such a change.

The survey was completed by 4,632 people in the School District, a huge number considering that the District serves approximately 10,000 students.

The most significant finding from the survey is that after completing all the questions, and contemplating the impacts of significant schedule changes, almost 2/3 of respondents continued to support changing school start times to support student health and success. Specifically, 64% of respondents said that making the change was “important” or “somewhat important”, 11% of respondents were neutral, and 25% of the said the change was “somewhat unimportant” or “unimportant”.

Broken down by role in the school district, the percentages of respondents supportive of the change were:

- 73% of community members
- 73% of parents of future students
- 67% of parents of current students
- 63% of students
- 53% of staff without students in the district
- 51% of staff with students in the district

Survey responses significantly supported the evidence that students will benefit from later start times:

- 75% of students believe a later start time will allow them to get more sleep.
- 71% of students believe a later start time will allow them to focus better in early classes.
- 71% of middle school parents believe their student(s) will benefit from additional sleep in the morning.
- 71% of high school parents believe their student will be more awake/alert in school.
- Nearly 70% of staff said students will be able to focus better in early morning classes.

The survey results also confirmed that there are concerns about moving start times, although these levels of concern were lower than overall support. Of the respondents who these questions applied to:

- 53% of students who are involved in extracurricular activities agree that they will have less time for these activities.
- 41% of middle school parents whose children are involved in activities are concerned about whether there is enough time for those activities.
- 40% of high school parents whose children are involved in activities are concerned about whether there will be enough time for before/after school activities.
- 50% of high school parents whose children are involved in activities are concerned about their child losing seat time.

Similar to the first survey (June 2019), the data showed a trend of differences between responses from respondents with the roles of Parents, OSD Staff, and OSD Staff Parents. There were also some significant differences between socioeconomic groups. A few of these differences are indicated within the more detailed review of the survey data in Appendix E, *Second Survey Results Summary*.

All information related to the Start/End times project, including the complete survey results (including all questions, pie charts, and tables), is available on the Olympia School District website:

https://www.osd.wednet.edu/our_district/board_of_directors/board_advisory_committees/s_y_calendar__start_times_advisory_committee

General comments and traffic concerns about the proposed change were provided by many survey respondents. 23% of survey respondents commented on traffic, and nearly 40% made general comments. An analysis of the comments is attached as Appendix D, *Themes of the Survey*.

V. Other Districts

School districts all over the country are recognizing that adolescents do better when school starts later.[9] Most notably, the entire state of California recently adopted legislation which mandates that all high schools in the state start no earlier than 8:30am, and that middle schools start no earlier than 8:00am. Returning to the later start times that were common earlier in this century is clearly the trend across the country. Other notable districts across the country that have moved secondary start times later[10] are:

- Juneau, Alaska
- Denver, Colorado
- Boulder, Colorado
- Fort Collins, Colorado
- Grand Junction, Colorado
- West Hartford, Connecticut
- The District of Columbia
- A number of large districts in Florida
- Needham, Massachusetts
- Holyoke, Massachusetts
- South Bend, Indiana
- Des Moines, Iowa
- Fayette and Jessamine Counties, Kentucky
- Minneapolis, Minnesota
- Oxford, Mississippi
- Columbia, Missouri
- Portsmouth, New Hampshire

[9] While we haven't researched most other countries' approaches to school start time, we did learn that in China, school schedules through high school include nap time.

[10] Not every district listed here moved all start times, or moved to the timing that we are contemplating. Also note that while the trend over the past half-century has been for high schools to have very early start times, some districts may already have later start times. These are examples of cities/districts that have *moved* their start times later.

- Princeton, New Jersey
- Las Cruces, New Mexico
- Ithaca, New York
- Columbus County, North Carolina
- Cincinnati, Ohio
- Bend, Oregon
- Corvalis, Oregon
- North Clackamas, Oregon
- Erie, Pennsylvania
- State College, Pennsylvania
- Barrington, Rhode Island
- Houston Unified School District, Texas
- Arlington, Virginia
- Montgomery County, Virginia
- Richmond, Virginia
- Madison, Wisconsin
- Jackson Hole, Wyoming

Numerous schools in Washington State have already adopted later start times for adolescents. Seattle Public Schools has already been cited throughout this document, and while the CAC has not done comprehensive research into every district in our state, we are aware that the following districts have already instituted later start times for secondary students:

- Anacortes
- Bellingham
- Camas
- Highline
- Evergreen School District
- Issaquah
- Mercer Island
- Northshore
- Seattle Lutheran, and many other Seattle private schools
- Annie Wright School in Tacoma

Our neighboring school district of North Thurston already has a middle school start time of 9:20, and there are indications that it may be contemplating a move to later starts for high schools.

School districts implement the schedule changes in different ways. Each is variously constrained by budget, resources, geography, public feedback, sports leagues, and the general culture of the district. Often districts employ creative solutions in order to change their start times. Some of these ideas include: using block scheduling, moving activities to morning hours, making use of time that had been used for early releases and moving it to the mornings, taking advantage of public transportation, moving non-academic periods to the end of the day, adding a 7th period, allowing graduated start and end times, adjusting length of practice times, shortening school days (while adding days to the year), or adjusting the pass time between periods, to name a few. The CAC has not comprehensively looked at all the ways that other districts have accomplished the changes, but we encourage District staff and the Board to do this research and to use creative solutions here in the OSD.

VI. Cost Savings and Expenditures

The main costs that the CAC has contemplated in association with a schedule change are those involved in transportation. As noted previously, we initially asked whether it would be possible to have all schools start between 8 and 9 am, as that would likely be the community's favored option (if it were available), but were met with a huge number that led us to pursue a cost-neutral option. That is not to say that the CAC recommends against additional expenditures in the transportation or other budgets, but we did not specifically look at exactly what these would be or where in the budget added funds could be found. The new bus schedule, as presented, is cost neutral or positive. Reordering the school schedules from "high-middle-elementary" to "elementary-high-middle" uses the same number of buses, and the Transportation Department has predicted no additional costs; in fact, they predicted cost savings due to efficiencies in the bus routes.

If the district decides to eliminate the 7:30 a.m. elementary school starts, or to change the start times or routes in another way that requires additional busing, the costs of doing so will need to be evaluated. The costs that will need to be accounted for include hiring additional drivers, purchasing additional buses, finding additional parking space, and hiring additional staff to maintain and manage the buses and personnel. The Committee also suggests that the District look carefully into identifying possible efficiencies

within the transportation system that could help compress start times and/or reduce costs.

One approach to reducing transportation costs could be the use of public transit.[11] Intercity Transit will become fare-free in January 2020, and students could potentially easily access it for transportation to and from school, and for other school-associated transportation needs such as local field trips. An added benefit would be acclimating students to using public transportation, which helps create long-term transit riders. Public transportation is widely used by secondary students across the country, and its use should be carefully considered when making a new transportation plan for the district.

There will be other costs associated with a schedule change. Other capital costs could include lights for athletic fields and building costs if building hours were different. Other foreseeable costs would be time-related. For example, the athletics departments will need to re-organize field usage schedules, and practice and game times. Academic and counseling departments will need to reevaluate and possibly completely redo school schedules. Families, students, and school staff will need to deal with changes associated with childcare, job schedules, and transportation.

VII. Conclusions

Sleep deprivation has serious short- and long- term consequences, and early school start times for adolescents contribute to sleep deprivation. Other factors also influence sleep, but those are often tied to individual choice and societal trends. A school district can't mandate what time a student falls asleep, or control whether a student is staring at their iPhone at 10 pm, but it can decide when that student needs to be somewhere in the morning. School schedules are modifiable, and they affect the sleep schedules of entire populations of students.

Changing schedules is difficult. Routines are established, expectations have been set, and there is comfort in habit. But health is often a reason to

[11] Other possible transportation savings could come from coordination with the Tumwater and North Thurston districts regarding the transport of students covered under the McKinney-Vento Act, decreasing transportation needs for athletics by reevaluating leagues, and consolidating special education routes.

change an established routine, or even a long-held tradition. We believe that in the OSD, students should know that the District has prioritized their health over the ever-increasing demands and expectations that they are faced with. Teens in 2019 live in a fast-paced, pressure-filled, competitive environment with constant access to the world--which they feel increasingly responsible for saving--in their hands. They have little to no down time. Now more than ever they need their sleep.

We are fortunate that our community, for the most part, recognizes this need and is willing to change their lives to accommodate it, despite the recognized challenges.

The Committee sees a change in start times as not only an opportunity to increase sleep time, but also as a chance to for the District to re-evaluate priorities and overall school day schedules (the feasibility of flexible scheduling has radically increased due to electronic access to educators and school materials) and make a real difference in student outcomes, not just through increasing graduation rates or academic achievement, but by making the health of adolescents, and their stable brain growth, an underlying community value.

VIII. Recommendations

1. The Citizens Advisory Committee recommends middle and high schools in the OSD start no earlier than 8:30 am.

2. The Committee recommends that the OSD create and implement a program that will actively educate students, parents, staff, and the community on the effects of sleep deprivation, on healthy sleep habits and recommended hours of sleep for all ages of students, and on how best to avoid blue/white light before sleep.

3. The Committee recommends that the District issue guidelines for each grade on appropriate screen use.

4. The Committee recommends that the District and the Board support the community to the best of their abilities before, during, and after a transition to later start times. Some suggestions for doing so include:

- Helping the Boys & Girls Club and Y-care with appropriate changes in their locations, and the times of day that they are available to the community.

- Engaging with childcare businesses in the community regarding the upcoming changes and determine if there are any issues that will impact their ability to take young children earlier in the day (accounting for earlier release of elementary students).

- Being available to the families in our district to help find solutions to their individual needs. We could provide a list of possible daycare centers and the hours they provide service, communicate the updated Y-care and Boys & Girls Club schedules, provide the updated school bus schedules, and reference the transit schedules for those students wanting transportation during times that OSD buses are not available. We could also use principals' funds to assist with after-school childcare for elementary students, or help parents find other sources for such assistance.

5. The Committee recommends that the District design and implement a study in which pre-change and post-change outcomes are collected and evaluated in a standardized manner and made available to the community. In addition, follow-up assessments over a longer time frame should be undertaken in order to determine whether the observed sleep increases and other outcomes are maintained. These may also help us to understand the mechanisms of change.[12] Longitudinal studies could also inform the District as to the best start times for specific ages and grades.

[12] For instance, some studies have seen academic benefits because of improving positive attitude towards life or due to development of persistence.

IX. Bibliography and Research Links

Bibliography and Research Links

A. Athletic Research

1. “Tired athletes are slower to react to a ball, puck, or player speeding toward them, increasing the likelihood of injury. Additionally, insufficient sleep doesn’t allow the body time to repair from the stress of workouts and games. And, because exhaustion also affects the immune system, sleep-deprived athletes are more susceptible to illness.” https://www.gssiweb.org/sports-science-exchange/article/sse-167-sleep-and-athletes - retrieved 11/17/2019

2. “...mood state was significantly altered with increases in depression, tension, confusion, fatigue and anger and decreases in vigour.” https://www.gssiweb.org/sports-science-exchange/article/sse-113-sleep-and-the-elite-athlete - retrieved 11/17/2019

3. “Following sleep restriction, it has been proven that a 30 minute nap improves athletes’ performance in speed trials29. It has also been shown that naps may improve the cognitive processes affected by sleep restriction30, which hypothetically may have a positive effect on the technical-tactical performance, when it comes to learning new motor skills or carrying out highly complex motor skills, as well as preventing the appearance of injuries. For this reason, it could be considered that athletes that suffer from sleep restrictions may benefit from a nap, thus turning it into a way of combating accumulated sleep loss.” http://archivosdemedicinadeldeporte.com/articulos/upload/rev01_mata_ordonez-ingles.pdf - retrieved 11/17/2019

4. “Catching more sleep could help student-athletes catch more touchdowns, but some still argue sports schedules are a reason against moving back the first bell.” https://www.theatlantic.com/education/archive/2017/04/how-school-start-times-affect-high-school-athletics/522537/ - retrieved 11/17/2019

5. “While the basic recommendation is for teenagers to get at least 8 hours of sleep per night, getting more sleep—say, 10 hours per night—on a regular basis can help those pursuing sports goals to reach their peak athletic performance.”
   https://www.sleepfoundation.org/articles/do-student-athletes-need-extra-sleep - retrieved 11/18/2019

B. Brain Research

1. “Because the prefrontal cortex is still developing, teenagers might rely on a part of the brain called the amygdala to make decisions and solve problems more than adults do. The amygdala is associated with emotions, impulses, aggression and instinctive behaviour.”

   Brain development: teenagers https://raisingchildren.net.au/pre-teens/development/understanding-your-pre-teen/brain-development-teens - retrieved 11/17/2019

2. “New findings in developmental psychology and neuroscience reveal that a fundamental reorganization of the brain takes place in adolescence.”
   Brain Development During Adolescence: Neuroscientific Insights Into This Developmental Period
   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3705203/ - retrieved 11/17/2019

3. “The scientists assume that the quality of sleep is jointly responsible for the neuronal connections to develop optimally during childhood and adolescence. Consequently, it is important for a child to sleep sufficiently during this life phase.”
   Developing brain regions in children hardest hit by sleep deprivation
   https://www.sciencedaily.com/releases/2016/10/161004114514.htm - retrieved 11/18/2019

4. “There is a close relationship between sleep and childhood neurodevelopmental/neurodegenerative disorders.”
   Sleep in Neurodevelopmental and Neurodegenerative Disorders.

https://www.ncbi.nlm.nih.gov/pubmed/26072342/ - retrieved 11/18/2019

5. "... the researchers determined that each hour of lost sleep was associated with a 38 percent increase in the odds of feeling sad and hopeless, a 42 percent increase in considering suicide, a 58 percent increase in suicide attempts and a 23 percent increase in substance abuse.

   "These correlational findings do not prove that lack of sleep is causing these problems. Certainly the reverse can be true: depression and anxiety can cause insomnia." "But the majority of the research evidence supports the causal direction being lack of sleep leading to [mental health] problems rather than the other way around," says study co-author Adam Winsler, a psychology professor at George Mason University."

