

# **Amherst Regional Public Schools**

## **Report of the Later Start Times Task Force**

April 15, 2011

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## **Introduction**

The Later Start Times Task Force was established in Fall 2010 by the Amherst Regional School Committee to explore options and implications for shifting the starting time of secondary schools. Schools districts that have made such a change – based on sleep researchers’ findings about teenagers’ sleep patterns – have found measurable positive outcomes in students’ academic performance, attendance, mental health, and overall health. Other districts have found a change in schedule too difficult to implement because of issues of transportation, sports schedules, and other complications.

The task force included parents, teachers, and administrators, including the directors of transportation and athletics and the Middle School principal. It met to review options, and communicated with relevant authorities within the district (e.g. food service) and outside (e.g. sleep researchers). Finally it surveyed four groups of affected “stakeholders” in the district – secondary students, secondary parents/guardians, elementary parents/guardians, and staff.

The task force is forwarding to the superintendent two options for later start times – one that switches the elementary and secondary schedules and buses (Option 2), and another that moves the whole district a half hour later in the day (Option 3) – as well as a separate proposal to change five early-release “testing” days to late-start days instead.

### **Reasons for Changing the Schedule**

Changing sleep cycles starting around puberty, based on hormone secretions and circadian rhythms, predispose teens to stay up later and not easily wake up early. At the same time, students moving from elementary to secondary schools switch to an earlier starting time. Amherst middle and high schools begin at 7:45 am, with buses picking up students as early as before 7:00 am.

In our survey of secondary students in the Amherst regional schools, 51 percent reported falling asleep in class “occasionally” and an additional 12 percent reported doing so every day. The surveys also showed overwhelming support (roughly 80 percent positive to 10 percent negative) for a later start time among both secondary students and secondary parents/guardians. Nearly 80 percent of middle and high school teachers in the survey thought a later start would positively affect their students’ academic achievement.

Sleep researchers have found that sleep changes kick in around seventh grade, with only some sixth graders affected. But in our survey, two-thirds of parents/guardians of sixth graders reported that their child had a harder time getting up and off to school than in fifth grade. A majority of those parents/guardians favored an option that would start the elementary school day half an hour later. (More survey results are presented later in this report.)

## **Obstacles to Changing the Schedule**

A change to later secondary start times faces a number of challenges, which this report will discuss. The most important is the need to change elementary starting times in order that one set of buses can continue to serve both elementary and secondary schools. An elementary school schedule change would disrupt family schedules, yet would have little if any benefit for elementary students (in fact, some options would negatively affect sixth graders) .

The second important challenge is the impact of later secondary school dismissal times on after-school sports. Playing fields shared with the town, transportation to away games, and daylight hours for outdoor practice in winter are all in short supply and would be impacted by a later school day. A related but less difficult problem is the shift in starting times, and possibly reduced available hours, for after-school clubs and activities.

Other districts contemplating a later start have worried about impacts on after-school child care of younger children by teens, and effects on teen after-school employment. Based on our surveys, these seem to be relatively unimportant issues in the Amherst region.

## **Other Districts' Experiences**

The research summary in Appendix A summarizes the effects of start-time changes in other school districts, beginning with the large-scale change in Minneapolis a decade ago (later high school start, earlier elementary). Anticipated problems there with after-school sports and activities did not materialize, and the new schedule showed strong positive effects. Since then, dozens of school districts nationally have changed start times, including a number in Massachusetts. Research on districts that changed start times consistently shows improved academic outcomes such as higher test scores, grades, and attendance. Mental and physical health measures also show improvement, and researchers have found lower teen motor vehicle accident rates.

A private high school in Rhode Island that recently shifted its schedule half an hour later (from 8:00 to 8:30) as a three-month experiment immediately made the change permanent at the end of the experiment, by popular demand. Interestingly, in that school the teens ended up getting 45 minutes' additional sleep although the start time was only 30 minutes later. Apparently, students liked feeling the benefits of more sleep, and were able to finish evening homework more quickly because they were less tired.

Secondary schools that do not share buses with elementary schools have an easier time changing their start times. In the local area, the Pioneer Valley Performing Arts (PVPA) charter school has gone to an 8:30 am to 4:15 pm schedule. The Holyoke schools moved both secondary and elementary schools later in the day about five years ago (Middle/High school 8:15-2:52 ; Elementary 9:05-3:05). The close-together ending times work because high school students use PVTA for transportation. Holyoke saw positive impacts on student performance and has kept the later schedule.

Northampton recently discussed a change in start times, complicated by its separate Middle School bus tier. The proposal that came forward to the school committee required the purchase

of additional buses at considerable expense. The school committee put off the proposal until its budget impact could be further explored.

### **Five Options**

The task force identified five possible options for the school day schedule:

Option 1: **No Change** – keep the current schedule. This option would be least disruptive to family schedules and high school sports, and would not cost anything, but would not benefit sleep-deprived teens.

Option 2: **Switch Secondary and Elementary** – the bus runs would be reversed; elementary would start and end an hour earlier; middle and high school would start and end an hour later. This option would maximize the sleep benefit for teens but also maximize the negative impact on elementary families and after-school sports.

Option 3: **Shift Everything a Half Hour Later** – both elementary and secondary schools would start and end a half hour later.

Option 4: **Put the Middle School on the Elementary Schedule** – buses would pick up middle schoolers with the elementary runs, so that middle school could start and end an hour later. This would give middle schoolers maximum sleep benefit without disrupting either elementary families or high school sports. High school students would get no sleep benefit.

