Later School Start Times

The information contained below is a compilation of quotes and data from roughly 20 studies and articles dealing with adolescent sleep and later school start times. This information was compiled by School Committee member Craig Duffy for a baseline of information to begin discussion on determining if a proposed later start time at Cumberland High School merits consideration.

The quotes and or data presented in these pages are followed by a number which is the reference number to a link which is provided on the last page of this document.

Why start school later?

“It is now well established that teenagers have a tendency toward later bedtimes and rise times. Most high schools in the US have early morning start times. For many high school students this results in a conflict between their sleep needs and the requirements of their school schedules. So, do later school times really help high school students? Based on accumulating evidence, the answer is unequivocally yes. Increasing numbers of studies conducted in various parts of the country show that a change in the start time of the school day can make a significant positive change in the lives of students.” (1)

Adolescents today face a widespread chronic health problem: sleep deprivation. Although society often views sleep as a luxury that ambitious or active people cannot afford, research shows that getting enough sleep is a biological necessity, as important to good health as eating well or exercising. Teens are among those least likely to get enough sleep; while they need on average 9 1/4 hours of sleep per night for optimal performance, health and brain development, teens average fewer than 7 hours per school night by the end of high school, and most report feeling tired during the day (Wolfson & Carskadon, 1998). The roots of the problem include poor teen sleep habits that do not allow for enough hours of quality sleep; hectic schedules with afterschool activities and jobs, homework hours and family obligations; and a clash between societal demands, such as early school start times, and biological changes that put most teens on a later sleep-wake clock. As a result, when it is time to wake up for school, the adolescent’s body says it is still the middle of the night, and he or she has had too little sleep to feel rested and alert.

The consequences of sleep deprivation during the teenage years are particularly serious. Teens spend a great portion of each day in school;
however, they are unable to maximize the learning opportunities afforded by the education system, since sleep deprivation impairs their ability to be alert, pay attention, solve problems, cope with stress and retain information. Young people who do not get enough sleep night after night carry a significant risk for fall asleep automobile crashes; emotional and behavioral problems such as irritability, depression, poor impulse control and violence; health complaints; tobacco and alcohol use; impaired cognitive function and decision-making; and lower overall performance in everything from academics to athletics. (10)

Most high schools operate on the worst possible schedule for teenagers. Administrators who have heeded the research and pushed back their starting times report fewer discipline problems and less tardiness, better attendance, and happier and more alert students. (7)

Now, fueled by accumulating research showing that adolescent bodies are designed to sleep late and that delaying school start times — even by just 30 minutes — makes a huge difference in how well teens feel and perform, an increasing number of schools around the country are ringing morning bells later than they used to. Many more are thinking about it. (12)

**How sleep impacts education.**

These adolescent sleep patterns can have profound consequences for education. With classes in most high schools in the United States starting at around 7:15 a.m., high school students tend to rise at about 5:45 or 6 a.m. in order to get ready and catch the bus. It’s no wonder that 20 percent of students sleep during their first two hours of school, when their brains and bodies are still in a biological sleep mode. The loss of adequate sleep each night also results in a “sleep debt” for most teens. Teens who are sleep-deprived or functioning with a sleep debt are shown to be more likely to experience symptoms such as depression, difficulty relating to peers and parents, and are more likely to use alcohol and other drugs. (2)

Contemporary research, though, indicates that all the discipline and time-management in the world will not overcome teen biology. Studies consistently show that older teenagers’ sleep clocks are set so they fall asleep later and wake later. Most high schools, however, start before 8 a.m., the worst time to find an alert teen. (7)
Even a little extra time can make a big difference, however, according to long-time sleep researcher Mary A. Carskadon, professor of psychiatry and human behavior at Brown University and director of the Sleep Research Laboratory at E.P. Bradley University Hospital in East Providence, Rhode Island. "The question is, can the schools give kids more sleep?" she said. "By moving the bar, they actually can give kids more sleep." (7)

"We are doing this as a health issue," said assistant principal Kathryn Hutchinson. (7)

"Given that the primary focus of education is to maximize human potential, then a new task before us is to ensure that the conditions in which learning takes place address the very biology of our learners." Mary A. Carskadon, PhD, Director of E.P. Bradley Hospital Research Laboratory and professor in Department of Psychiatry and Human Behavior at Brown University School of Medicine. (10)

Research shows that teenagers’ body clocks are set to a schedule that is different from that of younger children or adults. This prevents adolescents from dropping off until around 11 p.m., when they produce the sleep-inducing hormone melatonin, and waking up much before 8 a.m. when their bodies stop producing melatonin. The result is that the first class of the morning is often a waste, with as many as 28 percent of students falling asleep, according to a National Sleep Foundation poll. Some are so sleepy they don’t even show up, contributing to failure and dropout rates. (9)

What The research shows

Question..If we start school later, students will just go to bed later.