   Teenagers Who Don't Get Enough Sleep at Higher Risk for Mental Health Problems
   https://www.scientificamerican.com/article/teenagers-who-don-t-get-enough-sleep-at-higher-risk-for-mental-health-problems/ - retrieved 11/18/2019

6. "In contrast to the longstanding view of this relationship which viewed sleep problems as symptoms of psychiatric disorders, there is growing experimental evidence that the relationship between psychiatric disorders and sleep is complex and includes bi-directional causation."

   Psychiatric Disorders and Sleep
   https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3493205/ - retrieved 11/18/2019

7. "Dr. Allison Baker, a child and adolescent psychiatrist, says teens who don't get the kind of sleep they need in order to be able to self-

regulate can actually exhibit many of the same symptoms as kids with ADHD. Signs of sleepiness can include an inability to sit still, to stay on task and to focus. “It’s an easy misdiagnosis to make,” Baker says.”

Teens and Sleep: The Cost of Sleep Deprivation
https://childmind.org/article/happens-teenagers-dont-get-enough-sleep/ - retrieved 11/18/2019

8. “The symptoms and consequences [of sleep deprivation] have concrete effects on even the most resilient kids and potentially devastating ones on those who have a predisposition toward mood disorders like depression.”
Teens and Sleep: The Cost of Sleep Deprivation
https://childmind.org/article/happens-teenagers-dont-get-enough-sleep/ - retrieved 11/18/2019

9. As Hamburg noted in his opening remarks, the workshop offered an “opportunity to call attention to a very important and, until recently, neglected problem area.” “Adolescence is the time of greatest vulnerability from the standpoint of sleep,” Dement, a pioneer in the field of sleep research, told workshop participants.
“Sleep Needs, Patterns, and Diffculties of Adolescents”
https://www.nap.edu/read/9941/chapter/2#2

10. This article is about stress reduction as part of socioeconomic low performance gap mitigation and is not specifically related to school start times:
“We find that students from lower-income backgrounds who are given the opportunity to adaptively regulate their emotional experience before an examination (with either expressive writing, reappraisal, or both) outperformed lower-income students who were not given a similar opportunity. “Reducing socioeconomic disparities in the STEM pipeline through student emotion regulation”
Reducing socioeconomic disparities in the STEM pipeline through student emotion regulation
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6358706/

11. “During deep sleep, your breathing, heartbeat, body temperature, and brain waves reach their lowest levels. Your muscles

are extremely relaxed, and you are most difficult to rouse… …[This is] known as the healing stage, when tissue growth and repair take place, important hormones are released to do their jobs, and cellular energy is restored."
How Much Deep, Light, and REM Sleep Do You Need?
https://www.healthline.com/health/how-much-deep-sleep-do-you-need#stages - retrieved 11/25/2019

C. Primary Student Sleep and Start Time Research

1. "School start time change did not decrease total amount of sleep. This is the first study of its kind to report on the effects of a start time change in elementary school students."
   https://www.sciencedirect.com/science/article/abs/pii/S2352721815000522

2. "If elementary students are not affected by later start times, as my data suggest (albeit not definitively), it may be possible to increase test scores for middle school students at no cost by having elementary schools start first."
   https://www.educationnext.org/do-schools-begin-too-early/

3. "The effect on math scores is statistically indistinguishable from zero for ages 8 to 12; at age 13, it jumps to nearly 10 percent of a standard deviation from 5 percent. This is evidence that the increasing importance of start times with age is driven by the onset of puberty rather than other academic or behavioral changes."
   https://www.educationnext.org/rise-shine-how-school-start-times-affect-academic-performance/ retrieved - 11/15/19

4. "It has been observed that teenagers tend to have a delayed circadian rhythm, with respect to children and adults. This means that the cortisol and melatonin levels rise and reach a peak later than usual, which can cause difficulty in getting to sleep. In some cases, particularly when early morning routines are necessary for school or other activities, teenagers may have difficulty getting enough sleep and are more likely to become sleep deprived."
   https://www.news-medical.net/health/Circadian-Rhythm.aspx - retrieved 11/16/2019

5. “As children pass into adolescence, both the stages of sleep and the sleep cycle remain largely unchanged. One thing that does change, however, is the timing of their sleep.” http://healthysleep.med.harvard.edu/healthy/science/variations/changes-in-sleep-with-age

6. “School age children (6-13): Sleep range widened by one hour to 9-11 hours (previously it was 10-11)
Teenagers (14-17): Sleep range widened by one hour to 8-10 hours (previously it was 8.5-9.5)
Younger adults (18-25): Sleep range is 7-9 hours (new age category)” https://www.sleepfoundation.org/press-release/national-sleep-foundation-recommends-new-sleep-times - retrieved 11/18/2019

7. “Although our study did not permit direct examination of associations between circadian parameters, nighttime settling, and outcomes related to young children's potential for school success, our results have implications for parents and educators. Children with nighttime settling difficulties are more likely to sleep for shorter durations during the night (Jenni et al., 2005). Thus, they may be at higher risk for sleep restriction at a time when they are also obtaining many important academic and social/emotional skills (e.g., complexity of language, vocabulary, basic counting, impulse control, listening to directions) that serve as the foundation for future educational success (Rouse, Brooks-Gunn, & McLanahan, 2005). In children, daytime sleepiness is often manifested by increased activity, aggressive behavior, impulsivity, acting-out behavior, poor concentration, and inattention (Fallone, Owens, & Deane, 2002). Given that nighttime settling difficulties commonly emerge in early childhood and may persist into the school years, early intervention is of the utmost importance. Our findings highlight the need to consider children's individual circadian physiology in designing such programs. In adolescents and adults, a rich literature is emerging on the performance, mood, and health consequences of poor fit between the circadian timing system and social demands. With procedures now in place for assessing the onset of the hormone melatonin in young children, we can begin to answer key questions linking circadian rhythms, sleep, and young children's school readiness.”

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3925339/ - retrieved 11/16/2019

8. "Our research shows that adjusting school start times so that high school students have the latest start time would significantly increase achievement for older children at a very low academic cost for younger children—who will more than make up for this cost when they grow older."
https://www.educationnext.org/rise-shine-how-school-start-times-affect-academic-performance/ - retrieved 11/19/2019

9. "... the starting times for 71 elementary schools were spread among 7:40, 8:40, or 9:40."
https://www.spps.org/cms/lib/MN01910242/Centricity/Domain/7352/elementary_feedback_on_changed_start_times.pdf - retrieved 11/20/2019

10. Greater behavioral problems are observed, but not for socioeconomically disadvantaged students, with earlier school starts.
https://www.sleephealthjournal.org/article/S2352-7218(17)30004-9/abstract - retrieved 11/20/2019

11. "So how do you get kids to bed — and keep them there? What should you do when kids wake in the middle of the night? And how much sleep is enough for your kids?"
https://kidshealth.org/en/parents/sleep.html - retrieved 11/20/2019

12. "While it's true that sleep needs vary from one person to another, there are some very reasonable, science-based guidelines to help you determine whether your child is getting the sleep he or she needs to grow, learn, and play."
https://www.healthychildren.org/English/healthy-living/sleep/Pages/Healthy-Sleep-Habits-How-Many-Hours-Does-Your-Child-Need.aspx - retrieved 11/20/2019

D. Secondary Student Sleep and Start Time Research

1. "This paper reviews studies examining the association between school start times, sleep, and other outcomes including academic

performance, mental health, and motor vehicle collisions among adolescent students. This paper, and especially the table provided, is intended to be a resource for educators, parents, and other stakeholders who wish to learn more about the impact of changing school start times for adolescents."
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4824552/

2. "Since most teens have early school start times along with other commitments, this sleep phase delay can make it difficult to get the sleep teens need -- an average of 9 1/4 hours, but at least 8 hours. This sleep deprivation can influence the circadian rhythm; for teens the strongest circadian "dips" tend to occur between 3:00-7:00 am and 2:00-5:00 pm, but the morning dip (3:00-7:00 am) can be even longer if teens haven't had enough sleep, and can even last until 9:00 or 10:00 am."
https://www.sleepfoundation.org/articles/sleep-drive-and-your-body-clock

3. "The most obvious change from childhood to adolescence is in the circadian rhythm-teens often seem tired or experience trouble sleeping due to the change in their internal clocks. Due to these changes in rhythm, a teen's body wants to be awake later into the night and sleep later in the morning. By the age of 20, the amount of time a person spends in deep sleep is cut in half (children generally spend 50% of their night in deep sleep). "
https://www.sleepdr.com/the-sleep-blog/age-and-sleep-how-our-sleep-changes-from-childhood-to-adulthood/ - retrieved 11/16/2019

4. "The impact of early school times on adolescents is not understood by most educators: a common belief is that adolescents are tired, irritable and uncooperative because they choose to stay up too late, or are difficult to wake in the morning because they are lazy. Educators tend to think that adolescents learn best in the morning and if they simply went to sleep earlier, it would improve their concentration. These assumptions reflect societies' prejudice in favour of early risers in adulthood, exemplified by the proverb: "Early to bed, early to rise, makes a man healthy, wealth and wise."

   "This belief finds expression in many cultures, and even in today's business world (Czeisler 2006; Roenneberg 2012). Such conventional

wisdom lies behind the misconception that adolescents need to be trained to rise early and to go to sleep early. The truth is that adults need to be educated to adjust to another significant change in adolescents during puberty: a major biological shift in their sleep patterns."
https://www.tandfonline.com/doi/full/10.1080/17439884.2014.942666#.VfG5uJey5l0 - retrieved 10/31/2019

5. "Chronic sleep loss and associated sleepiness and daytime impairments in adolescence are a serious threat to the academic success, health, and safety of our nation's youth and an important public health issue."
https://pediatrics.aappublications.org/content/134/3/e921

6. "Sleep has an important role to play in the health of adolescents and young adults, both in the short and longer term."
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6301929/

7. [I]n late adolescence the conflict between social time and biological time is greater than at any point in our lives. During adolescence biological changes dictate both a sleep duration of nine hours and later wake and sleep times, a phenomenon found in other mammals (Hagenauer et al. 2009; Rüger et al. 2012). At its peak the combination of these two biological changes leads to a loss of two to three hours sleep every school day. Thus, a 07:00 alarm call for older adolescents is the equivalent of a 04:30 start for a teacher in their 50s. Failure to adjust education timetables to this biological change leads to systematic, chronic and unrecoverable sleep loss. This level of sleep loss causes impairment to physiological, metabolic and psychological health in adolescents while they are undergoing other major physical and neurological changes (Hansen et al. 2005; Giedd 2009; Giedd et al. 2012; Sawyer et al. 2012; Sørensen et al. 2012; Foster et al. 2013.)

8. "Because the factors that influence adolescent sleep patterns are both biological and behavioral, solutions need to address those processes as well as the constraints on sleep imposed by the practicalities and habits of young people's daily lives."
https://www.nap.edu/read/9941/chapter/2#5

9. “Children 6 to 12 years of age should sleep 9 to 12 hours per 24 hours on a regular basis to promote optimal health. Teenagers 13 to 18 years of age should sleep 8 to 10 hours per 24 hours on a regular basis to promote optimal health.” https://aasm.org/resources/pdf/pediatricsleepdurationconsensus.pdf - retrieved 11/16/2019

10. Sleep deprivation: In an aviation context, flight safety can be compromised. https://www.ncbi.nlm.nih.gov/pubmed/29921352

11. In a shift worker context, the result can be poor concentration, absenteeism, accidents, errors, injuries, and fatalities. https://www.sleepfoundation.org/articles/shift-work-and-sleep

12. The Ideal Work Schedule, as Determined by Circadian Rhythms: https://hbr.org/2015/01/the-ideal-work-schedule-as-determined-by-circadian-rhythms

13. “Some experts have proposed even more dramatic scheduling shifts. Researchers from Oxford University, Harvard University, and the University of Nebraska said 16-year-olds should not start school before 10 a.m., and 18-year-olds before 11 a.m.” “One study from 2016 even found that adjusting start times (and sleep schedules) could help close academic performance gaps between boys and girls.” https://blogs.edweek.org/edweek/high_school_and_beyond/2015/09/high_school_start_times_should_shift_to_10_am.html?r=298278249 — retrieved 10/30/2019

14. “Early school start times reduce performance among disadvantaged students by an amount equivalent to having a highly ineffective teacher. In school districts with greater flexibility to adjust start times, starting school even an hour later can boost performance at low cost.” https://www.brookings.edu/wp-content/uploads/2016/06/092011_organize_jacob_rockoff_paper.pdf - retrieved 11/20/2019

15. “When researching a school district which shifted to later start times for some of its middle and high schools for transportation

convenience, authors of the research found that “the analysis finds that students whose schools start one hour later watch roughly fifteen minutes less TV per day and spend roughly seventeen minutes more per week on homework, providing context on how start times can impact achievement.” https://www.brookings.edu/wp-content/uploads/2016/06/092011_organize_jacob_rockoff_paper.pdf - retrieved 10/31/19

16. “These students have no choice over their course schedules and, during the two years of the study, are assigned start times ranging from 7:00 a.m. to 8:50 a.m.1 Moreover, unlike most high schools, all first-year Air Force students take the same classes and the same standardized course exams, providing a consistent objective outcome measure.
Carrell and his colleagues (2011) found that students assigned to start classes prior to 8:00 a.m. performed worse not only in their first-period course, but in all of their courses. Moreover, the size of the effect was substantial, with a one- hour delay associated with a 0.15 standard deviation increase in performance. For sake of comparison, note that the achievement gap between black and white students in the United States is roughly 1.0 standard deviation.”
https://www.brookings.edu/wp-content/uploads/2016/06/092011_organize_jacob_rockoff_paper.pdf - retrieved 10/31/19

17. Referring to a study by Cortes, Bricker and Rohlfs (2009), the authors state “… they find that student grades and test score performance are notably lower for their first-period courses. For example, students assigned to a math class in first period do systematically worse on the end-of-year standardized math exam, whereas students assigned to English during first period do worse on the English exams. This study highlights the fact that start times might influence adolescent performance not simply because they are less alert early in the mornings, but also because they may be more likely to miss early morning classes.
https://www.brookings.edu/wp-content/uploads/2016/06/092011_organize_jacob_rockoff_paper.pdf - retrieved 10/31/19