Option 5: **Put K-12 all on the Elementary Schedule** – buses would pick up all grades together. Middle and high school would start and end an hour later (maximum sleep benefit, sports disruption)

These options are summarized on the following page.

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Summary of Later Start Options	NoChange (1)	Switch Elem/Sec (2)	Shift Half Hour (3)	MS with Elem (4)	All with Elem (5)
Sleep Impact	Worst for MS/HS	Best for MS/HS. Harder on some 6 <sup>th</sup> graders	Significant benefit for HS/MS. Better for some 6 <sup>th</sup> graders	Best for MS; no benefit for HS. No effect on elem.	Best for MS/HS. No effect on elem.
Elementary Schools	No change	Start hour earlier Pickup/walk in dark? PM childcare hour longer	Start half hour later AM childcare 'til later	No change	No change
Budget Effect	Baseline	Minimal. Est. \$4000 o/t. for late buses. Crossing guards maybe needed @ \$4,500 ea. Sports buses maybe \$3,000 more.	Minimal. Est. \$9,000 o/t for voke runs. Sports buses maybe \$3,000 more. Winter energy savings.	Est. \$200,000.	Est. \$500,000.
Transportation	Easiest / proven system	Switch bus schedule; similar to current late-start Thursdays.	Shift bus schedule except voke pickups. Fewer delay starts in bad weather.	Additional buses needed. More siblings ride together.	Additional buses needed. Older & younger kids ride together.
Sports	Best	Most pressure on fields, practice time, and game times, esp. in winter.	Some pressure on fields, practice time, and game times, esp. in winter.	Little impact	Most pressure on fields, practice, games in winter.
Shutesbury/Leverett	No change	Would start hour earlier (same buses)	Would start half hour later	Bus runs affected	Bus runs affected
Other		Possible impact on teens providing PM childcare; teen employment. Preschool times earlier.	Some impact possible on teen childcare and employment. Preschool times later.		

### **Impacts of Options 2 and 3**

It was determined that options 4 and 5 would require adding buses and would have substantial budgetary impact – about \$200,000 and \$500,000 per year respectively. The task force took note of Northampton’s recent decision to put off a schedule change because of added transportation costs. Since options 2 or 3 can accomplish the goals of a later start at minimal cost, the task force put options 4 and 5 on hold and focused on options 2 and 3.

Assuming that secondary late-start Thursdays once a month and elementary early-release Wednesdays every week are retained, the following schedules would result.

#### **Option 2:**

Elementary: 7:45-2:10 (from 8:40-3:05 now) [Wed. 7:45-12:25]  
Middle/High: 8:40-3:15 (from 7:45-2:20 now) [Late start 10:55-3:15]

Bus routes: Middle and High School buses would typically run from about 8:05 am to about 8:35 (shifted from today’s 7:00 to 7:30). Elementary school bus routes would typically run from about 7:10 to about 7:40 am (shifted from today’s 8:05 to 8:30).

#### **Option 3:**

Middle and High Schools: 8:15-2:50 (from 7:45-2:20 now) [Late start 10:30-2:50]  
Elementary Schools: 9:10-3:35 (from 8:40-3:05 now) [Wed. 9:10-1:50]

Bus routes: Middle and High School buses would typically run from about 7:30 am to about 8:00 (shifted from today’s 7:00 to 7:30). Elementary school bus routes would typically run from about 8:35 to about 9:00 am (shifted from today’s 8:05 to 8:30).

The task force evaluated the impacts of each option in a variety of areas.

### **Financial Impacts**

Neither Option 2 nor Option 3 would have substantial budget implications.

Under Option 2, the earlier start time for elementary school could require hiring additional crossing guards. If this turns out to be needed, it could cost around \$25,000/year. The later secondary times would require additional overtime for bus drivers (\$4,000/year), and might require more contracted buses rather than district-owned buses for away sports games, at a possible cost of around \$3,000/year.

Under Option 3, the sports buses could similarly cost \$3,000/year. In addition, there would be a gap between bus runs for Vocational students (whose schedule would not change) and the regular bus runs (half hour later), leading to about \$9,000 in overtime for drivers. However, the later start times could save modestly on energy costs during winter.

### **Labor Contract Impacts**

Changing the daily schedule is an “impact bargaining” item for the Amherst Pelham Educators Association (APEA). The district would provide official written notice to the Association about the proposed schedule changes. The task force does not anticipate conflicts associated with renegotiating work hours with either internal staff or external (e.g. bus) companies.

## **Transportation Impacts**

Both Options 2 and 3 would require Leverett and Shutesbury to follow the same schedule change as Amherst and Pelham elementary schools, unless additional buses are to be purchased.

Under Option 2, buses would make elementary runs first, then secondary runs, and the overall schedule of drivers and buses would not change. In winter months in the morning, elementary students could be walking to school or to the bus stop in the dark or dusk.

Under Option 3, transportation contracts with bus drivers and outside companies would have to be renegotiated to incorporate new work hours (a half hour later in the day). This should not be a problem. Bus runs would be the same as at present but shifted thirty minutes (except vocational student runs which would not shift). Students may be more awake and not miss the bus.

Option 3 would help with daylight in the winter months. Secondary students would no longer be walking, waiting for buses, or driving to school in the dark or dusk. During inclement weather, the half hour delay would help greatly with morning transportation, and give DPW staff more time to prepare streets for morning bus runs.

## **Athletics Impacts**

Any late-start option would have a substantial negative effect on athletics and after-school activities. Probably most clubs and after-school activities will find ways to adjust to later or shorter hours, but some sports will be more seriously impacted.