Answer...This common misconception seems reasonable enough. But contrary to expectation, it has not come to pass in studies of students who have had their schools shift to later start times. Three studies, conducted in 2007, 2008 and 2009, found that students got more sleep because they went to bed at or near the same time each night and were able to rise later with the later school start times. Full citations and a discussion of this topic are available at http://schoolstarttime.org/delaying-school-start-times/will-students-squander-opportunity-extra-sleep/.

The landmark study by Kyla Wahlstrom at the University of Minnesota also
showed that starting school about 1/2 hour later resulted in teens getting a full hour of extra sleep each school night (19)

Changes made in school start times in several locations in Minnesota in the 1990's showed early positive results. Keeping the length of the school day the same but changing the start of the school day from 7:15 AM to 8:40 AM or from 7:25 AM to 8:30 AM resulted in improved functioning for both urban and suburban students. Urban students had better attendance, decreased tardiness and fewer visits to the school nurse. Suburban students tended to keep their regular bed times and so added about an hour of sleep per night and were able to get more homework done during the day because of increased alertness and efficiency. In Massachusetts a change in middle-school start times for younger teens also proved beneficial. Students at a school with a 8:37 AM start time slept about one hour more, had less difficulty staying awake in school, and had better grades than students at a school with a 7:15 AM start time. A recent study at a private Rhode Island high school showed that shifting the start time from 8:00 AM to 8:30 AM increased the number of students getting 8 hours of sleep a night from 16% to 55%, improved attendance, and resulted in fewer visits by students to the health center. Mood improvements were also noted among the students.

Perhaps most dramatic of all were results from a school district in Fayette County, Kentucky. In the 1990's, after a change in start time from 7:30 AM to 8:30 AM a decrease was found in car accident rates for 16 - 18 year olds in the Fayette County school district, while rates actually increased in the rest of the state for 17 - 18 year olds. Given the danger posed to young people from car accidents this is a strong reason in itself to change school start times. (1)

The Minneapolis Public Schools, who changed their start time from 7:15 to 8:40—provided Wahlstrom and her colleagues information regarding the work, sleep, and school habits of over 7,000 secondary students, over 3,000 teachers, and interview data from over 750 parents about their preferences and beliefs about the starting time of school. Additional data from the study done in Minneapolis schools showed that there was a significant reduction in school dropout rates, less depression, and students reported earning higher grades. (2)
“Delaying school start times is a demonstrated strategy to promote sufficient sleep among adolescents.”—Danice K. Eaton, Ph.D., Division of Adolescent and School Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention (CDC), Lela R. McKnight-Eily, Ph.D., Division of Adult and Community Health, CDC, Richard Lowry, M.D., Adolescent and School Health, CDC, Geraldine S. Perry, Health, CDC, Letitia Presley-Cantrell, Ph.D., Division of Adult and Community Health, CDC, Janet B. Croft, Ph.D., Division of Adult and Community Health, CDC. (Eaton, McKnight-Eily, Lowry, Croft, Presley-Cantrell, & Perry, *Prevalence of Insufficient, Borderline, and Optimal Hours of Sleep Among High School Students – United States, 2007* (2010) J. Adolescent Health, p. 3.) (5)

**Rhode Island**

**St. George’s School, Middletown**

After implementing a trial to delay school by 30 minutes, the following results were reported:

"The portion of students reporting at least eight hours of sleep on school nights jumped from about 16 percent to almost 55 percent; reports of daytime sleepiness dropped substantially, from 49 percent to 20 percent; first period tardiness dropped by almost half and students reported having more time to eat a hot, more nutritious breakfast."