18. “We have hundreds of districts that have moved their bell times later [...] and the sky didn’t fall,” Ziporyn tells Teen Vogue. She says most schools can easily find creative solutions to logistical problems, such as altering bus routes or having sports practices at lunch. It all starts with making sleep a priority. https://www.teenvogue.com/story/starting-school-later-can-drastically-improve-students-lives?fbclid=IwAR2hQIae3rT6YpJ_zWs2kr3tq9Z5lYsBzafImcb0sx7kK-bvTlKk1-mNUQc

19. “During adolescence biological changes dictate both a sleep duration of nine hours and later wake and sleep times, a phenomenon found in other mammals (Hagenauer et al. 2009; Rüger et al. 2012). At its peak the combination of these two biological changes leads to a loss of two to three hours sleep every school day. Thus, a 07:00 alarm call for older adolescents is the equivalent of a 04:30 start for a teacher in their 50s." https://www.tandfonline.com/doi/full/10.1080/17439884.2014.942666#.VfG5uJey5l0 - retrieved 10/31/2019

20. “Delayed start times may even lead to a decrease in the achievement gap between students from low and high socioeconomic backgrounds, said the researchers.” http://neatoday.org/2019/02/27/what-happens-when-schools-start-later/

21. “The average school district in our sample has no gender achievement gap in math, but a gap of roughly 0.23 standard deviations in ELA that favors girls.” https://cepa.stanford.edu/sites/default/files/wp18-13-v201806_0.pdf

22. “Sleep in Middle and High School Students” https://www.cdc.gov/features/students-sleep/ -- retrieved 11/15/19

23. “Sleep studies suggest that girls go to sleep earlier, are more active in the morning, and cope with sleep deprivation better than boys. We provide the first causal evidence on how gender differences in sleep cycles can help explain the gender performance gap. We exploit over 240,000 assignment-level grades from a quasi-experiment with a community of middle and high schools where students'

schedules alternated between morning and afternoon start times each month. Relative to girls, we find that boys' achievement benefits from a later start time. For classes taught at the beginning of the school day, our estimates explain up to 16% of the gender performance gap." http://ftp.iza.org/dp10012.pdf - retrieved 10/16/2019

24. "Eight Major Obstacles to Delaying School Start Times" https://www.sleepfoundation.org/articles/eight-major-obstacles-delaying-school-start-times -- retrieved 11/14/19

25. California State Law regarding School Start Time: https://www.latimes.com/california/story/2019-10-13/california-first-state-country-later-school-start-times-new-law - retrieved 11/16/2019 https://www.sacbee.com/news/politics-government/capitol-alert/article236008458 .html?smid=nytcore-ios-share#storylink=cpy - retrieved 11/16/2019

26. The average crash rates in the 2 years after the change in school start times, as shown in Figure 4, reflect a significant decrease of 16.5% in the study county ($p < .01$), whereas there was a significant increase of 7.8% across the same time period in the rest of the state ($p < .01$): https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2603528/ - retrieved 11/19/2019

27. Although not all studies found that later start times corresponded to improved academic performance, no studies found a negative impact of later school start times on academics. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4824552/ - retrieved 11/19/2019

28. Sleep hygiene as part of treatment for sleep problems: https://aasm.org/resources/factsheets/crsd.pdf - retrieved 11/16/2019

29. Naps can help pick you up and make you work more efficiently, if you plan them right. Naps that are too long or too close to bedtime can interfere with your regular sleep. https://www.sleepfoundation.org/articles/teens-and-sleep - retrieved 11/19/2019

30. "Sleepmore in Seattle: Later school start times are associated with more sleep and better performance in high school students" https://www.researchgate.net/publication/329624593_Sleepmore_in_Seattle_Later_school_start_times_are_associated_with_more_sleep_and_better_performance_in_high_school_students - retrieved 11/19/2019

31. "Learn how starting school later can help adolescents get enough sleep and improve their health, academic performance, and quality of life." https://www.cdc.gov/features/school-start-times/index.html - retrieved 11/19/2019

32. "Preliminary findings from a new study of middle school and high school students suggest that they got more sleep and were less likely to feel too sleepy to do homework after their district changed to later school start times." https://www.sciencedaily.com/releases/2019/06/190607113825.htm - retrieved 11/19/2019

33. "...multiple factors contribute to teens' sleep deprivation, including athletics and extracurricular activities, homework, jobs and use of technology." Interviewee states, "Evidence strongly suggests that a too-early start to the school day is a critical contributor to chronic sleep deprivation among American adolescents." https://www.davisenterprise.com/local-news/sleep-expert-urges-later-school-start-times-less-homework/ - retrieved 11/19/2019

34. "School Start Times for Adolescents: The American Academy of Pediatrics recognizes insufficient sleep in adolescents as an important public health issue..." https://pediatrics.aappublications.org/content/134/3/642 - retrieved 11/20/2019

35. "This report describes how social class characteristics plausibly depress achievement..." https://www.epi.org/publication/five-social-disadvantages-that-depress-student-performance-why-schools-alone-cant-close-achievement-gaps/ - retrieved 11/21/2019

36. “These findings suggest cost is still likely to be a significant contributor to healthiness of food choices…” https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4910945/ - retrieved 11/21/2019

37. “Examining the Impact of Later High School Start Times on the Health and Academic Performance of High School Students: A Multi-Site Study” https://conservancy.umn.edu/bitstream/handle/11299/162769/Impact%20of%20Later%20Start%20Time%20Final%20Report.pdf?sequence=1&isAllowed=y&smid=nytcore-ios-share - retrieved 11/23/2019

38. Matthew Walker, author of Why We Sleep and professor of neuroscience and psychology at the University of California, Berkeley, and the video “What Happens to your Brain and Body when you Don’t Get Sleep” https://www.independent.co.uk/life-style/health-and-families/sleep-deprivation-video-effects-body-mind-human-health-cancer-alzheimers-dementia-brain-damage-a8153851.html?amp - retrieved 11/23/2019

E. Other Research

1. "State tests are a good dipstick," said Chris Reykdal, Superintendent of Public Instruction. "They let us see a point in time, and they show us where things are going well and where improvement is needed. Most important, this year's results are showing us that large gaps exist in subject areas, in race and ethnicity, and in poverty and mobility. And those gaps are telling us that we have a lot of work to do." https://www.k12.wa.us/about-ospi/press-releases/gaps-continue-state-test-results-more-work-ahead — retrieved 11/7/2019

2. Olympia middle and high school enrollment, attendance, graduation, drop-out and absence data: https://washingtonstatereportcard.ospi.k12.wa.us — retrieved 10/22/2019

3. Definition of homeless students:

https://www.k12.wa.us/student-success/access-opportunity-education/homeless-education — retrieved 11/7/2019

4. Olympia School District school report cards: https://washingtonstatereportcard.ospi.k12.wa.us/ReportCard/ViewSchoolOrDistrict/100182 - retrieved 11/18/2019

5. Washington's State Board of Education (SBE) collects compliance information annually, including required instructional hours: https://www.sbe.wa.gov/our-work/basic-education-compliance

6. National Center for Children in Poverty: Washington State

   29% (262,054) of white children live in low-income families.
   58% (34,417) of black children live in low-income families.
   63% (201,694) of Hispanic children live in low-income families.
   28% (32,002) of Asian children live in low-income families.
   54% (10,588) of American Indian children live in low-income families.
   Low-Income Children: 38% (590,327) of children live in low-income families (National: 41%)
   http://www.nccp.org/profiles/WA_profile_6.html - retrieved 11/18/2019

7. "In 2015, the Seattle Transportation Benefit District (STBD) launched the Youth ORCA Program in cooperation with Seattle Public Schools (SPS) to distribute ORCA cards to income-eligible youth." https://commuteseattle.com/articles/new-clients-reduced-fare-youth-orca/ - retrieved 11/18/2019

8. Thurston Climate Mitigation Plan https://www.trpc.org/909/Thurston-Climate-Mitigation-Plan - retrieved 11/18/2019

IX. Appendices

A. AAP 2014: School Start Times for Adolescents

"School Start Times for Adolescents" PDF

B. Outside of School Traveling Activities and Seat Time

"Outside of School Traveling Activities and Seat Time" PDF

C. First Survey Results

"Survey 1 Information" PDF

D. Second Survey Themes Analysis

"Themes of the Survey" PDF

E. Second Survey Results Summary

"Second Survey Results Summary" PDF

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

POLICY STATEMENT

School Start Times for Adolescents

abstract

FREE

The American Academy of Pediatrics recognizes insufficient sleep in adolescents as an important public health issue that significantly affects the health and safety, as well as the academic success, of our nation's middle and high school students. Although a number of factors, including biological changes in sleep associated with puberty, lifestyle choices, and academic demands, negatively affect middle and high school students' ability to obtain sufficient sleep, the evidence strongly implicates earlier school start times (ie, before 8:30 AM) as a key modifiable contributor to insufficient sleep, as well as circadian rhythm disruption, in this population. Furthermore, a substantial body of research has now demonstrated that delaying school start times is an effective countermeasure to chronic sleep loss and has a wide range of potential benefits to students with regard to physical and mental health, safety, and academic achievement. The American Academy of Pediatrics strongly supports the efforts of school districts to optimize sleep in students and urges high schools and middle schools to aim for start times that allow students the opportunity to achieve optimal levels of sleep (8.5–9.5 hours) and to improve physical (eg, reduced obesity risk) and mental (eg, lower rates of depression) health, safety (eg, drowsy driving crashes), academic performance, and quality of life. *Pediatrics* 2014;134:642–649

ADOLESCENT SLEEP WORKING GROUP, COMMITTEE ON ADOLESCENCE, and COUNCIL ON SCHOOL HEALTH

KEY WORDS
adolescents, insufficient sleep, school start times

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FACTORS INFLUENCING INSUFFICIENT SLEEP IN ADOLESCENTS

Insufficient sleep represents one of the most common, important, and potentially remediable health risks in children,[1,2] particularly in the adolescent population, for whom chronic sleep loss has increasingly become the norm.[3] The reasons behind the current epidemic of insufficient sleep are complex and interrelated. From a biological perspective, at about the time of pubertal onset, most adolescents begin to experience a sleep–wake "phase delay" (later sleep onset and wake times), manifested as a shift of up to 2 hours relative to sleep–wake cycles in middle childhood.[4] Two principal biological changes in sleep regulation are thought to be responsible for this phenomenon.[5,6] One factor is delayed timing of nocturnal melatonin secretion across adolescence[5,7,8] that parallels a shift in circadian phase preference from more "morning" type to more "evening" type, which consequently results in difficulty falling asleep at an earlier bedtime.[4] The second biological factor is an altered "sleep drive" across adolescence, in which the pressure to fall asleep accumulates more slowly, as demonstrated by the adolescent brain's response to sleep loss[9]

and by a longer time to fall asleep after being awake for 14.5 to 18.5 hours in postpubertal versus prepubertal teenagers.[10] Thus, these 2 factors typically make it easier for adolescents to stay awake later. At the same time, several studies from different perspectives indicate that adolescent sleep needs do not decline from preadolescent levels, and optimal sleep for most teenagers is in the range of 8.5 to 9.5 hours per night.[5,11,12] On a practical level, this research indicates that the average teenager in today's society has difficulty falling asleep before 11:00 PM and is best suited to wake at 8:00 AM or later.[4,12,13]

The sleep–wake changes that flow from this biological maturation may enable teenagers' interactions with such environmental factors and lifestyle/social demands as homework, extracurricular activities, after-school jobs, and use of technology.[14–16] As a result, most teenagers stay up late on school nights, getting too little sleep, and then sleep in on weekends to "catch up" on sleep. Although this weekend oversleeping can help offset the weekly sleep deficit, it can worsen circadian disruption and morning sleepiness at school.[9,17,18]

The Extent and Effects of Adolescent Sleep Loss

Given both biological demands and today's sociocultural influences, it is not surprising that many studies have documented that the average adolescent in the United States is chronically sleep deprived and pathologically sleepy (ie, regularly experiencing levels of sleepiness commensurate with those of patients with sleep disorders such as narcolepsy).[19] For example, a recent National Sleep Foundation poll[20] found that 59% of sixth- through eighth-graders and 87% of high school students in the United States were getting less than the recommended 8.5 to 9.5 hours of sleep on school nights; indeed, the average amount of school night sleep obtained by high school seniors was less than 7 hours. In this same survey, however, 71% of parents believed that their adolescent was obtaining sufficient sleep. This mismatch indicates a significant lack of awareness among adults regarding the extent of adolescent sleep loss. As a result, many middle and high school students are at risk for adverse consequences of insufficient sleep, including impairments in mood, affect regulation, attention, memory, behavior control, executive function, and quality of life (Table 1).[21–26]

Insufficient sleep also takes a toll on academic performance. In the National Sleep Foundation poll cited previously,[20] 28% of students reported falling asleep in school at least once a week, and more than 1 in 5 fell asleep doing homework with similar frequency. Many studies show an association between decreased sleep duration and lower academic achievement at the middle school, high school, and college levels, as well as higher rates of absenteeism and tardiness and decreased readiness to learn (Table 1).[17,27–30]

An increased prevalence of anxiety and mood disorders has also been linked to poor quality and insufficient sleep in adolescents.[31–33] Other specific health-related effects of sleep loss include increased use of stimulants (eg, caffeine, prescription medications) to counter the effects of chronic sleepiness on academic performance.[34,35] Adolescents are also at greater risk of drowsy driving–related crashes as a result of insufficient sleep.[36,37] Chronic sleep restriction increases subsequent risk of both cardiovascular disease and metabolic dysfunction, such as type 2 diabetes mellitus.[38,39] An association between short sleep duration and obesity in children and adolescents has been demonstrated in several cross-sectional and prospective studies, underscoring how chronic sleep restriction can undermine health (Table 1).[40,41]

IDENTIFYING SOLUTIONS: THE ROLE OF DELAYING SCHOOL START TIMES

This "epidemic" of delayed, insufficient, and erratic sleep patterns among adolescents and the accompanying negative effects on adolescent health and well-being highlight the importance of identifying potentially modifiable factors. The quest to reduce the high cost of sleep loss in adolescents is not only an important public health issue but one of paramount importance to educators, pediatric health care providers, and

TABLE 1 Impact of Chronic Sleep Loss in Adolescents

Physical health and safety
Increased obesity risk
Metabolic dysfunction (hypercholesterolemia, type 2 diabetes mellitus)
Increased cardiovascular morbidity (hypertension, increased risk of stroke)
Increased rates of motor vehicle crashes ("drowsy driving")
Higher rates of caffeine consumption; increased risk of toxicity/overdose
Nonmedical use of stimulant medications; diversion
Lower levels of physical activity
Mental health and behavior
Increased risk for anxiety, depression, suicidal ideation
Poor impulse control and self-regulation; increased risk-taking behaviors
Emotional dysregulation; decreased positive affect
Impaired interpretation of social/emotional cues in self and others
Decreased motivation
Increased vulnerability to stress
Academics and school performance
Cognitive deficits, especially with more complex tasks
Impairments in executive function (working memory, organization, time management, sustained effort)
Impairments in attention and memory
Deficits in abstract thinking, verbal creativity
Decreased performance efficiency and output
Lower academic achievement
Poor school attendance
Increased dropout rates

advocates for adolescent health. Although many changes over the course of adolescence can affect the quality and quantity of sleep, one of the most salient and, arguably, most malleable is that of school start times. Numerous studies have demonstrated that early start times impede middle and high school students' ability to get sufficient sleep. Studies comparing high schools with start times as little as 30 minutes earlier versus those with later start times demonstrate such adverse consequences as shorter sleep duration, increased sleepiness, difficulty concentrating, behavior problems, and absenteeism.[29,30,42–46] For example, in one key school transition study, Carskadon et al[19] evaluated the effects of a 65-minute advance (ie, move earlier) in school start time from grade 9 to grade 10 in 40 students. They found a delay in the biological markers of circadian timing but also objectively measured daytime sleepiness levels typical of patients with sleep disorders.