Currently, the high school delays after-school sports and activities so that the period from 2:20 to 3:15 is available for academic help. Students may access teachers for after-school help before practices, games, meets, or club activities begin. Meanwhile student athletes must meet standards of attendance and grades in order to participate in practices. These policies support the high academic achievement of student athletes. Also, teaching staff have the opportunity to provide after-school academic support to all students and then participate in coaching sports. One drawback of the current system is the issue of supervising 300 to 450 students after school and before sports or other activities, since not all of them go for academic help.

Under **Option 2**, with the end of the school day delayed by an hour, sports schedules would be seriously impacted. A 3:20 dismissal would be very late for transport to away games, most of which would have to start after 4:30 – an issue especially in October and November and for those sports (e.g., field hockey) where varsity and junior varsity play sequentially using the same field and officials. For all sports, if the current after-school help policy continues, practices could not begin until 4:00, with students returning home later in the day. Similarly, we could potentially lose coaches who do not want to extend their school day with later practices/games.

Later sports practices and home games would also conflict with town programs during all three seasons, as the high school and middle school share facilities, including Community Field, with town sports programs. This could lead to pushback from affected community groups.

Option 2 would lead to the elimination of the golf team and the ice hockey program, because these depend on outside facilities for practice time and match time. The times we use those facilities cannot be renegotiated. The Nordic ski team would not be able to practice after school because of the lack of daylight hours in winter.

One benefit of option 2, however, is that varsity athletes who have night games would be able to sleep an hour later the next morning. For teams whose practice time is severely impacted by Option 2, there is also the possibility of practicing before school in the morning. Although this negates the benefits of a later start for those students during their sports seasons, this might be a price worth paying if the rest of the student body could have the benefits of a later start time.

Under **Option 3**, all the same concerns would arise, but would be mitigated by the shorter delay in starting after school. The half hour delay would be much easier to work around than the hour delay.

Under **either Option 2 or Option 3**, the delayed transportation to away games would require using contracted buses rather than district-owned buses more often. This could add \$3,000-\$5,000 per year. Currently, athletic fees and fundraising pay for athletic costs (other than a portion of the athletic director and coaches' salaries). If the additional transportation costs were passed on to athletes, the higher fees could prove a hardship to some or even drive some away.

One mitigation strategy under either late-start option would be to exempt some or all athletes from the after-school academic support period. This would allow practices to begin earlier – compensating entirely for the delayed schedule in the case of Option 3. **Under Option 3 (but not Option 2), this policy would save golf and ice hockey from elimination**, and would let the Nordic Ski team practice after school. It would also solve the issue of supervising athletes during the after-school period before practices. However, it would make those teacher/coaches unavailable to give academic support on some days.

### **Elementary School Impacts**

Different start times have no inherent value for elementary students, with the possible exception of Option 3 for sixth graders. And a schedule change would disrupt elementary family routines.

Elementary parents in our survey reacted differently to the two options, one of which would start school an hour earlier and one half an hour later. Some felt that one option would have a strong negative impact on family schedules, and different respondents felt that the other option would. Overall, a majority expected a negative impact on family/work life from Option 2, with 37% of respondents rating the impact “strongly negative” and 18% “strongly positive.” Response to

Option 3 was more mixed, with about a quarter rating the impact on family/work life as “strongly negative,” another quarter “strongly positive,” and the rest fairly split as well. The two options create different types of problems: Under Option 2, 51% foresaw a problem with Parents’ Work and 58% with Childcare after School. Under Option 3, the only problem area seen by a majority of parents was Parents’ Work (82%).

Preschool times would have to be adjusted with a change in elementary schedule. Under Option 3, with school starting later, more parents may face a gap between when they leave for work and when school starts. We surveyed elementary parents about whether they would use expanded child care before school under Option 3. Of those (a strong majority) who saw a negative impact on Parents’ Work under Option 3, one-third said they would use the extended daycare every day, and another 31% said “some days each week” and 22% “occasionally.” Thus, this seems to be a useful strategy if Option 3 is adopted.

Other districts have found resistance to switching elementary and secondary start times because kindergarteners could have to catch buses in the dark on winter mornings. During the darkest months our twilight is 6:45 and sunrise 7:15, and the bus routes would start around 7:00 under Option 3. This might be perceived as a problem by elementary parents. This problem is not relevant to Option 3.

Sixth graders differed from the other elementary grades. Although sleep researchers find that sleep needs most often change around seventh grade, our survey found an impact on sixth graders. Among parents of sixth graders, 68 percent reported their child had a harder time this year waking up and getting off to school in the morning. Sixth grade parents favor Option 3 with the later elementary start time (55% positive, 26% negative) and were mixed on Option 2 (about 40% in favor and against). Sixth graders themselves strongly support later start times. Relatively few report falling asleep in class every day (7%) or occasionally (14%).

Parents of kindergarteners seem to face greater disruption from Option 2, with 44% expecting a “strongly negative” impact on their family/work lives. Their opinion of Option 3 was more mixed (28% strongly positive, 22 percent strongly negative, but overall a bit more negative than positive).

### **Community Surveys**

We received survey responses from 396 secondary parents, 253 secondary students, 232 elementary parents, and 202 staff. In this summary, we conflate strongly and mildly positive or negative responses to give an overall positive and negative percentage for each question. Full survey summaries are in Appendix B.