"The results were so impressive that the school made the change permanent." (18)

**Glens Falls High School** NY

Preliminary data from 1st year of implementation in 2012-13 already show reduction in tardies & improved sleep (18)

**Wake County**

"...later start times are associated with decreased absences, less time spent watching television and a greater amount of time spent on homework, indicating that these factors may explain why later starting students have higher test scores." (18)

**Massachusetts**

**Nauset High School**

After the 2012 implementation of an hour later school start, preliminary
analysis revealed:
- a 53 percent drop in the number of failing grades
- a 38 percent decline of D's and F's
- the number of days students were suspended for disciplinary reasons plummeted from 166 in the first two months last year to 19 days in September and October of this year. (18)

Indiana
Avon High School
"I think the research is very plain. The older the student, the later you should start school," said Rick Adcock, Avon High School principal. (18)

Cathedral High School
Principal Dave Worland initiates a 30 minute delay in school start times. He states, "It's not about the adults, it's about the kids." (18)

Kentucky
Fayette County
Teen driver crash rates reduced by 16.5% in 2 years after school start time delayed by one hour while the rest of the state saw an increase in teen crash rates. (18)

Jessamine County
Since implementing later school starts in 2002, "attendance immediately went up, as did scores on standardized tests, which have continued to rise each year." The schools also cut down on "passing time" and saved on bus expenses (18)

We find that early school start times negatively affect student achievement—students randomly assigned to a first period course earn lower overall grades in their classes on the same schedule day compared to students who are not assigned a first period class on that day. We verify that this negative effect is not solely a result of poor performance during first period courses. Although students perform worse in first period classes compared to other periods, those with first period classes also perform worse in their subsequent classes on that schedule day. These estimates are robust to professor by year by M/T day fixed effects and individual student fixed effects. Our findings have important implications for education policy; administrators
aiming to improve student achievement should consider the potential benefits of delaying school start time. A later start time of 50 minutes in our sample has the equivalent benefit as raising teacher quality by roughly one standard deviation. Hence, later start times may be a cost-effective way to improve student outcomes for adolescents. (6)

In 2002, high schools in Jessamine County in Kentucky pushed back the first bell to 8:40 a.m., from 7:30 a.m. Attendance immediately went up, as did scores on standardized tests, which have continued to rise each year. Districts in Virginia and Connecticut have achieved similar success. In Minneapolis and Edina, Minn., which instituted high school start times of 8:40 a.m. and 8:30 a.m. respectively in 1997, students’ grades rose slightly and lateness, behavioral problems and dropout rates decreased. (9)

Who is doing it?

According to the National Sleep Foundation, more than 80 school districts around the country have now made the change to start their high schools later. These districts range from large, urban school districts, such as Minneapolis and Denver, to suburban districts, such as Jessamine County in central Kentucky. (3)

Potential Negatives

There are, of course, some potential negative effects associated with later start times and longer sleep periods. It can be disruptive to parents’ work schedules, result in shortened times for after-school activities such as sports and clubs, cause students to get home later in the day, and may also impact hours available for after school jobs. These challenges may be more difficult to accommodate in some settings than others. For example, parents in suburban schools may have greater difficulty coping with the changes in transportation and work schedules than those in an urban setting. (1)

Because most school districts have delicately balanced bus transportation system designed to run as efficiently and inexpensively as possible, any change in the school schedule can have a severe impact. The specific circumstances in each district vary, but problems that arise can include cost, recruiting drivers, and/or redesigning the routes. (4)
High school athletics are very important to many students who have obvious concerns about the impact of a change in start times on their ability to participate. Any delay in the start of school will most likely result in a later release time, which may reduce time available for practice and matches. (4)

Many people are resistant to change and emotions can run high when someone is forced to alter his/her routine. Most families have a highly coordinated schedule worked out to balance the many activities of each of its members. The thought of reworking this delicate balance can be intimidating. Many parents have a hard time looking beyond this personal disadvantage to the benefits that will result.(4)

There were also some problems reported as a result of later school start times:

- Less time for sports, arts, and other after school activities
- Getting home from school later
- Conflicts with jobs
- Conflicts with extracurricular activities
- Conflicts with bus schedules and with family transportation arrangements
- Conflicts with parents’ and teachers' schedules (11)

What do they think after they changed to earlier start?

According to Carson, once students settled into the new start times in Wilton CT, athletic performances improved and, as expected, there was less absenteeism and tardiness, more mental alertness, improved grades and fewer students falling asleep in class. Carson also said students had stronger immune systems, were depressed less often and caused fewer disciplinary problems. “Parents reported less confrontation at home and more conversation,” she said. Carson said none of the parents, teachers or school committee members she spoke with in communities that made changes wanted to go back to their previous schedules, and that the town was “getting a very large return here for no money.” (17)
The high school now starts its day at 8:35 a.m., more than an hour later than last year. A preliminary report about the first two months of school seems to indicate the change has paid off with big improvements in academics as well as a huge drop in the number of days students were suspended from school.