Because circadian-based phase delays emerge at around the time of pubertal onset, they also affect younger adolescents, who increasingly are subject to many of the same environmental and lifestyle competing priorities for sleep as older teenagers. Recent research shows that delaying school start times for middle school students is accompanied by positive outcomes similar to those found in high schools, including later rise times, more school night total sleep, less daytime sleepiness, decreased tardiness rates, improved academic performance, and better performance on computerized attention tasks.[30,47,48]

According to the US Department of Education statistics for 2011–2012,[49] approximately 43% of the over 18 000 public high schools in the United States currently have a start time before 8:00 AM. Over the last 15 years, however, a small but growing number of school districts have responded to research reports regarding insufficient sleep among middle and high school students with what may be viewed as a "systematic countermeasure" to reduce the prevalence of sleepiness and its consequences: delaying school start times. Early studies addressed a core question: "Does delaying start time result in students obtaining more sleep, or do students just stay up later and thus negate the effects of the delayed start time?" Wahlstrom et al[50,51] assessed more than 18 000 high school students in Minneapolis before and after the district's school start time changed from 7:15 AM to 8:40 AM beginning with the 1997–1998 school year. Bedtimes after the change were similar (ie, did not shift to a later time) to those of students in schools that did not change start times, and, as a result, students obtained nearly 1 additional hour of sleep on school nights during the 1999–2000 school year. Other studies have also failed to show a delay in bedtime in response to delayed start times. In a study involving grades 6 through 12 in a school district that delayed high school start times by 1 hour (7:30 to 8:30 AM), students averaged 12 to 30 minutes more nightly sleep, and the percentage of students who reported ≥8 hours of sleep increased from 37% to 50%.[52] Owens et al,[53] in a study of adolescents attending an independent school that instituted a start time delay of 30 minutes (from 8:00 to 8:30 AM), reported that average bedtimes actually shifted *earlier* by an average of 18 minutes, and mean self-reported school night sleep duration increased by 45 minutes. In addition, the percentage of students getting less than 7 hours of sleep decreased by 79%, and those reporting at least 8 hours of sleep increased from 16% to 55%. Finally, in a 3-year study of >9000 students from 8 public high schools in 3 states (Colorado, Wyoming, and Minnesota), the percentage of students sleeping ≥8 hours per night was dramatically higher in those schools that had a later start time (eg, 33% at 7:30 AM vs 66% at 8:55 AM).[54]

Moreover, a number of studies have now clearly demonstrated that delaying school start times not only results in a substantive increase in average sleep duration but also has a significant positive effect on a variety of key outcomes; these effects range from decreased levels of self-reported sleepiness and fatigue to improvements in academic measures. In the Minneapolis study,[50,51] attendance rates for students in grades 9 through 11 improved, and the percentage of high school students continuously enrolled increased. Likewise, Dexter et al[42] found that public high school sophomores and juniors at a later- versus earlier-starting high school reported more sleep and less daytime sleepiness. Htwe et al[55] reported that high school students slept an additional 35 minutes, on average, and experienced less daytime sleepiness after their school start time was delayed from 7:35 to 8:15 AM.

Improvements in academic achievement associated with delayed start times have been somewhat less consistently demonstrated; in the Minneapolis study, grades showed a slight but not statistically significant improvement,[50] and standardized test scores were not increased overall compared with those before the start time change.[46,56] However, several recent studies have documented improvements in academic performance associated with later start times. A study of students in Chicago public high schools demonstrated that absences were much more common and student grades and test score performance were notably lower for first-period classes compared with afternoon classes and that performance on end-of-year

subject-specific standardized tests (ie, math, English) correlated with whether the student was scheduled for that subject during first period.[56] Similarly, first-year Air Force Academy students assigned to start classes after 8:00 AM (compared with before 8:00 AM) performed better in their first-period course and, in addition, had a 0.15 SD increase in performance across all of their courses.[44] In a study focusing on middle school students,[45] a 1-hour later shift in school start times was associated with an increase in reading test scores by 0.03 to 0.10 SD and in math test scores by 0.06 to 0.09 SD. The author concluded that an increase in start times by 1 hour would result in a 3 percentile point gain in both math and reading test scores for the average student. Furthermore, students performing in the lower end of the test score distribution seemed to benefit most, with gains roughly twice those in above-average students, and the effects persisted into high school. In a more recent middle school study by the same research group, the results suggested that moving school start later by 1 hour can have an impact on standardized test scores comparable to decreasing the class size by one-third. Finally, in a recent 3-state study, 5 of the 6 high schools in which grade point average was assessed showed a significant pre–post increase in grade point average in core subjects of math, English, science, and social studies.[54]

Finally, there may be additional health-related and other benefits associated with delays in start time. For example, students in the independent school study cited previously[53] reported significantly more satisfaction with their sleep. In addition, class attendance improved, as did health-related variables, including fewer visits to the campus health center for fatigue-related complaints.[53] Although not specifically assessed as an outcome in previous research, later start times might increase the likelihood that students will eat breakfast before school and thus further enhance their readiness to learn.[57] Finally, improvements in teacher satisfaction linked to increased sleep offers yet another potential mechanism for classroom enrichment.

Several other outcome measures examined in these studies also deserve emphasis. In the study by Owens et al,[53] there were significantly fewer students self-reporting symptoms of depressed mood as well as improved motivation after the start time delay. In a more recent study, also conducted in an independent school setting, a 25-minute delay in start time was associated not only with increased sleep duration and decreased daytime sleepiness but also with less self-reported depressed mood.[58] Although more research is needed, given the mounting evidence supporting a bidirectional link between sleep patterns and problems and mood disorders in this population[59] (including an increased risk of suicidal ideation[57]), countermeasures that could potentially mitigate these effects have important public health implications.

Furthermore, adolescents are at particularly high risk of driving while impaired by sleepiness, and young drivers aged 25 years or younger are involved in more than one-half of the estimated 100 000 police-reported, fatigue-related traffic crashes each year.[60] Danner and Phillips[52] examined the relationship between automobile crash records for students 17 to 18 years of age and high school start times. Car crash rates for the county that delayed school start times decreased by 16.5% over the 2 years before and after the school-start change, whereas those for the state as a whole increased by 7.8% across the same time period. In another recent study conducted in 2 adjacent, demographically similar cities, there were significantly increased teen (16- to 18-year-olds) crash rates over a 2-year period in the city with earlier high school start times (2007: 71.2 per 1000 vs 55.6 per 1000; 2008: 65.8 per 1000 vs 46.6 per 1000 [$P < .001$]), and teen drivers' morning crash peaks occurred 1 hour earlier.[61] Finally, the recent study by Wahlstrom et al[54] found a crash rate reduction in 16- to 18-year-olds of 65% and 70%, respectively, in 2 of the 4 high schools studied; notably, the high school with the latest start time (Jackson Hole, WY) had the largest decline in car crashes.

Although considerable empiric support exists for the concepts that early school start times are detrimental to adolescents' health and well-being and that delaying school start times results in substantive and sustained benefits to students, the ongoing debate among school districts in the United States regarding the widespread institution of later start times for middle and high schools continues to spark controversy. Moreover, the logistical considerations in implementing delayed school start times in middle and high schools are far from trivial. Wolfson and Carskadon[62] surveyed 345 public high school personnel regarding their perspective on high school start times, factors influencing school start times, and decision-making around school schedules. Most respondents at that time had not changed or contemplated changing their school start times. Perceived barriers to changing school schedules commonly endorsed included curtailed time for athletic practices and interference with scheduling of games, reduced after-school employment hours for students, challenges in providing child care for younger siblings, adjustments in parent and family schedules, potential safety issues, effects on sleep duration in younger children if

elementary school schedules are "flipped" with those of middle/high school students, and the need to make alternative transportation arrangements. However, to date, to our knowledge, there have been no published studies that have systematically examined the impact of school start time delay on these parameters, although anecdotal evidence suggests that many of these concerns are unfounded (www.sleepfoundation.org). Moreover, communities across the country have adopted a variety of creative solutions to address these problems, including shifting to public transportation for older students, enlisting community volunteers to provide supervision at bus stops, adjusting class schedules to minimize late dismissal times, scheduling free periods/study halls at the end of the school day to allow participation in after-school extracurricular activities, exempting student athletes from physical education requirements, and installing lights for athletic fields.

In addition, as outlined in a recent Brookings Institute Report ("Organizing Schools to Improve Student Achievement: Start Times, Grade Configurations, and Teacher Assignments"),[63] economists have suggested that delaying school start times would have a substantial benefit-to-cost ratio (9:1). This finding is based on a conservative estimate of both costs per student ($0–$1950, largely related to transportation) and the increase in projected future earnings per student in present value because of test score gains related to moving start times 1 hour later (approximately $17 500). Finally, because the appropriation of federal dollars for schools is partially dependent on student attendance data, reducing tardiness and absenteeism levels could result in increased funding and further offset costs related to moving start times later.

CONCLUSIONS

Taken together, these studies support the presence of significant improvements in benchmarks of health and academic success in a variety of settings in association with later school start times, including in urban school districts with a large percentage of low-income and minority students, suburban public schools, and college-preparatory independent schools. It is clear that additional research is needed to further document the effects of changes in school start times over time, to examine specific factors that increase or decrease the likelihood of positive outcomes, and to assess the effect on families, the community, other stakeholders, and the educational system in general. However, it may be strongly argued that both the urgency and the magnitude of the problem of sleep loss in adolescents and the availability of an intervention that has the potential to have broad and immediate effects are highly compelling.

It should also be emphasized that delaying school start times alone is less likely to have a significant effect without concomitant attention to other contributing and potentially remediable factors, such as excessive demands on students' time because of homework, extracurricular activities, after-school employment, social networking, and electronic media use. One of the biggest challenges school districts face is the need to inform community stakeholders (eg, parents, teachers and administrators, coaches, students, bus drivers, businesses that employ students, law enforcement officials) about the scientific rationale underpinning the merits of delaying school start times; the threats to health, safety, and academic success posed by insufficient sleep; and the potential benefits for adolescents of school start time delay. Thus, education and community engagement are equally key components in increasing the likelihood of success.

The American Academy of Pediatrics recognizes insufficient sleep in adolescents as a public health issue, endorses the scientific rationale for later school start times, and acknowledges the potential benefits to students with regard to physical and mental health, safety, and academic achievement. The American Academy of Pediatrics lends its strong support to school districts contemplating delaying school start times as a means of optimizing sleep and alertness in the learning environment and encourages all school administrators and other stakeholders in communities around the country to review the scientific evidence regarding school start times, to initiate discussions on this issue, and to systematically evaluate the community-wide impact of these changes (eg, on academic performance, school budget, traffic patterns, teacher retention).

RECOMMENDATIONS

1. Pediatricians should educate adolescents and parents regarding the optimal sleep amount teenagers need to match physiologic sleep needs (8.5–9.5 hours). Although napping, extending sleep on weekends, and caffeine consumption can temporarily counteract sleepiness, these measures do not restore optimal alertness and are not a substitute for regular sufficient sleep.
2. Health care professionals, especially those working in school-based clinics or acting in an advisory capacity to schools, should be aware of adolescent sleep needs. They should educate parents, teenagers, educators, athletic coaches, and other stakeholders about the biological and environmental factors, including early school start times, that contribute to widespread chronic sleep deprivation in America's youth.