**Secondary parents and students** overwhelmingly support a later start time.

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	Option 2		Option 3	
	pos	neg	pos	neg
Secondary parents	<b>77%</b>	15	<b>79</b>	10
How would affect your child	<b>84</b>	11	<b>86</b>	8
Students, grades 6-12 overall	<b>79</b>	17	<b>85</b>	3
How a later start would affect academics well being, health			89+ 3- [both options] 91+ 2-	
Students grades 7-8	<b>87</b>	8	<b>85</b>	10
How a later start would affect academics well being, health			89+ 3- 95+ 3-	
Students grades 9-12	<b>77</b>	19	<b>84</b>	12
How a later start would affect academics well being, health			89+ 3- 91+ 2-	
Student athletes (62 respondents)	<b>77</b>	19	<b>87</b>	11
Students taking care of younger siblings (20)		<b>80</b>	15	<b>85</b> 10

The responses of **elementary parents/guardians and staff** are much more split. Overall, parents/guardians see the immediate effect of a schedule change, especially Option 2, as negative for their family and work lives, but they see later starts as having a positive effect over the course of their children’s entire school career from pre-K to 12<sup>th</sup> grade.

Elem. parents – effect on work schedule	34	<b>53</b>	40	<b>45</b>
Effect on child’s PreK-12 career	<b>55</b>	35	<b>65</b>	24

Elementary staff (91 respondents) expect negative disruption to their family/work schedule under Option 2 but somewhat support Option 3:

Elem. staff - family/work schedule	26	<b>64</b>	<b>51</b>	36
How affect student academics	23	<b>51</b>	<b>38</b>	23

Middle School staff (46 respondents) expect personal disruption under Option 2 but see benefit for their students in either proposal:

MS staff – family/work schedule	40	<b>46</b>	<b>51</b>	31
How affect student academics	<b>61</b>	11	<b>67</b>	4

High School staff (86 respondents) also see Option 3 as better for their family/work lives, but see both options as benefiting students:

HS staff – family/work schedule	<b>51</b>	38	<b>60</b>	28
How affect student academics	<b>65</b>	13	<b>62</b>	8

Our overall impression from the surveys is that there is support for a change, with elementary parents seeing it as more of a problem with schedules but acknowledging the benefits for kids in the long term. Secondary parents show lots of support and overwhelmingly responded to the survey. In general more support is seen for option 3 than 2.

### **Test Days**

Five days in each school year, one at the end of each trimester and two more at the end of the year, are test days at the high school. Currently they operate on an early-release schedule, and the middle school follows the same schedule (for busing reasons).

The task force offers the proposal, separate from whatever is done with the regular daily schedule, to make these five days late-start rather than early-release days. Buses would operate on a schedule similar to late-start Thursdays, i.e. picking up elementary students and then returning for secondary ones, while running a normal return-home schedule after school.

The main advantages to this change would be to give students extra sleep on days when they take important exams, to improve on-time attendance and performance on those days. A secondary benefit would be to avoid the massing of secondary students in downtown Amherst after an early release, which reportedly has been a problem for merchants.

The task force could find no drawbacks to this change. It was supported by the middle and high school principals, and by secondary teachers surveyed (54% positive, 22% negative). The food service director reported that it would be feasible to add lunch at the two schools on these days. No budget impact to the district is anticipated.

## **Appendix A – Research Summary on Teen Sleep and School Start Times**

Many articles and news reports have been published on teen sleep needs and school start times. This appendix summarizes some of the important or recent ones.

### **I. Research on Teenagers and Sleep**

The impetus to shift start times later came from sleep researchers who found that circadian rhythms differ in teenagers from either younger children or adults.

In 1980, a group of researchers including the legendary Stanford sleep researcher William Dement (Carskadon et al. 1980) published results of a 6-year longitudinal study in a summer sleep lab where sleep opportunity was held constant at 10 hours in children starting at 10-12 years old (ending at age 16-18). Contrary to the expectation that the teenagers' sleep needs would diminish as they got older, reaching the adult level of 7.5 to 8 hours by their late teens, what the study found was that sleep needs remained constant at 9.2 hours. "Sleep need is not reduced during adolescence" (Wolfson and Carskadon 1998: 876).

Actual sleep time diminishes as teens get older, however, because they go to sleep later but – because of school schedules – still wake up early. The tendency to stay up later was attributed by sleep researchers to "psychosocial factors and to biological changes that take place during puberty" (Wolfson and Carskadon 1998: 876). Studies showed a strong biological basis for this shift, even in the absence of psychosocial factors. The sleep shift results from changes in the timing of melatonin secretion, associated with puberty, which drive the circadian timing (Carskadon et al. 1997).

School start times have been found to be "the predominant determinant of awakening times" for teens. The non-negotiable need to wake up for school at a fixed time conflicts with the teens' shifting circadian rhythms. Worse, teens' school times typically shift earlier as they move from elementary to secondary schools and they get even less sleep as a result (based on various U.S. and Polish studies). In one study, researchers followed 15 teens whose schedule shifted 65 minutes earlier as they went from 9<sup>th</sup> to 10<sup>th</sup> grade, and found their sleep reduced by 40 minutes. Other studies showed that students with earlier school start times (7:30 am or earlier) get less sleep than those with later start times. Typically, teens sleep-deprived during the week try to "catch up" by sleeping very late on weekends and vacations. (Wolfson and Carskadon 1998: 876.)