Tardiness also declined by nearly 30 percent. "I think the tone of the day has changed dramatically. That's reflected in the overall (mood) of the student body," said Nauset High School Principal Tom Conrad. "It's very clear to me it's a more relaxed opening of school than with the 7:25 a.m. start time. Students seem to be more alert and they don't seem to be rushing to get to class within seconds of getting to school." (16)

The number of D's and F's at Nauset also dropped, from 597 to 368, a 38 percent decline. The number of days students were suspended for disciplinary reasons plummeted from 166 in the first two months last year to 19 days in September and October of this year. (16)

For example, initially Edina parents were concerned about the effect of later starts on such logistical issues as busing, athletics, and child care for younger students. But at the end of the first year of implementation, 92 percent of respondents on a survey for Edina high school parents indicated that they preferred the later start times. (2)

Students reported less depression when there was a later starting time," she says. "And teachers reported that students were more alert and ready for learning. Parents reported that their children were easier to live with because their emotions were more regulated." Additionally, Wahlstrom found a decrease in the number of students who were dropping out of school or moving from school to school. (3)

So in 2003, Jessamine County's high schools started 50 minutes later. School District Supervisor, Lu Young, says the change has had a big impact at the high schools.

"We found that our students were more on time and in better attendance first period than they had been in the past," she says. (3)

"One of the anecdotal findings was that we noticed better attendance and less student sleeping in class that first hour," Wolak says. (3)
Administrators in high schools where classes start later talked with Education World about dramatic improvements in student attendance, behavior, and school climate after schedule changes were made. "Some anecdotal information we've heard from parents includes: 'This has saved our family. It has reduced the stress in the morning,'" said Dr. Paul Highsmith, principal of Mercer Island (Washington) High School, which this year moved the starting time up 40 minutes -- to 8 a.m. "Kids like it. Teachers say the kids are not quite as zombie-like in the morning. So far, the results of a survey have been very positive." (7)

"Kids said they were feeling more in charge of their learning: they were more awake, less depressed, and not falling asleep in school." (7)

Arguments against starting later -- that kids simply would go to bed later rather than get more sleep and after-school activities would be decimated -- have not panned out, said Nelson and Wahlstrom.

"Coaches considered this the death knell for athletics," said Wahlstrom. "But there was no negative impact on participation or the success rate." Few students reported staying up later, she added.

Many of the working students also reported feeling more rested. "Kids working 20 hours a week or more were unaffected," Wahlstrom said. "They would be exhausted anyway. For those kids who only work one night a week and weekends, this benefited them." (7)

"I wish we could have started two hours and 40 minutes later," he added. "All the research, and the Minnesota study, are pretty compelling. The biggest hurdle is that people said if we started later, kids would just go to bed later. Generally, they go to bed at the same time." (7)

Later is also safer. When high schools in Fayette County in Kentucky delayed their start times to 8:30 a.m., the number of teenagers involved in car crashes dropped, even as they rose in the state. (9)

Nor have after-school jobs and activities been affected as anticipated. And though team practices and matches might have to start a bit later, student participation has usually stayed the same. Some districts have even witnessed improved performance from better-rested athletes. (9)
Some schools in Minnesota and in other states have moved their start times later. With the same bedtime, students were able to get more sleep. These were some of the positive results for students:

- Attended school more often
- Arrived on time more often
- Ate breakfast more regularly
- Completed more homework during school times (more alert and efficient)
- Appeared more alert in class (reported by teachers)
- Visited the school nurse fewer times
- Had fewer behavioral problems
- Earned better grades (Massachusetts study)
- Involved in fewer car crashes (Kentucky study) (11)

In this study, I use data from Wake County, North Carolina, to examine how start times affect the performance of middle school students on standardized tests. I find that delaying school start times by one hour, from roughly 7:30 to 8:30, increases standardized test scores by at least 2 percentile points in math and 1 percentile point in reading. The effect is largest for students with below-average test scores, suggesting that later start times would narrow gaps in student achievement. (13)

I find evidence consistent with this explanation: among middle school students, the impact of start times is greater for older students (who are more likely to have entered adolescence). However, I also find evidence of other potential mechanisms; later start times are associated with reduced television viewing, increased time spent on homework, and fewer absences. (13)