3. Educational interventions for parents and adolescents as well as the general public should be developed and disseminated by the American Academy of Pediatrics and other child and sleep health advocacy groups. Content should include the potential risks of chronic sleep loss in adolescents, including depressed mood, deficits in learning, attention and memory problems, poor impulse control, academic performance deficits, an increased risk of fall-asleep motor vehicle crashes, and an elevated risk of obesity, hypertension, and long-term cardiovascular morbidity. Information should also be included about the potential utility of systemic countermeasures, including delaying school start times, in mitigating these effects. Finally, educational efforts should also emphasize the importance of behavior change on the individual level and the personal responsibility that families and students themselves have in modifying their sleep habits.
4. Pediatricians and other pediatric health care providers (eg, school physicians, school nurses) should provide scientific information, evidence-based rationales, guidance, and support to educate school administrators, parent-teacher associations, and school boards about the benefits of instituting a delay in start times as a potentially highly cost-effective countermeasure to adolescent sleep deprivation and sleepiness. In most districts, middle and high schools should aim for a starting time of no earlier than 8:30 AM. However, individual school districts also need to take average commuting times and other exigencies into account in setting a start time that allows for adequate sleep opportunity for students. Additional information regarding opportunities, challenges, and potential solutions involved in changing school start times may be found at: http://www.sleepfoundation.org/article/sleep-topics/school-start-time-and-sleep; http://schoolstarttime.org.
5. Pediatricians should routinely provide education and support to adolescents and families regarding the significance of sleep and healthy sleep habits as an important component of anticipatory guidance and well-child care. In particular, pediatricians should endorse parental involvement in setting bedtimes and in supervising sleep practices, such as social networking and electronic media use in the bedroom; for example, pediatricians could recommend to parents that they establish a "home media use plan" and enforce a "media curfew." Adolescents should be regularly queried regarding sleep patterns and duration and counseled about the risks of excessive caffeine consumption, misuse of stimulant medications as a countermeasure to sleepiness, and the dangers of drowsy driving.

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School Start Times for Adolescents

ADOLESCENT SLEEP WORKING GROUP, COMMITTEE ON ADOLESCENCE and COUNCIL ON SCHOOL HEALTH

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Outside of School Traveling Activities and Seat Time

(including Athletics breakdowns per sport)

Delaying the start/end times of the school day will impact Seat Time and homework time. The impact will be favorable in some instances and problematic in others.

QUICK SUMMARY:
Feedback from our stakeholders and scientific studies resulted in both pros and cons:

Beneficial outcomes backed by science include:

- Zero Hour will be more reasonably timed for both students and teachers.
- Seat Time for first period will improve and result in fewer absences and tardies.
- Socio-economically disadvantaged students will be especially benefited by a later start time with accompanying increased Seat Time in the morning.
- Students will be more alert, improving their ability to retain information.
- Students will watch less TV and spend more time on their homework.

Potential benefits provided by local stakeholders include:

- Both teachers and students will be more focused, improving students' ability to retain information.
- More teachers would be interested in teaching Zero Hour classes that start later.
- More Zero Hour classes will increase academic and study time options for students.

Problematic outcomes backed by science include:

- For students who have not been previously taking Zero Hour classes and begin to do so after a start/end time delay, any possible gains in additional sleep time would be eliminated.

Potential problems provided by local stakeholders include:

- **Seat Time will decrease as student travel times for outside of school activities will increase if game, concerts and contest schedules do not shift accordingly.**
- Later start times could impact Running Start students' ability to fit in Zero Hour or 1st period classes if they start their college classes early in the day.

Athlete Seat Time Hours:
If the athletic leagues do not modify the game schedules, the additional hours of Seat Time lost would increase:

1) CHS: Delay to 8:45 am would increase Seat Time loss by 5192 hours.
2) OHS: Delay to 8:30 am would increase Seat Time loss by 5471 hours.

a) FALL: 2552 hours shared by 367 students (1337 are for X Country)
b) WINTER: 1140 hours shared by 205 students
c) SPRING: 1779 hours shared by 311 students

Seat Time: General Information

A positive outcome related to Seat Time for secondary students with later start times will be an increase in attendance to first period, including both less tardies and fewer absences. Students will be more focused and have increased academic success not only with the earliest classes; increased academic success will be seen throughout the school day. As an aside, it is known that while there are many reasons that students might choose the Running Start track, having the ability to get up later is one of them.

A significant challenge resulting to later school end times, of course, is the impact that travel times for outside of school activities will have (e.g. athletic games, music concerts and extracurricular contests). The actual impact on student Seat Time will depend entirely on whether program schedules remain the same as they have been during this 2019-2020 school year or if they can be modified.

In particular, the high school athletic directors are concerned about their ability to have appropriate accommodations made to their respective league's game scheduling. It is unclear if that will be able to be accomplished.

In all activities that involve time away from school (e.g. athletic games, music concerts and extracurricular contests), the ability to coordinate and modify schedules will be the most important factor in whether Seat Time Loss will remain the same or if additional Seat Time will be lost.

Delaying school start times:

- Can increase Seat Time at the start of school as fewer students are tardy or absent.
- Can decrease Seat Time at the end of the school day for students who need to travel early for outside of school activities and whose schedules are unable to be modified.

Since it's documented that regular (and on-time) school attendance impacts learning, then is follows that later start times could have a direct impact on the achievement gap between those students and advantaged students.

Seat Time: General Feedback from Stakeholders

The OSD Music Director detailed several impacts to the Music Program that include:

- Zero Hour:
    - Zero Hour will be at a more reasonable hour and he could see that it's possible more students will be willing to take advantage of it.

    - Teachers have commented that they would be willing to teach Zero Hour, but it's just too early. Shifting the start time could allow recruitment of more Zero Hour teachers.
    - It's more likely that both teachers and students will be more focused during Zero Hour if it starts later.
- Coordination with Running Start students and the IB program:
    - These students often use Zero Hour as well as early classes that allow the rest of their school day to be flexible for engaging with their particular program classes and off campus classes. If the start is later, it's possible that having the "singleton" classes (such as ensemble) will be late enough in the morning that is now impacts students' program scheduling.
- Switching teaching times for Primary and Secondary coursework:
    - Currently the music teachers Secondary students first as they are in school earlier. This may need to change and have Primary students take their Music Program classes earlier. At this point, it is unclear if this would be a necessary change.
- School course scheduling:
    - Singleton classes, such as choir, are a kind of skeleton in the schedule and other classes are filled around it within a student's schedule. If the solution to coordinating with the Running Start and IB Program students is to move required high school classes to later in the day, adjustments of global school class calendars will need to be made as singleton classes could end up being moved to the end of the day.
- Event planning and locations:
    - Music Program recitals and performances can be shifted to accommodate the later start times. Events that have schedules outside of OSD's control could result in increased Seat Time loss.
    - The bigger issue is that the shared facilities that can be used for scheduled events now need to fit everything into a smaller amount of time. Some areas are used by the community during certain times and things will need to be rescheduled.
    - Complicating this is that there are logistical challenges associated with certain locations. CHS has the best separated performance areas and OHS is awkward (imagine band concert going on while a wrestling match is in the same building).

The Secondary Athletic Directors detailed several impacts to the Athletics Programs that include:

- Zero Hour:
    - Zero Hour will be at a more reasonable hour and it's possible more students will be willing to take advantage of it. Perhaps an Athletic Study Group could be formed and available after game nights or as needed.
    - This time could be used for practices.
- School course scheduling:
    - It would be helpful if class scheduling could be modified in a way that allowed study periods to be at the end of the day, thus having fewer academic class time being missed due to travel.
    - It would be great, but admittedly not likely, to have core classes earlier in the day to avoid travel impacts.

- Locations and logistics:
    - Shifting the end of the school day later, and then having corresponding shifts of practices/games means that more lighted fields will be necessary. This is a big issue for middle schools. Shared practice location or squishing schedules into smaller time slots would require reorganizing how it works.
    - Shared officiation between middle and high schools is an issue even now. Would later start times impact this? Currently game officials have to leave middle school games early or skip the game entirely since they prioritize getting to the high school games on time.
    - Facilities (e.g. gymns and fields) that are shared are now available for less time in the afternoons. Adjustments will be needed to fit everything into a smaller amount of time or earlier in the day. Some areas are used by the community during certain times and things will need to be rescheduled.

Seat Time: Athletics Program feedback

Each high school student receives 1080 instructional hours per year, with 180 instructional hours per yearly class period. Each semester's class period is 90 hours.

Olympia High School:
5th & 6th period hours instructional time

- OHS student athletes (883 students) receive a combined 158,940 instructional hours per year for the last two periods of school.

5th & 6th period hours additional lost seat time:

- The proposed Seat Time Lost is 5471 additional hours based on an 8:30am start time.
- The proposed additional lost annual instructional hours for the final two periods of the school day due to athletics is 3%.
- Student athletes will receive 97% of the usual amount of instructional hours for the final two periods of the school day that they were able to receive in previous years.

Capital High School:
5th & 6th period hours instructional time

- CHS student athletes (997 students) receive a combined 179,460 instructional hours per year for the last two periods of school.

5th & 6th period hours additional lost seat time:

- The proposed Seat Time Lost is 5192 additional hours based on an 8:30am start time or 6500 based on a 9:00am start time.
- The proposed additional lost annual instructional hours for the final two periods of the school day due to athletics is 3% (for an 8:30am start time) and 4% (for a 9:00am start time).
- Student athletes will receive 96 to 97% of the usual amount of instructional hours for the final two periods of the school day that they were able to receive in previous years.

Olympia High School:
Annual hours instructional time

- OHS student athletes (883 students) receive a combined 953,640 instructional hours per year.
- The additional Seat Time Lost hours based on an 8:30am start time is 5471.
- The proposed additional lost annual instructional hours is 0.6%.
- Student athletes will receive 99.4% of the usual amount of annual instructional hours.

Capital High School:
Annual hours instructional time

- CHS student athletes (997 students) receive a combined 1,076,760 instructional hours per year.
- The additional Seat Time Lost hours based on an 8:30am start time is 5192 and based on an 9:00am start time is 6500.
- The proposed additional lost annual instructional hours is 0.5% with an 8:30am start time and 0.6% with a 9:00am start time.
- Student athletes will receive 99.4 to 99.5% of the usual amount of annual instructional hours.

Both high school Athletic Directors provided athlete totals per season/sport. These numbers are:

Capital High School has a total of 1378 students in school.
A total of 997 student spots on teams:

- 336 students (24% of the student population) are involved in Fall Sports.
- 275 students (20% of the student population) are involved in Winter Sports.
- 386 students (28% of the student population) are involved in Spring Sports.

Olympia High School has a total of 1861 students in school.
A total of 883 student spots on teams:

- 367 students (20% of the student population) are involved in Fall Sports.
- 205 students (11% of the student population) are involved in Winter Sports.
- 311 students (17% of the student population) are involved in Spring Sports.

The Olympia High School Athletics Program has also provided the following breakdown of additional lost Seat Time hours (5471) with a shift to a later start by sport and number of athletes. This information gives an indication of which students/teams are most affected. For example, the sport with the highest total additional lost Seat Time is X Country (boys and girls combined), while the sport with the most individuals student additional Seat Time loss is the Girls Bowling team.

These teams will have zero additional lost Seat Time:

Fall:

- Girls Varsity Soccer (21 students)
- Girls Varsity Volleyball (14 students)
- Boys Varsity Football (39 students)

- CoEd Drill (25 students)

Winter

- Girls Varsity Basketball (12 students)
- Girls Varsity Gymnastics (16 students)
- Boys Varsity Basketball (12 students)

Spring

- Boys C team Baseball (17 students)
- Boys Varsity Soccer (22 students)
- Boys JV Soccer (18 students)

Additional Seat Time Loss is indicated for the following Varsity teams (shown with total hours lost per student that season and the number of students affected):

Fall:

- Girls Golf: 14 hours (7 students)
- Girls Swim: 22 hours (34 students)
- Girls X Country: 16.5 (35 students)
- Boys Golf: 15.75 hours (11 students)
- Boys X Country: 16.5 (46 students)
- Boys Tennis: 10.5 hours (9 students)

Winter

- Girls Wrestling: 2.5 hours (15 students)
- Girls Bowling: 27.5 hours (27 students)
- Boys Swim: 11.5 hours (38 students)
- Boys Wrestling: .5 hours (20 students)

Spring

- Girls Fastpitch: 14.5 hours (18 students)
- Girls Tennis: 12 hours (12 students)
- Girls Track: 5 hours (55 students)
- Boys Baseball: 16 hours (20 students)
- Boys Track: 5 hours (76 students)

Additional Seat Time Loss is indicated for the following JV and C teams (shown with total hours lost per student that season and the number of students affected):

Fall:

- Girls Soccer JV: 5.5 hours (18 students)
- Girls Soccer C team: 13.5 hours (25 students)
- Girls Volleyball JV: 4 hours (13 students)
- Girls Volleyball C team: 3 hours (12 students)
- Boys Football JV: 2 hours (20 students)
- Boys Football C team: 6 hours (26 students)
- Boys Tennis: 13.5 hours (12 students)

Winter:

- Girls Basketball JV: 1.5 hours (10 students)
- Girls Basketball C team: 10.5 hours (10 students)
- Boys Basketball JV: 10 hours (10 students)
- Boys Basketball C team: 17.5 hours (15 students)

Spring

- Girls Fastpitch JV: 17 hours (12 students)

- Girls Tennis: 13.5 hours (18 students)
- Boys Baseball JV: 16.5 hours (18 students)
- Boys Soccer C team: 10 hours (25 students)

School Calendar and Start/End Times

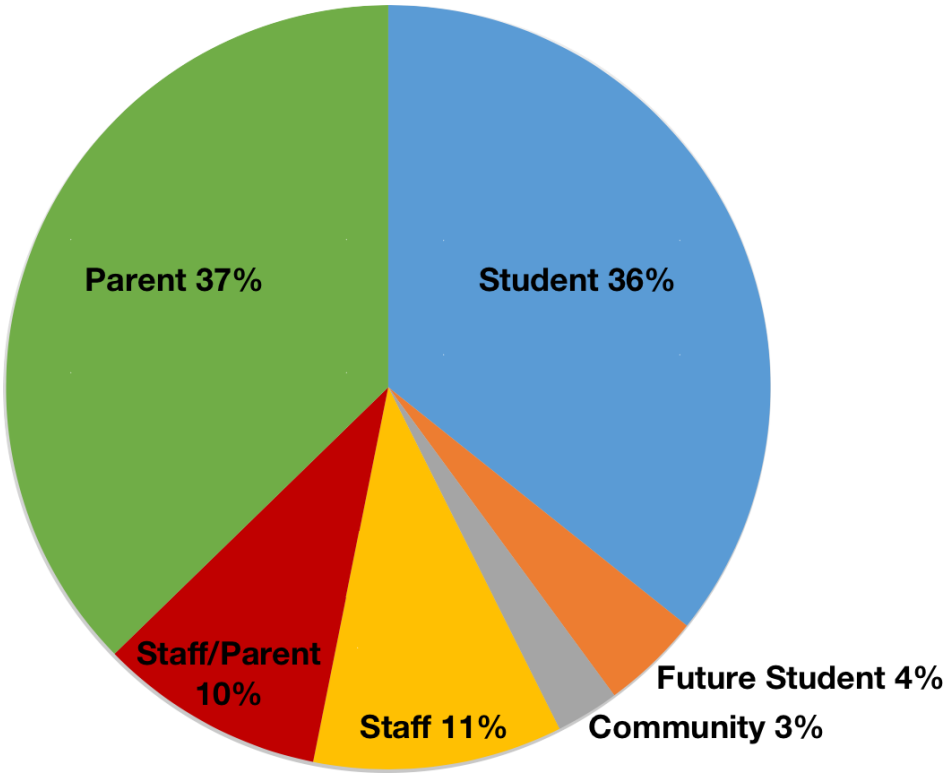
Survey #1 Information

The Calendar and Start/End Times Citizen Advisory Committee was formed to recommend to the Olympia School Board a school schedule and calendar that best supports foundational needs of children. Our the Strategic Plan is supported as many of our desired outcomes can be engaged by adjusting the calendar and bell schedule. The committee has began researching and evaluating what a change in the school schedule and calendar would look like and this document and corresponding presentation is to inform the OSD School Board and the public of our work to date.