Not surprisingly, sleep reduction in teens correlates with a variety of negative daytime outcomes, starting with "daytime sleepiness." Several studies in the 1990s, involving hundreds of students, found less sleep to correlate with lower grades. A 1995 survey of Israeli students from elementary to high school age reported that less sleep correlated with "daytime fatigue, inability to concentrate in school, and a tendency to doze off in class. Persistent sleep problems have also been associated with learning difficulties throughout the school years." (Wolfson and Carskadon 1998: 877; Epstein, Cillag and Lavie 1995; Quine 1992). Sleep disturbance (insomnia) in

middle-school students correlates with “fatigue, mood disturbance, suicidal ideation, and unhappiness” (Roberts, Roberts, and Chen 2001).

The 1998 study by Wolfson and Carskadon, published in the prestigious journal *Child Development*, documented the effect of early awakening times on daytime functioning in more than 3,000 students at four Rhode Island high schools (rural, urban, and 2 suburban). (The urban school had twice the number of minority and free-lunch students as the others.) Starts time were all from 7:10 to 7:30 am. The study found a strong correlation between grades and sleep time, with A and B students getting almost 20 minutes more sleep/night than C students and about 30 minutes more than D and F students.(Wolfson and Carskadon 1998: 881). Students getting inadequate sleep had more behavioral problems such as tardiness, feeling tired every day, and higher rates of depressive mood (p.883). Sleep patterns did not vary by gender (p.880). No differences were found between single-parent and two-parent households (p.884). No differences between the urban, suburban, and rural schools were described.

The sleep researchers’ concerns about start times were summarized by Stanford’s William Dement: “Sending kids to school at 7 a.m. is the equivalent of sending an adult to work at 4 in the morning. It’s almost abusive to them” (quoted in Diconsiglio 2002: 17).

## **II. Effects of Changing Start Times**

The first major response to the sleep researchers’ findings came when Minneapolis changed school schedules in seven high schools with 12,000 students. The district moved elementary school starts earlier and moved high school starts from 7:15 am to 8:40. Researcher Kyla Wahlstrom at the University of Minnesota followed the change in a longitudinal study and documented positive outcomes in terms of academics and mental health over several subsequent years. The study reported “improved attendance and enrollment rates, less sleeping in class, and less student-reported depression” (Wahlstrom 2002). Attendance rates improved for all ethnic groups (p.9). Grades improved only slightly, though this was difficult to measure (p.11) [lower dropout rates, after later starts began, may have kept students with lower grades in school and thus brought down the grade average]. Minneapolis is considered a typical urban district in terms of ethnic composition and income (p.5). “Few” students take the SAT or ACT tests.

One concern about shifting school start times was that teens would simply stay up later as they adjust to waking up later. Research has shown this does not occur. In Minneapolis, students’ bedtimes did not change when start times shifted later (Wahlstrom 2002: 12). In a later study in New England, Wolfson et al. (2007) compared 7<sup>th</sup>-8<sup>th</sup> grade middle schools with early (7:15 am) and late (8:37 am) start times. The experiment was set up when the school board decided to change from a single 8:00 start time to have some schools earlier and some later, to save money. Bedtimes were found to be similar in both groups despite the different waking times. Those at the later-start school got 50 minutes more sleep on average and reported less sleepiness and less tardiness.

Danner and Phillips (2008) studied sleep habits and adolescent motor vehicle accident rates in a large, county-wide school district, before and after the school day was shifted an hour later. After the shift, students got 10-30 minutes more sleep on average (increasing from grade 9 to 12), and decreased their weekend make-up sleep accordingly. There was a “significant drop in auto collision rates for high school-aged drivers.”

Owens, Belon, and Moss (2010) studied the impact of a half-hour change (8 am to 8:30) in start time for a private 9-12 high school with 200 students in Rhode Island. This shift was implemented as a 3-month experiment but then made permanent by popular demand. The researchers measured improved motivation, reduced fatigue and depression, and higher class attendance. The number of students getting eight hours’ sleep rose from 16 to 55 percent. Surprisingly, the average sleep time increased by 45 minutes although school start was delayed by only 30 minutes – the students went to bed earlier, not later. Student comments attributed this to the benefits they began seeing from getting more sleep (p.613). One faculty member quoted in the article (p.613) said: “On a more personal note, I have found the 8:30 start to be the single most positive impact to my general quality of life at [the school] since I started 12 years ago.” The researchers conclude that a modest, half-hour delay (from an already late-ish 8:00 start) had a dramatic effect on academic, psychological, and health outcomes.

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Wolfson, Amy R. and Mary A. Carskadon. Sleep Schedules and Daytime Functioning in Adolescents. *Child Development* 69, 1998: 875-887.

### **Addendum to Summary of Research**

In a phone call, leading sleep researcher Amy Wolfson (College of the Holy Cross, Worcester) provided additional information about *elementary* school sleep and about differential effects by *social class/income*.

She said that no study has gathered good data on elementary start times. The reason is that circadian cycle shifts have not developed at that age, so start times are not an issue (or, more accurately, are an issue only secondarily as districts think about changing middle and high school start times).

There is research on the biology of circadian cycle delay in general, showing it starts around puberty, varying by individual. The sleep needs of 8.5 to 9.5 hours are constant from about age 10 and up through high school. The shift happens a bit earlier for girls than boys.

In her own pilot studies of 5<sup>th</sup> and 6<sup>th</sup> graders in earlier and later starting schools, the 5<sup>th</sup> graders were not affected and the 6<sup>th</sup> graders were slightly affected by the difference in start times. If elementary school starts were moved an hour earlier, she thought that some 6<sup>th</sup> graders would have trouble with the earlier schedule, but overall the elementary-age students would be able to function well with whatever start times they have.