I find that students who start school one hour later watch 12 fewer minutes of television per day and spend 9 minutes more on homework per week, perhaps because students who start school later spend less time at home alone. Students who start school earlier come home from school earlier and may, as a result, spend more time at home alone and less time at home with their parents. If students watch television when they are home alone and do their homework when their parents are home, this behavior could explain why students who start school later have higher test scores. In other words, it may be that it is not so much early start times that matter but rather early end times. (13)
Previous research tends to find that students in early-starting schools are more likely to be tardy to school and to be absent. In Wake County, students who start school one hour later have 1.3 fewer absences than the typical student—a reduction of about 25 percent. Fewer absences therefore may also explain why later-starting students have higher test scores: students who have an early start time miss more school and could perform worse on standardized tests as a result. (13)

Some Conclusions

But on the whole, the benefits outweigh the costs of making this change. By simply adjusting school start times, far fewer students will be sleepless in America. (Psychology Today 1)

Despite the inconveniences involved in district-wide changes, sleep researchers emphasize the need to view sleep, like food and exercise, as a pillar of health. (12)

Judith Owens, a sleep researcher at Brown Medical School in Providence, R.I. "Parents need to take this as seriously as eating right, using seatbelts and putting on sunscreen." (12)

Additional Resources

Biography
http://www.lifespan.org/services/childhealth/research/team/carskadon.htm
http://research.brown.edu/myresearch/Mary_Carskadon

Inside the Teenage Brain - an interview with Dr. Mary Carskadon
http://www.pbs.org/wgbh/pages/frontline/shows/teenbrain/interviews/carskadon.html

Adolescent Sleep Patterns: Biological Social ..., - 2002 - 326 pages
Encyclopedia of Sleep and Dreaming - 1993 - 744 pages
Sleep Medicine - 2002 - 788 pages


Another good resource is the Sleep Foundation website
http://www.sleepfoundation.org/article/sleep-topics/school-start-time-and-sleep

Additional information:
http://www.stanford.edu/~dement/adolescent.html
Chatham Schools: http://www.app.com/article/20100126/NEWS03/100126001/Administrators-push-back-school-start-time-in-Chatham-so-students-can-get-more-sleep

(This site is a follow-up summary of the impact of later start times - pluses and minuses – on (a) after school activities; (b) mental health; (c) safety – across a handful of schools across the country that implemented later start times)
http://www.fcps.edu/fs/taskforce07/documents/finalreport/appendixu.pdf

(This is a brochure about sleep cycles in teens from NIH.)

(This is a 2 page article by the Sleep Foundation specifically on school start time & sleep patterns in teens.)
http://www.sleepfoundation.org/article/sleep-topics/school-start-time-and-sleep

(This newspaper article points out that grades don’t necessarily improve.)

(This is a detailed, 30-page review of all the evidence about sleep, adolescence, and late school start times, by the Sleep Foundation.)

This is a compiled report on schools that have changed their start time.
Compilation Paula Long 2005 School Start Times.pdf

Boston Globe article December 2009
School districts south of Boston examine delaying high-scho.pdf

Article: Beyond Doing School - From 'Stressed Out' to "Engaged In Learning"

The Teen Brain: It's Just Not Grown Up Yet by Richard Knox

Links to Quotes

2) http://www.cehd.umn.edu/research/highlights/Sleep/
4) http://www.sleepfoundation.org/article/hot-topics/eight-major-obstacles-delaying-school-start-times
5) http://schoolstarttime.org/2011/06/12/schools-recently-delaying-start-times/
7) http://www.educationworld.com/a_admin/admin/admin314.shtml
9) http://www.nytimes.com/2008/01/14/opinion/14kalish.html?_r=1
10) http://www.sleepfoundation.org/article/hot-topics/backgrounder-later-school-start-times
11) http://yoursleep.aasmnet.org/Article.aspx?id=538
13) http://educationnext.org/do-schools-begin-too-early/
14) http://www.sharon.k12.ma.us/pages/Sharon_Public_Schools/Main_Menu/Special_Projects/School_Start_Time
15) http://www.boston.com/news/nation/articles/2010/07/06/study_shows_teens_benefit_from_later_school_day/
17) http://www.wickedlocal.com/duxbury/news/x1452248425/Changes-in-store-for-school-start-times-in-September#axzz2LZXIRAGg
18) http://www.startschoollater.net/success-stories.html
19) http://www.startschoollater.net/myths-and-misconceptions.html