The following information is based on the survey sent in early June 2019.

Community Survey #1

June 2019



All of the schools in the Olympia School District were represented in this survey and there were 2427 responses.

RESPONDENTS	PERCENTAGES
PARENT/GUARDIAN/FAMILY MEMBER OF CURRENT STUDENT	37%
STUDENT	36%
STAFF	11%
BOTH STAFF AND PARENT/GUARDIAN/FAMILY MEMBER	10%
PARENT/GUARDIAN/FAMILY MEMBER OF FUTURE STUDENT	4%
COMMUNITY MEMBER	3%

86% of the survey respondents agreed that it's important to pursue a change in school start times.

The percentages of respondents who indicated the importance of this change are shown here by role:

- **89% of students**
- **74.6% of staff**
- **80% of the dual Staff/parent, family, guardian role**
- **93% of parent/family/guardian**
- **89% of community**
- **91% of parent/family/guardian of a future student**

General take aways from the data include:

- The overall results didn't report a negative impact to work, before school obligations, extra curricular or transportation. However, when the students were sorted by schools, students from CHS, JMS, and HES reported a negative impact on family obligations after school.
- The overall results showed no negative impact related to work except for staff with a dual role of parent/family/guardian (see below).
- Respondents with a staff role (N=488) with or without a student reported greater negative impact in all areas compared to other groups. This group represented 20% of the survey.
    - Staff at the secondary level and staff with a dual as a parent/guardian/family member affiliated with the secondary reported the greatest negative impacts.
    - Staff and staff with a dual role of parent/family/guardian that are affiliated with both primary and secondary schools reported a negative impact to work.

    - A negative impact to extra curricular activities was indicated by respondents who have a staff role in the district. This was indicated the most by those affiliated with secondary in some manner.

- 94% of student responses were from middle and high school students

- Big take away – concern of the negative impact to extra curricular activities

— Data Breakdown

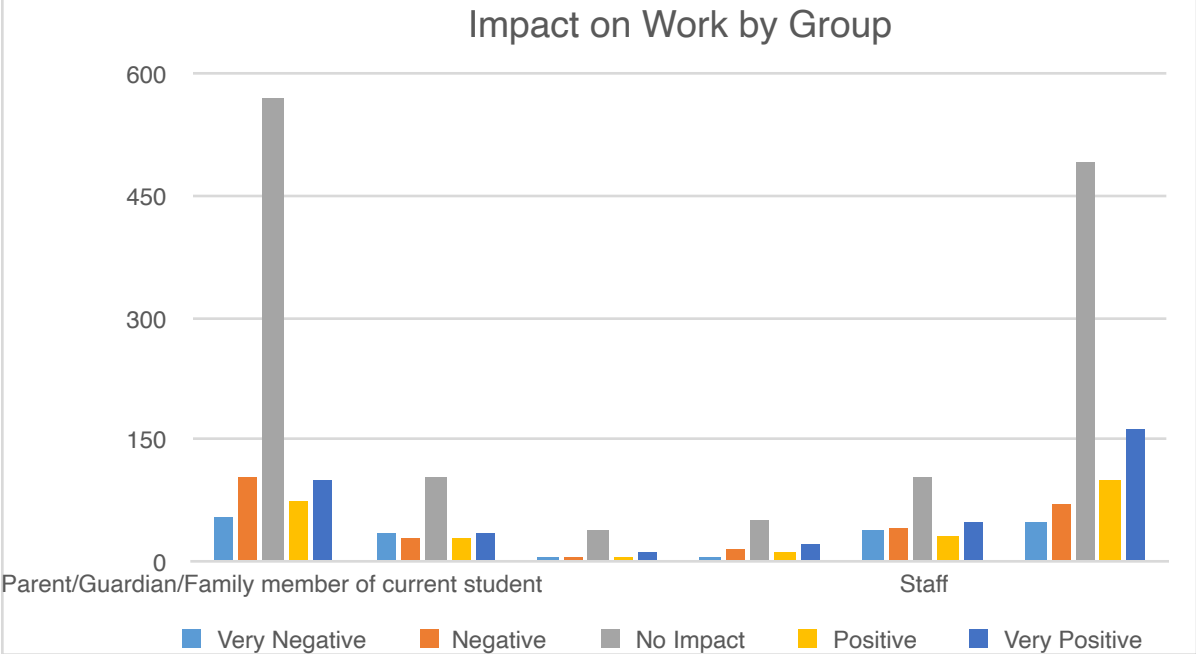
After an initial survey our community, we can see that 86.2 percent of our respondents felt it was either extremely important or somewhat important to pursue a change in middle and high school start times. Another 4.3 percent had no opinion on the issue.

The remaining 9 and a half percent of our community raise issues that will need to be carefully considered prior to such a move. These issues include concerns over childcare, how changing start times affects students in extracurricular activities and those attending New Market Skills Center, whether start times would impact elementary school start times, how this would impact transportation to and from school for students, and potential impacts on local traffic patterns.

Most of our respondents overall reported no change to work, transportation, childcare or extracurricular activities. Recognizing that middle and high school students themselves represent more than a third of the respondents to this survey, we analyzed responses by group as well.

As you can see, the most common response in each group regarding potential impacts to work as ‘No Impact’ by a significant margin. Nevertheless, approximately 450 respondents (about 19 percent) across each of the 6 measured groups did report a potential negative or very impact to their work.

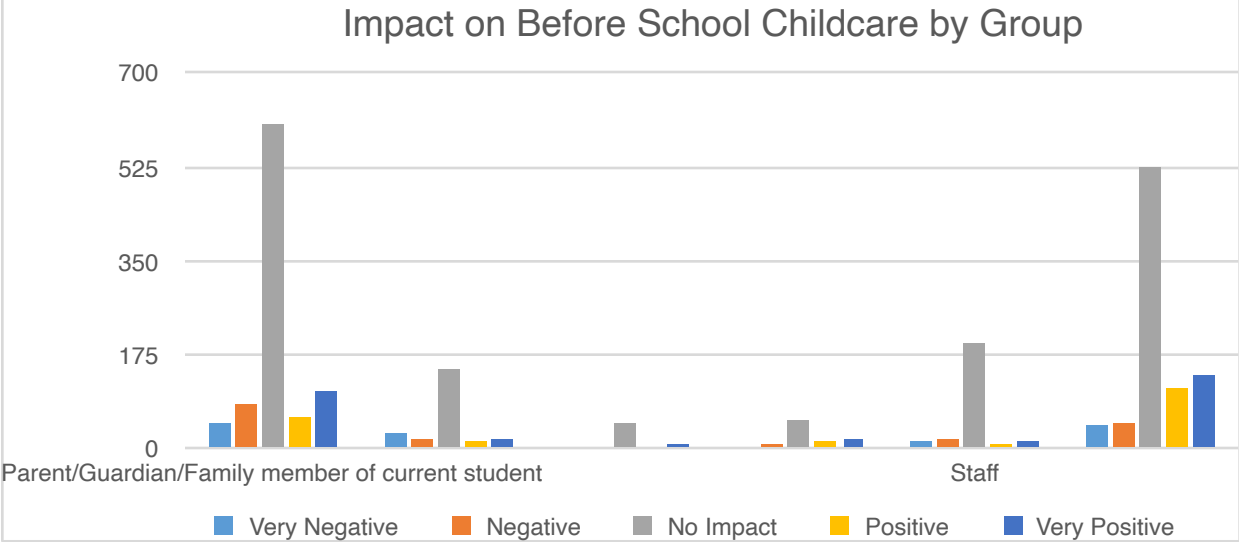
Meanwhile, 620 respondents – representing about 26 percent of respondents reported a positive or very positive impact to their work. The group with the largest of such responses was the student population, whereas the negative and positive responses among parents not employed by the district were fairly similar in proportion.



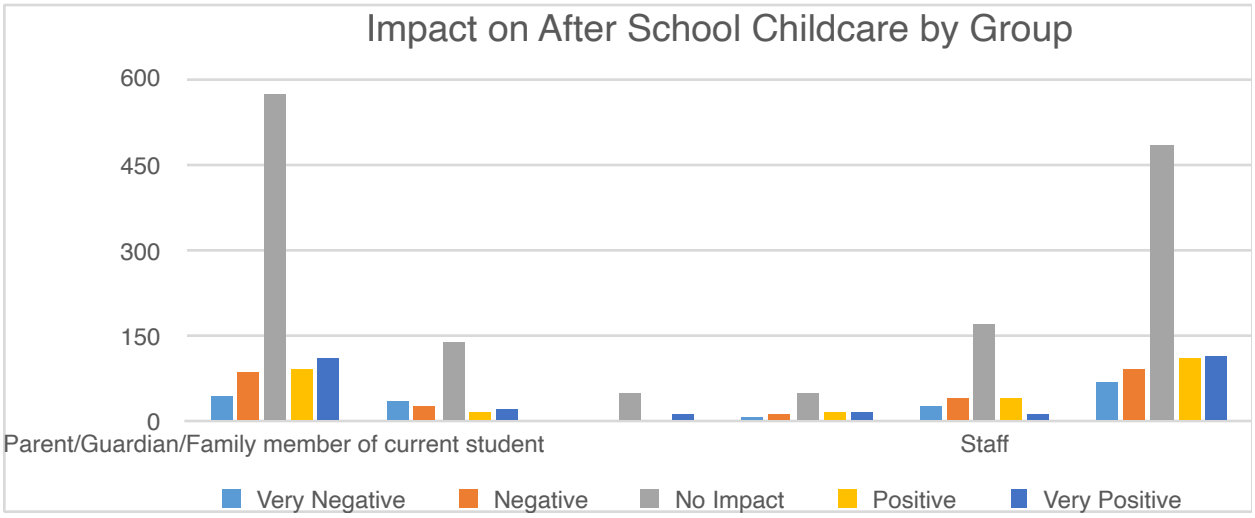
GROUP	VERY NEGATIVE	NEGATIVE	NO IMPACT	POSITIVE	VERY POSITIVE
PARENT/GUARDIAN/FAMILY MEMBER OF CURRENT STUDENT	54	105	572	73	100
BOTH STAFF AND PARENT/GUARDIAN/FAMILY MEMBER	36	28	104	28	36
COMMUNITY MEMBER	6	4	39	5	11
PARENT/GUARDIAN/FAMILY MEMBER OF FUTURE STUDENT	5	16	50	10	21
STAFF	38	40	102	30	46
STUDENT	46	71	490	99	161
TOTALS	**185**	**264**	**1357**	**245**	**375**

Respondents reported before school childcare generally had little impact. It is important to note that this early survey did not assess which of the respondents had children who currently have children under the age of 12. Additionally, the survey did not indicate whether a change in elementary start times may occur in addition to the change of middle/high school start times. As such, the direct impact on families needing childcare will need to more carefully assessed going forward.

That said, of those polled, respondents reported a negative impact for before school childcare and 437 reported potential negative impacts for after school childcare. 518 respondents reported a positive impact to before school childcare, and 554 respondents reported a positive impact to after school childcare. Again, the section of parents not employed by the school district reports a majority of 'no impact' – with the remaining groups nearly evenly divided once again between positive and negative impacts. It is also important to note on this issue that school staff largely reports no impact, however, this change could impact a small portion of our OSD employees and as their employer we should find out more about what the district can do to help these employees so that we can retain our skilled staff through this transition if we decide to move forward.