Wolfson sees Middle School as a good cutoff in thinking about when later sleep times would help. She emphasized that 7<sup>th</sup> and 8<sup>th</sup> graders benefit from later start times at least as much as high schoolers. Although many districts have focused on high school start times, she said “frankly, middle school would really benefit” because there are “so many risk factors” in the transitions student go through at that stage.

Regarding class issues, Wolfson has a paper under review now looking at sleep differences in higher and lower income teens in Worcester (a low-income district overall). The sleep deficits are very significantly worse in the lower-income students. Presumably (though this has not been studied directly), the improved sleep schedules from later start times would thus benefit lower income students disproportionately. Regarding effects on employment, Wolfson said nothing has been published on this directly, but she pointed out that teens working more than 20 hours/week (which seems to be the cutoff) get significantly less sleep. These are not mostly low-income teens working to support their families, but more often higher-income teens working for experience or extra spending money.

Wolfson mentioned that the National Association of School Psychologists has a statement about sleep and start times (“Schools with early start times (any time before 8:30 a.m.) place students at a disadvantage...”). The American Association of Pediatrics expects to have a statement in about a year, and the Centers for Disease Control is still working on its policy statement.

She also mentioned that a number of districts in eastern Mass., especially south of Boston, have changed their start times, and she thinks Massachusetts may be a leader on this issue.

**Appendix B – Results of Four Surveys**

(Pages follow.)

Secondary parent survey

Secondary student survey

Elementary parent survey

Staff survey

# Later Start Time Secondary Parent/Guardian Survey









## 1. How would each of the proposed changes affect your family/work schedule:

	Very Positive	Somewhat Positive	Neutral/No Opinion	Somewhat Negative	Strongly Negative	Response Count
Option 2 (start and end one hour later)	64.1% (248)	13.2% (51)	7.2% (28)	7.5% (29)	8.0% (31)	387
Option 3 (start and end one half-hour later)	45.5% (166)	34.0% (124)	10.1% (37)	5.5% (20)	4.9% (18)	365
<b>answered question</b>						<b>396</b>
<b>skipped question</b>						<b>0</b>

## 2. In what area(s), if any, would each proposed change negatively affect your schedule? (Choose all that apply)

	Parents' Work	Child Care Before School	Child Care After School	After-School Activities	None	Response Count
Option 2 (start and end one hour later)	12.1% (45)	1.6% (6)	2.4% (9)	24.2% (90)	68.3% (254)	372
Option 3 (start and end one half-hour later)	7.6% (26)	1.5% (5)	2.6% (9)	15.5% (53)	80.1% (274)	342
Other (please specify)						45
<b>answered question</b>						<b>375</b>
<b>skipped question</b>						<b>21</b>

### 3. What is your child(ren)'s current grade level?

		Response Percent	Response Count
Grade 7		25.9%	101
Grade 8		20.8%	81
Grade 9		22.3%	87
<b>Grade 10</b>		<b>29.0%</b>	<b>113</b>
Grade 11		19.0%	74
Grade 12		8.5%	33
<b>answered question</b>			<b>390</b>
<b>skipped question</b>			<b>6</b>

### 4. How do you think a schedule change with later start times in middle and high school would affect your child(ren)

	Very Positively	Somewhat Positively	Neutral/No Opinion	Somewhat Negatively	Very Negatively	Rating Average	Response Count
Option 2 (start and end one hour later)	<b>71.5% (279)</b>	12.8% (50)	5.1% (20)	6.4% (25)	4.1% (16)	1.59	
Option 3 (start and end one half-hour later)	<b>53.0% (195)</b>	33.2% (122)	6.3% (23)	5.2% (19)	2.4% (9)	1.71	
<b>answered question</b>							
<b>skipped question</b>							

# Later Start Time Student Survey



1. Please rate your support of Later Start Time Option 2: Middle and High School Start and End Times Moved One Hour Later.

		Response Percent	Response Count
Strongly Support		63.6%	161
Slightly Support		15.0%	38
Neutral/No Opinion		4.3%	11
Slightly Negative		5.9%	15
Strongly Negative		11.1%	28
<b>answered question</b>			<b>253</b>
<b>skipped question</b>			<b>0</b>

2. Please rate your support of Later Start Time Option 3: Middle and High School Start Times Moved a Half-Hour Later.

		Response Percent	Response Count
Strongly Support		51.4%	130
Slightly Support		33.2%	84
Neutral/No Opinion		4.0%	10
Slightly Negative		4.7%	12
Strongly Negative		6.7%	17
<b>answered question</b>			<b>253</b>
<b>skipped question</b>			<b>0</b>

**3. Please rate your opinion of how a later start time would affect your life, as a middle or high school student, in the following ways.**