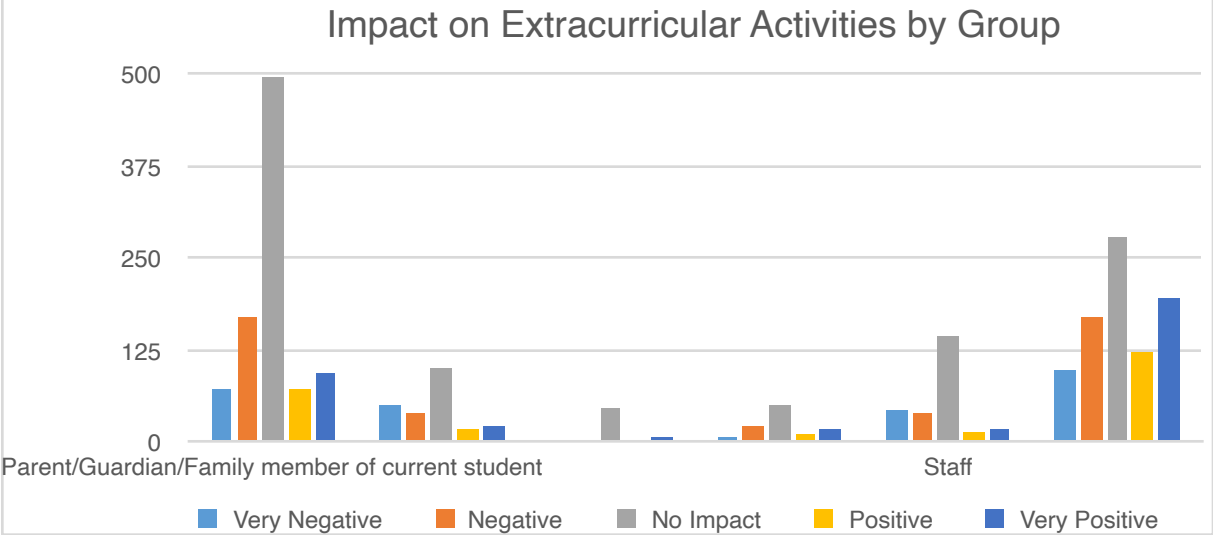


GROUP	VERY NEGATIVE	NEGATIVE	NO IMPACT	POSITIVE	VERY POSITIVE
PARENT/GUARDIAN/FAMILY MEMBER OF CURRENT STUDENT	48	85	605	58	108
BOTH STAFF AND PARENT/GUARDIAN/FAMILY MEMBER	31	21	147	13	20
COMMUNITY MEMBER	3	2	49	3	8
PARENT/GUARDIAN/FAMILY MEMBER OF FUTURE STUDENT	5	11	53	12	21
STAFF	13	18	199	11	15
STUDENT	45	48	525	111	138



GROUP	VERY NEGATIVE	NEGATIVE	NO IMPACT	POSITIVE	VERY POSITIVE
PARENT/GUARDIAN/FAMILY MEMBER OF CURRENT STUDENT	46	88	572	89	109
BOTH STAFF AND PARENT/GUARDIAN/FAMILY MEMBER	33	27	139	14	19
COMMUNITY MEMBER	4	1	47	4	9
PARENT/GUARDIAN/FAMILY MEMBER OF FUTURE STUDENT	5	11	50	18	18
STAFF	27	37	170	37	11
STUDENT	69	89	483	110	116
TOTALS	**184**	**253**	**1461**	**272**	**282**

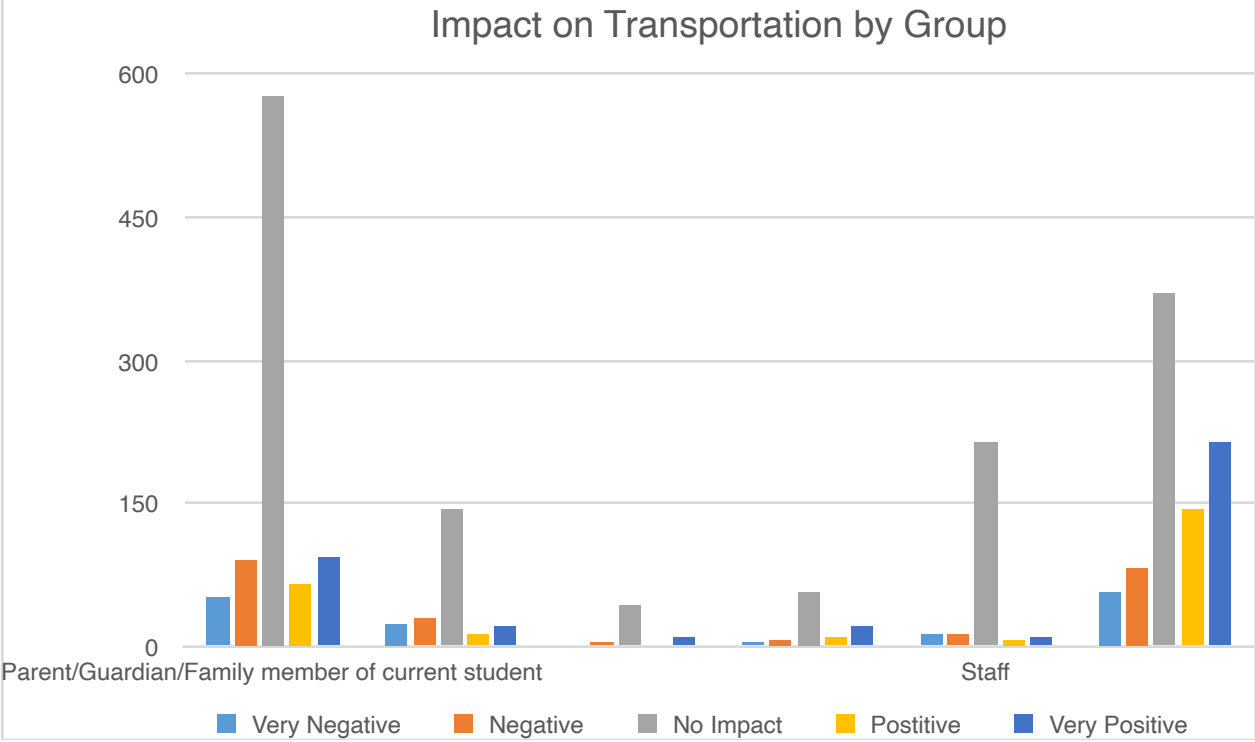
Of all of our questions, the largest number of concerns seemed to focus around impacts to extracurricular activity schedules and the associated impacts extracurricular activities would have on classroom attendance, study and family time should the district move forward with a chance. 715, or nearly 30 percent, of our respondents expressed they believe a start time change would have a negative or very negative impact on extracurricular activities. Far more OSD staff and parents of students, in particular, believe these impacts could be negative. Though overall, the largest response in this category for those groups was still ‘no impact’.



GROUP	VERY NEGATIVE	NEGATIVE	NO IMPACT	POSITIVE	VERY POSITIVE
PARENT/GUARDIAN/FAMILY MEMBER OF CURRENT STUDENT	71	169	498	71	95
BOTH STAFF AND PARENT/GUARDIAN/FAMILY MEMBER	50	41	102	17	22
COMMUNITY MEMBER	2	4	48	3	8
PARENT/GUARDIAN/FAMILY MEMBER OF FUTURE STUDENT	5	23	49	9	16
STAFF	43	39	145	13	16
STUDENT	99	169	278	124	197
TOTALS	**270**	**445**	**1120**	**237**	**354**

Lastly, regarding transportation we see each group in our break-down reporting that start time changes would largely have no impact on their daily transportation – with nearly as many students reporting a total positive impact as those who reported no impact.

Again, we do see about 379 respondents (about 15 percent) selecting one of the two negative options, while 614 (or slightly more than 25 percent) indicated positive impacts (heavily influenced by the student vote).



GROUP	VERY NEGATIVE	NEGATIVE	NO IMPACT	POSTITIVE	VERY POSITIVE
PARENT/GUARDIAN/FAMILY MEMBER OF CURRENT STUDENT	51	91	578	66	95
BOTH STAFF AND PARENT/GUARDIAN/FAMILY MEMBER	23	31	145	13	20
COMMUNITY MEMBER	3	4	45	3	10
PARENT/GUARDIAN/FAMILY MEMBER OF FUTURE STUDENT	4	8	59	11	20
STAFF	12	13	213	7	11
STUDENT	57	82	370	145	213
TOTALS	**150**	**229**	**1410**	**245**	**369**

—Survey Comments

There were 874 individually written responses. Common themes were concern about the impact to after school activities, especially sports and jobs. Several respondents commented on perceived bias of the survey and noted watching the video helped influence. There were also questions and comments about elementary start times and how elementary was not mentioned in the video or research data. Many people wanted to know if elementary would start earlier and reported not being able to give feedback not knowing if elementary start times would change.

Here is a sampling of the comments, with a supportive, concerned, and suggestion comment given for each Role.

Role: Student

Supportive Comment:

> I will function way better and learn way better if I have a later start time. Young children are more able to fall asleep early, while teenagers need the extra sleep, so switching schedules makes sense. It doesn't make sense that I am expected to function at the exact times that I am least productive, but then sleep through times students my age are seen to be most productive

Concern Comment:

> If you change the time we start then kids will stay up later knowing they have more time in the morning and will most likely get less sleep. I like that we get out of school early and would hate getting out later because we would have less time from school then sports.

Suggestion Comment:

> Late Starts on a single weekday is preferable to shifting the entire schedule. The real world doesn't revolve around students getting out in the afternoon. This hinders work and transportation for many. High School students can handle waking up at the same time most days. I do recognize the benefits of later starts, so it may be appropriate to implement it for one day a week. This has worked in the past with less problems than early release.

Role: Parent/Family/Guardian of Current student

Supportive Comment:

Younger children wake up earlier naturally. Please have them go to school early and allow the growing brains of high schoolers to sleep.

I agree with later start times for MS & HS, but that doesn't mean I want my elementary aged child starting at o-dark thirty as a compromise.

Concern Comment:

Later start times for high school will severely impact students ability to work after school as later start times result in later release times. I am currently my students' transportation to school and later start times will also impact my ability to be to work on time. Also high school student athletes already consistently miss 6th period to allow for sport travel. Later start times will result in students missing additional classroom instruction time. Later start times will also result in team practices, musical group rehearsals and all other extra curricular after school activities starting later. This in turn gives students a later start to initiate and complete homework and as I previously mentioned limiting students ability to hold an after school job. I completely understand that sleep is important however delaying school start times is not the answer.

Suggestion Comment:

What are creative solutions we can brainstorm about the structure of the school day itself? Avanti seems to have achieved that and I would guess there are real ideas out there that could be explored. Thanks for requesting input. I look forward to following this discussion.

Later start time is good and if you don't do the whole week at least go back to late start on Wednesday.

For middle school student parents, this may affect their work schedule. There are no before school programs that I am aware of so I might have to rely on my 6th grade student to be responsible enough to get herself on the bus by herself.

Role: Staff

Supportive Comment:

In education we always talk about teaching methods being research based. It about time we listen to research on start times. Keeping it the same because that is the way we have done it, is just plain stupid. Do what is best for the kids, and for high school it is to give them time to sleep!

Concern Comment:

There is only 4.5% change in academic outcomes. And once a new start time becomes the 'normal' start time, will students just stay up a little later. With social networking there is a temptation to interact a little later.

If we change to later start times for high school, then sports games and practices will be later resulting in later nights. Students with after school jobs would be affected as well, as they would not be able to start the job as early

Suggestion Comment:

Will all elementary start times be aligned? All middle? Staff development gets very tricky with the staggered start times. It would be great to have the same start times at the different levels so we can do district training.

Role: Both Staff and Parent/Family/Guardian of Current student Role

Supportive Comment:

While these changes could possibly negatively impact our family schedule (pickup/dropoff with work start/end times), I recognize the broader positive impact it could have and appreciate it. Also, as a district employee, I know the district would be understanding of potential scheduling conflicts that could arise from such a change.

I vividly remember the challenge that early start times presented to me when I was in high school - leading to fatigue and higher caffeine consumption.

Concern Comment:

My concern with a later start for middle and high school is all of the after school activities would get pushed back as well and the overall day would be going so

late. Elementary school students dont have as many activities right after school. My children do just fine with the start times, they go to bed at a decent hour.

Suggestion Comment:

As a high school teacher there is a marked negative impact on performance in my first period class typically (late arrivals, inability to focus, lake of energy, low engagement/ participation). As a parent of elementary school children, they spend 2 full hours at Y Care before school even starts for them and then at the end of the day are dragging. I believe there is a potential positive impact for both groups. I would like to see the district work with the South Sound Y however to help support a potential impact to their services and provide guidance re: child-hood development and needs of students at different time of day. There will also need to be consideration given to the impact hs sports schedules and a later schedule will have. Those athletes who will miss significant classroom time to travel for sports events may need extra academic support so teachers are not expected to reteach material and students don't fall behind. That being said, the benefits of better sleep and healthier teenagers outweigh any of those concerns.

Role: Parent/Family/Guardian of Future student

Supportive Comment:

Generally supportive, given the research. Concerned about what it might mean for elementary school start and end times given the practical concerns sur-rounding before and after school care.

Concern Comment:

I believe by changing the start times to 8:30 maybe be beneficial now but what happens when you go to college and you have morning classes that start at 7:00 am. Or if you have a job that starts at 7:30 am. Are you going to be late to college or to work? I would rather have students learn to get up a little earlier now so in the future they learn how to hold a job and succeed in college. By starting at a later time and ending later means that sports or afternoon activities now go later into the evening which means not getting home until 11:00 pm to finish homework. That would be my concern.

Suggestion Comment:

Another option, that could be hard to implement, is having every 1st period class be PE related, or involving some kind of active movement or activity, such as shop, or art.

Role: Community

Supportive Comment:

The research on benefits of changing to a later start time for instruction are from the 1990's out of Brown University and we are way behind the times in implementing this change. Tweens and Adolescents score higher, have better social relationships and do not fall asleep in class. Make this reasoned, well supported by research decision to change start time to later for the sake of the children - not parents' work schedules. Add in more effective before and after school programs for those parents who need it.

Concern Comment:

The videos seems like propaganda designed to elicit a certain pre-determined response. Question 2 just further exacerbates the truth that this is not an impartial survey. Perhaps the district should hire an impartial consultant to design a proper survey if they truly want to know the wishes of the community. If the school board has already decided these changes (as I suspect they have), why put up this charade that the community's opinions might actually matter?

Suggestion Comment:

Having gone through this in 2 prior districts, the biggest gripes were poor implementation by transportation...not accounting for regular commute traffic flow in planning and thus causing either multiple student tardies in mornings...hs.., or kids getting home very late...hs and elem.. Further, that routes were set up so that in too many cases the sleep gains for hs were cancelled out by having to catch the bus far too early. And of course increased issues in the parent drop off zones at all levels. Also, kids..littles..left to get to bus without supervision due to parent work schedules. SOME of this works itself out, however planning ahead will save a LOT of grief for everyone.

Themes of the Survey

Many of our 4622 respondents commented. Please understand that the analysis of the comments is limited. This summary gives an overall indication of frequency of sentiments. Word count analysis's were performed and common themes and trends were identified. The board could certainly employ a more rigorous analysis to determine statistical significance, but hopefully our cursory analysis gives a general idea of survey takers feelings on the proposal. After the comments are scrubbed for personally identifiable information and made accessible, we understand they will go on the website for all to read and view.

Our survey contained two comment sections: one for traffic related concerns and one for general comments.

I. Traffic-Related Responses: Brief Summary

- **23.0% (1,064) of survey respondents answered this question.**
- **33.2 (364) of commenters answered "no" without further detail.**
- **16.5% of commenters (175) expressed concerns that late -OR- early start times may cause localized traffic congestion or hazards during morning and/or afternoon commutes.** Overall, this was the most frequently mentioned theme, though suggestions for mitigating traffic issues vary widely from neighborhood to neighborhood because "rush hour" happens at different times. As such, many traffic-related comments were not grounded in support for or opposition to proposed changes.
    - Twenty-nine (29) commenters reported traffic issues on Henderson Blvd., particularly at the Carlyon Ave intersection. Some respondents suggested installing a traffic light or large roundabout to mitigate congestion and increase safety.
    - Twelve (12) reported traffic issues at Hansen Elementary, primarily due to difficult entry/exits for student drop-offs and pickups.
    - Eleven (11) reported issues on Cooper Point Rd. Some respondents suggested different start times for Capital High School and Jefferson Middle School.
    - Nine (9) reported issues at Centennial Elementary due to congestion on Boulevard Rd.
- **5.6% of commenters (60) expressed concerns that early start times create unsafe walking and biking conditions for younger students** in winter and fall, due to early-morning darkness.
- **Several commenters (<1%) suggested that a late start benefits high school students who drive to school**, as daylight improves their visibility during morning commutes.
- **A few (<1%) commenters said that a later start time would adversely affect after-school extracurricular schedules**— particularly for student athletes— and make evening commutes more hazardous for high school students who drive home due to increased traffic and possible darkness.

II. Additional Comments Responses: Brief Summary

- **36.71% (1,698) of survey respondents answered this question.**
- **27.6% (469) of commenters used the word "sleep,"** generally in support of later start times for high schools though frequently in support of later start times for elementary schools, as well.
- **8% used the phrase "more sleep" in their answer**, mostly in support of later start times for high school students.
    - Commenters clearly appreciate students' need for additional sleep.
    - Many expressed concerns that a later start time would shift high schoolers' bedtimes an hour later, resulting in no net sleep benefit.
    - Many commenters expressed support of later class times for elementary students, and many are unwilling to make elementary students "bear the burden" of later high school start times.
    - Students remarked that "zero hour" classes are detrimental to their ability to learn and recommended later start times.
- **16.7% (196) used the words "sports," "athlete," or "athletics" in their answer.**
    - Many commenters expressed concerns that a late start time would adversely affect student athletes' schedules by requiring them to be absent from class more frequently – thereby adversely affecting academic performance – and arrive home later from practice and events.
- **Many commenters expressed concerns that varying start/end schedules would adversely affect childcare options for their families.** For example, many older students care for and/or transport their younger siblings who attend elementary schools. If elementary students are released over an hour before high school and middle school students are released, their primary caretakers would not be available. This phenomenon may disproportionately affect low-income students and families.
- **Comments are frequently incongruous regarding the work-related effects of later start times on students and parents.** One student mentioned that later start times would allow them to sleep longer and feel more rested during their evening shifts at work, while another noted that later start times "rob students" of the opportunity to work and prepare for college.

Selected Comments Opposing Early Elementary Start Times:

"I think it will be better for high schoolers to be driving later in the morning. Better visibility, less work traffic, and no little kids walking to or from school at Olympia start and release times. However, I do not like the idea of little kids walking to school in the dark."

"I am frustrated that these time proposals seem to advantage middle and high schoolers to the detriment of elementary schoolers. I understand the importance of middle and high schoolers getting more sleep in

order to improve academic performance, and I support that. However, this seems to put the burden on elementary school children because the district simply doesn't want to pay for more bussing."

"Though I love the changes for older kids, I have concerns about elementary kids coming to school in the dark if there is a 7:30 [a.m.] start."

"Driving or walking to school in the dark is extremely ill-advised. Our families that walk to bus or school would be at increased risk, and it's not worth it so that older kids can sleep in."

"Are you kidding me? My elementary school student will NOT benefit from being awake for school at 7:30 [a.m.]! You will be seeing me at all future school board meetings to talk about this issue."

"The 9a.m. start time for elementary has been a blessing. I would not want to change that."

"If this [early elementary start times] happens, we will have to pay for after school care that we cannot afford. There is no equity here for families that have little flexibility in works schedules and budgets."

Selected Comments Supporting Early Elementary Start Times:

"Later start is a lot safer transportation-wise, as there will be more daylight. Plus, our kids will be more rested and alert. Especially middle and high school students who go to school on their own. The benefits are great, and I really hope the district moves ahead with this change."

"I think starting Capital High School an hour later will help reduce the congestion on Highway 101 into West Olympia. Ah, the dreaded zipper merge is very difficult for novice high school students to maneuver."

"Moving high schooler start times will help commute times by not having as many young and inexperienced drivers in the road during rush hour."

"My high schooler catches the bus at 6:45 [a.m.]. I think it would actually be significantly safer for elementary kids to start earlier because there is an increased likelihood of a parent being at the bus stop or walking with the child than there is currently. If possible, 8 [a.m.] start in elementary instead of 7:30 [a.m.] means it would be daylight in the winter for young kids getting to the bus or walking to school. I am a HUGE fan of later start time for middle and high schoolers!"

Selected Comments Regarding Localized Traffic Issues

"I leave later in the afternoon/evening, and turning left from Carlyon onto Henderson is impossible and dangerous because cars are non-stop and fast."

"Traffic on Henderson keeps increasing and the new traffic circle isn't helping. I fear more children will be hit if another is installed at Carlyon. Please make sure school start times don't coincide with rush hour."

"Make sure school entrances and exits are easier to navigate. Some entrances have cars backed up and leaving a school block/entrance is so difficult. The use of roundabouts and an increase in stop signs might be helpful to improve the flow of traffic."

“Morning drop-off at Hansen is unmanageable. Extreme traffic causes drop-offs to take 10+ minutes. There is no accountability for parents to park in no-parking areas and add to the delays.”

“I feel the roundabout on Henderson will help with traffic issues in our area and keeping times staggered also benefits. Middle and high schoolers need the later time: sleep studies have shown [this] for years.”

“The traffic concerns I have are not related to the proposed change. However, the parking lot drop-off setup at Hansen Elementary needs to be looked at someday.”

Selected Comments Regarding Effects on Extracurricular Activities:

“Later start times will have a negative impact on athletics and extracurricular activities, both school and non-school related. Many parents will have child care issues if kids stay at home longer in the morning, though that is not an issue for me. You can just as easily have your kids go to bed at a reasonable time and they won’t be tired during the day.”

“The research is clear and has been for ages. Early starts for school is not in the best interest of teens and adolescents. The decisions should not be based on accommodating bus schedules and sports. It should be based on what is best for students.”

“Although several people may be concerned about athletics, it is important to understand that practices can take place in the mornings. When I was in high school 10 years ago we had a schedule change and my practices were moved to AM practices on certain days. If students want to be a part of an option program during the school year then they should also be willing to change their schedule to suit their needs. As a coach in the district I strongly believe that this is something students are capable of doing. I regards to missing class time for athletics I strongly believe that schools need to start finding other schools to play closer to our district. Most of their time is wasted in driving an hour to a location. I also think that game times can start sooner! A lot of times the buses arrive to the game location and the players sit for an hour before the game starts. There are things that can be done to support a later start time and I believe it is in the best interest for our student population as a whole.”

“My main concern is for after-school athletics and the likelihood that early release will become more prevalent.”

“The biggest issue with changing the schedule would be the after school activities. For example, a student may be on a sports team that practices after school and then has an additional activity after practice on certain days. Changing the bell schedule will just create additional conflicts.”

“If you believe the change in start time will allow for more sleep, you are severely mistaken. Sports will be later, which means I will get to my job later. If anything, people will get less sleep because they will get home from way later from sports and work, then have additional homework.”

“School sports would go later, and we would sleep just as much if not less. Having an earlier start time would make more time to complete sports and school.”

Second Survey Results Summary

4632 people responded to the (second) survey completed November 15th, 2019.

- 2605 Parents (who are not also OSD staff)
- 980 Students
- 421 OSD Staff
- 329 OSD Staff Parents
- 174 Community Members
- 123 Future Parents (community members who will have children in the OSD in the future)

Similar to the first survey (June 2019), the data showed a trend of differences between respondents with the roles of Parents, OSD Staff, and OSD Staff Parents. There were also some significant differences between socioeconomic groups. A few of these differences are indicated within this summary.

Some questions were optional. Other questions allowed respondents to select “Does not apply” and those responses were not tallied when determining the resulting percentages in this summary. The full survey data (including all questions, pie charts, and tables) is available on the Olympia School District website:

https://www.osd.wednet.edu/our_district/board_of_directors/board_advisory_committees/s_y_calendar__start_times_advisory_committee

Rounding has been used in order to make the numbers easier to read in this summary document and therefore a few of the totals add to 99% or 101%.

Support for Delaying Adolescent School Start Times

64% of overall respondents indicated positively that the OSD should move middle and high school times later and an additional 11% were neutral to the idea. The break down by role is:

- 73% of Community Members
- 73% of Future Parents
- 67% of Parents
- 63% of Students
- 53% of OSD Staff
- 51% of OSD Staff

Logistical Issues Related to Elementary Schools Start Times

- 71% of elementary school Parents and OSD Staff Parents of elementary schoolers said they could adjust to logistical challenges or said there would be no impact when asked if they can adjust to the elementary school start time changes knowing their children would benefit from more sleep in middle and high school. This included 63% of OSD Staff Parents and 72% of Parents.
- 29% of elementary school Parents and OSD Staff Parents of elementary schoolers said they could not adjust to the logistical challenges of earlier start and end times (including 37% of OSD Staff Parents).
- 87% of elementary school Parents and OSD Staff Parents of elementary schoolers said the family changes needed in order to adjust to an 8:00am or 8:30am start time would be manageable or have no impact.

- 39% of elementary school Parents and OSD Staff Parents of elementary schoolers said the family changes needed in order to adjust to a 7:30am start time would be manageable or have no impact while the remaining 62% said it would be unmanageable.
- Although this didn't apply to 376 of the respondents, 45% of the remaining Students agreed that they wouldn't be able to watch their sibling(s) after school.
- The childcare and transportation impacts associated with the 7:30am and 8:00am start times were fairly close according to elementary school Parents and OSD Staff Parents of elementary schoolers; 7:30am was the least ideal start time and 8:30am was the clearly preferred start time. Parents and OSD Staff Parents of elementary school children were asked about impacts relating to before- and after- school childcare and transportation and their answers are shown in the following tables:

Question: Would there be less need for *before-school* childcare? (data separately collected and shown per proposed start time)

Answer	**7:30am**	**8:00am**	**8:30am**
No impact	46%	49%	54%
Agree/somewhat agree	29%	27%	24%
Disagree/Somewhat disagree	25%	24%	22%

Question: Would it be challenging to arrange for *after-school* childcare? (data separately collected and shown per proposed end time)

Answer	**1:52pm**	**2:22pm**	**2:52pm**
No impact	35%	40%	56%
Agree/somewhat agree	55%	47%	26%
Disagree/Somewhat disagree	10%	13%	18%

Question: Would there be transportation challenges *before school*? (data separately collected and shown per proposed start time)

Answer	**7:30am**	**8:00am**	**8:30am**
No impact	37%	45%	58%
Agree/somewhat agree	49%	40%	21%
Disagree/Somewhat disagree	14%	16%	21%

Question: Would there be transportation challenges *after school*? (data separately collected and shown per proposed end time)

Answer	**1:52pm**	**2:22pm**	**2:52pm**
No impact	36%	44%	58%
Agree/somewhat agree	54%	43%	22%
Disagree/Somewhat disagree	10%	13%	19%

Sleep, Alertness, Focus, and Stress

- 75% of Students believe a later start time will allow them to get more sleep.
- 71% of middle school Parents believe student(s) will benefit from additional sleep in the morning, compared to 62% of OSD Staff and 63% of OSD Staff Parents.
- 71% of Students believe a later start time will allow them to focus more in early classes.
- 65% of middle school Parents believe their student(s) would be more awake/alert in school with later start times, compared to 48% of OSD Staff Parents of middle schoolers.
- 71% of Parents of high schoolers believe their high school student(s) will be more awake/alert in school with later start times, compared to 54% of OSD Staff Parents of high schoolers.
- 69% of OSD Staff said middle and high school students will be better able to focus in early morning classes with later start times, compared to 64% of OSD Staff Parents.
- 54% of middle school Parents said the household stress level would be reduced if start times were later (an additional 18% indicated there would be no impact). Notably:
    a. Only 36% of OSD Staff Parents of middle schoolers believed that later start times would reduce household stress; in fact, 45% believe it would not reduce household stress (compared to 29% of middle school Parents).
- 58% of high school Parents said the household stress level would be reduced if start times were later (an additional 17% indicated there would be no impact). Notably:
    b. 67% of low income high school Parents believed later start times would reduce household stress.
    c. 63% of minority high school Parents believed later start times would reduce household stress.
    d. Only 41% of OSD Staff Parents of high schoolers believed that later start times would reduce household stress; in fact, 42% believe it would not reduce household stress (compared to 25% of Parents of high schoolers).

Student Activities (athletics, music, extracurricular activities, and jobs)

- Although this didn't apply to 190 of the respondents, 58% of the remaining Students who are involved in activities agree that they will have less time for extracurricular activities.
- 41% of middle school Parents and middle school OSD Staff Parents whose children are involved in activities are concerned about whether there is enough time for those activities.
- 40% of high school Parents and high school OSD Staff Parents whose children are involved in activities are concerned about whether there is time for outside of school activities.
- Although this didn't apply to 156 of the respondents, 50% of the remaining high school Parents and high school OSD Staff Parents whose children are involved in activities are concerned about their child losing additional seat time for outside of school activities.
- Although this didn't apply to 291 of the respondents, 62% of the remaining Students agreed that they will have less time for a job.