	<b>Very Positive</b>	<b>Slightly Positive</b>	<b>Neutral/No Opinion</b>	<b>Slightly Negative</b>	<b>Very Negative</b>	<b>Rating Average</b>	<b>Response Count</b>
Academic success in school.	<b>64.0% (160)</b>	24.8% (62)	8.0% (20)	2.0% (5)	1.2% (3)	1.52	250
Overall well being, health.	<b>78.5% (197)</b>	12.0% (30)	7.2% (18)	1.2% (3)	1.2% (3)	1.35	251
Childcare for siblings after school.	22.3% (55)	8.1% (20)	<b>63.2% (156)</b>	3.6% (9)	2.8% (7)	2.57	247
Later or shorter after-school sports.	20.7% (51)	11.8% (29)	<b>38.2% (94)</b>	20.3% (50)	8.9% (22)	2.85	246
Later or shorter after-school clubs or activities.	22.4% (56)	11.6% (29)	<b>41.6% (104)</b>	18.0% (45)	6.4% (16)	2.74	250
Work after school.	18.1% (45)	7.6% (19)	<b>58.2% (145)</b>	9.2% (23)	6.8% (17)	2.79	249
Work before school.	23.7% (59)	10.8% (27)	<b>61.0% (152)</b>	2.0% (5)	2.4% (6)	2.49	249
How I would get to school.	38.2% (95)	6.0% (15)	<b>47.8% (119)</b>	4.4% (11)	3.6% (9)	2.29	249
How I would get home from school.	31.5% (79)	8.8% (22)	<b>53.8% (135)</b>	2.8% (7)	3.2% (8)	2.37	251
How I would get to work after school.	19.4% (48)	2.0% (5)	<b>74.2% (184)</b>	2.0% (5)	2.4% (6)	2.66	248
How I would get to work before school.	20.2% (50)	3.6% (9)	<b>73.8% (183)</b>	1.2% (3)	1.2% (3)	2.60	248
Private lessons that are scheduled before school.	22.6% (56)	4.8% (12)	<b>68.1% (169)</b>	2.0% (5)	2.4% (6)	2.57	248
Private lessons that are scheduled after school.	20.1% (50)	9.2% (23)	<b>55.0% (137)</b>	9.6% (24)	6.0% (15)	2.72	249
Transportation for others in my family.	31.0% (76)	10.6% (26)	<b>48.6% (119)</b>	6.1% (15)	3.7% (9)	2.41	245





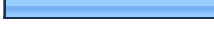


Other (please specify)

16

answered question 252

skipped question 1




**4. In what grade are you currently enrolled?**

		Response Percent	Response Count
6th		5.6%	14
7th		6.0%	15
8th		10.8%	27
9th		18.8%	47
<b>10th</b>		<b>31.6%</b>	<b>79</b>
11th		18.8%	47
12th		8.4%	21
		<b>answered question</b>	<b>250</b>
		<b>skipped question</b>	<b>3</b>

**5. In what activities do you currently participate? (Please choose all that apply to you.)**

	Fall	Spring	Both Fall and Spring	Response Count
School Clubs	26.8% (42)	23.6% (37)	<b>49.7% (78)</b>	157
Drama/Theatre Productions	21.7% (15)	<b>42.0% (29)</b>	36.2% (25)	69
Band/Orchestra Productions	26.9% (18)	14.9% (10)	<b>58.2% (39)</b>	67
Chorus Productions	20.0% (9)	24.4% (11)	<b>55.6% (25)</b>	45
Athletics	30.2% (49)	29.6% (48)	<b>40.1% (65)</b>	162
Work	22.4% (13)	29.3% (17)	<b>48.3% (28)</b>	58
School Tutoring	<b>37.9% (11)</b>	27.6% (8)	34.5% (10)	29
Childcare for siblings	20.6% (7)	17.6% (6)	<b>61.8% (21)</b>	34
Volunteer	31.5% (23)	31.5% (23)	<b>37.0% (27)</b>	73
			Other (please specify)	31
<b>answered question</b>				<b>237</b>
<b>skipped question</b>				<b>16</b>

**6. Do you fall asleep during class?**

		Response Percent	Response Count
Never		35.9%	89
<b>Occasionally</b>		<b>51.6%</b>	<b>128</b>
Every day		12.5%	31
<b>answered question</b>			<b>248</b>
<b>skipped question</b>			<b>5</b>

## 7. How do you get to and from school most days?

	Transportation To School	Transportation From School	Transportation Both Ways	Response Count
Walk	14.7% (5)	41.2% (14)	<b>44.1% (15)</b>	34
Bike	<b>50.0% (7)</b>	21.4% (3)	28.6% (4)	14
Drive Myself	32.3% (10)	6.5% (2)	<b>61.3% (19)</b>	31
Ride with a parent/guardian or friend	<b>48.5% (64)</b>	26.5% (35)	25.0% (33)	132
Ride the school bus	37.8% (70)	21.1% (39)	<b>41.1% (76)</b>	185
Take public transportation (PVTA)	3.7% (1)	<b>92.6% (25)</b>	3.7% (1)	27
			Other (please specify)	12
<b>answered question</b>				<b>253</b>
<b>skipped question</b>				<b>0</b>

# Later Start Time Parent/Guardian Survey



## 1. How would each of these options under consideration affect your family/work schedule:

	Very Positive	Somewhat Positive	Neutral/No Opinion	Somewhat Negative	Strongly Negative	Response Count
Option 2 (Start the elementary school day one hour earlier)	17.7% (40)	16.8% (38)	12.4% (28)	15.9% (36)	<b>37.2% (84)</b>	226
Option 3 (Start the elementary school day one half-hour later)	<b>25.0% (56)</b>	15.2% (34)	14.7% (33)	21.4% (48)	23.7% (53)	224
<b>answered question</b>						<b>231</b>
<b>skipped question</b>						<b>1</b>

## 2. In what areas,if any, would each option under consideration negatively affect your schedule?

	Parents' Work	Child Care Before School	Child Care After School	After-School Activities	Response Count
Option 2 (Start the elementary school day one hour earlier)	51.3% (59)	20.0% (23)	<b>58.3% (67)</b>	22.6% (26)	115
Option 3 (Start the elementary school day one half-hour later)	<b>81.8% (99)</b>	27.3% (33)	13.2% (16)	33.9% (41)	121
Other (please specify)					57
<b>answered question</b>					<b>156</b>
<b>skipped question</b>					<b>76</b>




**3. If the secondary schools started one half-hour later and extended early drop-off times were available at the elementary schools, how often would you be likely to utilize them?**

		Response Percent	Response Count
Every Day		20.4%	46
Some Days Each Week		23.5%	53
Occasionally		23.0%	52
<b>Never</b>		<b>33.2%</b>	<b>75</b>
<b>answered question</b>			<b>226</b>
<b>skipped question</b>			<b>6</b>

**4. What is your child(ren)'s current grade level?**

		Response Percent	Response Count
Preschool		15.2%	35
Kindergarten		13.9%	32
Grade 1		17.8%	41
Grade 2		20.4%	47
<b>Grade 3</b>		<b>23.0%</b>	<b>53</b>
Grade 4		22.6%	52
Grade 5		17.4%	40
Grade 6		19.1%	44
<b>answered question</b>			<b>230</b>
<b>skipped question</b>			<b>2</b>







**5. If you currently have a 6th grader, does he or she have more difficulty waking up and getting ready for school this year than last year?**

		Response Percent	Response Count
Yes		67.9%	36
No		26.4%	14
Not sure		5.7%	3
<b>answered question</b>			<b>53</b>
<b>skipped question</b>			<b>179</b>

**6. Over the course of your child's PreK-12 career, what affect would you expect from a schedule change with later start times in middle and high school?**

	Very Positive	Somewhat Positive	Neutral/ No Opinion	Somewhat Negative	Very Negative	Rating Average	Response Count
Option 2 (Elementary day starts one hour earlier and secondary day starts one hour later)	<b>34.1% (75)</b>	21.4% (47)	9.1% (20)	17.7% (39)	17.7% (39)	2.64	220
Option 3 (Elementary day starts one half-hour later and secondary day starts one half-hour later)	32.0% (70)	<b>33.3% (73)</b>	11.0% (24)	14.6% (32)	9.1% (20)	2.36	219
<b>answered question</b>							<b>225</b>
<b>skipped question</b>							<b>7</b>

**7. What school does your child attend? If your children attend different elementary schools, you may select multiple locations.**

		Response Percent	Response Count
Crocker Farm Elementary		20.2%	21
<b>Fort River Elementary</b>		<b>40.4%</b>	<b>42</b>
Leverett Elementary		7.7%	8
Pelham Elementary		11.5%	12
Shutesbury Elementary		1.9%	2
Wildwood Elementary		22.1%	23
		<b>answered question</b>	<b>104</b>
		<b>skipped question</b>	<b>128</b>

# Later Start Times Staff Survey



## 1. How would each option under consideration affect your family/work schedule?

	Very Positive	Somewhat Positive	Neutral/No Opinion	Somewhat Negative	Strongly Negative	Response Count
Option 2 (Elementary Schools start and end one hour earlier; Middle and High School start and end one hour later)	21.3% (42)	18.3% (36)	11.2% (22)	18.3% (36)	<b>31.0% (61)</b>	197
Option 3 (Elementary Schools start and end one half-hour later; Middle and High School start and end one half-hour later)	23.6% (45)	<b>29.3% (56)</b>	13.6% (26)	15.7% (30)	17.8% (34)	191
<b>answered question</b>						<b>202</b>
<b>skipped question</b>						<b>0</b>

## 2. How do you think each option would affect your students' academic achievement?

	Very Positively	Somewhat Positively	Neutral/No Opinion	Somewhat Negatively	Strongly Negatively	Does Not Apply	Response Count
Option 2 (Elementary Schools start and end one hour earlier; Middle and High School start and end one hour later)	<b>27.8% (54)</b>	21.1% (41)	16.5% (32)	14.9% (29)	13.4% (26)	6.2% (12)	19
Option 3 (Elementary Schools start and end one half-hour later; Middle and High School start and end one half-hour later)	15.9% (30)	<b>36.0% (68)</b>	28.0% (53)	6.3% (12)	7.4% (14)	6.3% (12)	18
<b>answered question</b>							<b>20</b>
<b>skipped question</b>							

**3. Secondary Teachers: Whether or not the schedule changes, an additional option under consideration would change the five yearly exam days in middle and high school from early dismissal to late-start days. How do you think this proposal would affect your students'academic achievement?**

		Response Percent	Response Count
Very Positively		17.9%	27
Somewhat Positively		21.9%	33
Neutral/No opinion		18.5%	28
Somewhat Negatively		9.3%	14
Strongly Negatively		7.3%	11
<b>Does Not Apply</b>		<b>25.2%</b>	<b>38</b>
<b>answered question</b>			<b>151</b>
<b>skipped question</b>			<b>51</b>

**4. What is your current job assignment (choose all that apply)?**

	Elementary	Middle School	High School	Response Count
Teacher	40.3% (52)	19.4% (25)	<b>42.6% (55)</b>	129
Paraprofessional	<b>52.6% (20)</b>	21.1% (8)	31.6% (12)	38
Clerical	66.7% (4)	50.0% (3)	<b>83.3% (5)</b>	6
Maintenance	50.0% (1)	<b>100.0% (2)</b>	50.0% (1)	2
Administrator	<b>33.3% (2)</b>	<b>33.3% (2)</b>	<b>33.3% (2)</b>	6
Other District Staff (ie. school nurse, physical therapist)	<b>50.0% (13)</b>	38.5% (10)	<b>50.0% (13)</b>	26
<b>answered question</b>				<b>202</b>
<b>skipped question</b>				<b>0</b>