# Wilton League of Women Voters

## School Start Time Study Report

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## Study Group

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# Executive Summary

This report presents the major findings of the Wilton (Connecticut) League of Women Voters study of school start times in grades 6-12. The League initiated this project following an October 2001 presentation by Connecticut Senate President Pro Tem Kevin B. Sullivan who reviewed recent adolescent sleep research and its implications for student learning, health, and safety.

In a 5-month-long study, members of the study group

- reviewed the extensive literature on the biological determinants of adolescent sleep patterns
- studied the research on the effects of sleep deprivation on adolescent learning, health, and safety
- interviewed local officials to develop an understanding of the complex issues involved in changing school schedules and
- presented their findings to the membership of the Wilton LWV for consensus.

The study group also surveyed professional staff at both Wilton High School and Middlebrook School—the town's middle school—and found widespread support for a later start time at both schools. Additionally, a separate school-sponsored survey of WHS students showed overwhelming support for a later start time. After reviewing the consensus expressed by the members present at the study group's presentation, the governing body of the Wilton LWV approved the following position statement:

*The Wilton League of Women Voters recommends that the Wilton Board of Education delay the start time for instruction at Wilton High School and Middlebrook School in order to provide the best opportunity for student learning and to promote adolescent health and safety.*

Specifically, the League recommends that:

- the Wilton Board of Education devise a plan to implement a later school starting time at Wilton High School and at Middlebrook School, thereby setting a high priority on the health and safety of its adolescent students and offering Wilton students the opportunity to learn when they are most alert and receptive.

- the Wilton Board of Education, as part of its plan, include a thorough review of the various strategies to implement an earlier start time in order to determine the best possible ways to minimize any costs associated with a later school start and to maintain participation in extra-curricular activities.

The Wilton League of Women Voters is convinced that the health, educational, and safety benefits of promoting adequate sleep for Wilton teens far outweigh the logistical challenges inherent in revising school schedules.

## Introduction

The issue of school start times received national attention in the late 1990s when Edina and Minneapolis, MN decided to delay their high school opening bells in response to an informational campaign launched by the Minnesota Medical Association. This health education effort highlighted emerging adolescent sleep research that publicized statistics on widespread sleep deprivation among America's teenagers.

In Connecticut, the concept of later school start times attracted statewide interest in January 2001, when Senator Kevin B. Sullivan, President Pro Tem of the State Senate, proposed legislation—An Act Concerning School Day Start Time—requiring that no school in the state ring its opening bell for instructional classes before 8:30 am. Although many legislators and members of the public favored the bill, Senator Sullivan decided not to pursue statewide legislation at that time. However, because of the overwhelming amount of research about the benefits of more sleep for teenagers and the negative consequences of sleep deprivation, the movement toward a later school start time for adolescents has continued to gather steam. Many school districts across the country—Minneapolis and Edina MN, in the forefront—have already delayed their high school starting times. Moreover, the University of Minnesota's Center for Research on Educational Improvement (CAREI) has conducted two large-scale evaluation studies of the effects of the delayed start time at the request of the Minnesota school districts that have made the switch. The National Sleep Foundation, a private non-profit organization dedicated to keeping the public informed about sleep research, maintains a directory of schools that have made the switch to later start times.

Last October, Senator Sullivan spoke to a large audience of Wilton parents, town officials, legislators, and community leaders at a luncheon meeting sponsored by the LWV, the Wilton Education Foundation, and the Wilton PTA Council. Since that time, interest in a later school start time for adolescents has been growing in Wilton. About 60 people—including Wilton's State Senator Judith Freedman—immediately signed up for the League's on-line follow-up list to keep informed about this issue; several attended a subsequent statewide informational hearing at the state Capitol. In response to the increasing interest among its members, the League of Women Voters decided to form a study group to take a closer look—we hope an impartial look—at the various aspects of this issue, while maintaining a focus on ***providing the best approach to learning.*** Why are so many schools enacting, or considering, a later start for adolescent students?

The study group researched and discussed the latest adolescent sleep research: the effects of sleep deprivation on adolescent health, behavior, and learning. We surveyed Wilton's professional staff at Wilton High School and at Middlebrook School to tap their experience and observations. We interviewed several knowledgeable local officials in order to gain a basic understanding of the possible impact of a later start time on sports, extra-curricular activities, and transportation schedules. Because this issue is complex

and can be approached from several vantage points, we constantly re-focused our attention on what is best educationally for students.

As a wrap-up, we reviewed our findings and discussed questions with the members of the Wilton LWV and guests. Members of the Wilton LWV reached consensus on the concept of recommending that the Wilton Board of Education delay the start time for instruction at Wilton High School and Middlebrook School. With some minor editing, the consensus was approved by the Steering Committee of the League at its next meeting, establishing the Study Group's recommendation as the official position of the League.

## I. Review of Sleep Research with Adolescents

For the history of sleep research in the U.S. and around the world, we have relied heavily on the writings of William Dement, MD in The Promise of Sleep, a review and description of the scientific research on the mechanisms of sleep, and on the work of Mary Carskadon, Ph.D., currently the director of the Center for Sleep Disorders at Brown University Medical School/E.B. Bradley Hospital.

***Why does it seem harder for adolescents to get up in the morning than for younger children? And why don't they just go to bed earlier?***

Two big reasons: circadian rhythms and puberty.

Sleep research, which has been performed for decades at centers such as those at Stanford University, E.B Bradley Hospital /Brown University Medical School, and Henry Ford Hospital in Detroit, has explored the phenomenon of human circadian rhythms—daily cycles of alertness alternating with sleepiness—and the biological clock that governs them. The alertness period of the cycle is strong enough to keep people awake during specific times of the day even when they should be exhausted—an effect very familiar to jet-lagged travelers and night-shift workers. Circadian rhythms are generated internally from two structures in the brain and are communicated down to the cellular level. (Dement, 2000) Circadian rhythms differ among different age groups—teenagers' cycles of alertness and drowsiness undergo a phase-delay that makes them wide-awake when their younger siblings–and their parents—are falling asleep. Circadian rhythms exist independently of social or environmental cues. However, research with NASA astronauts has shown that, under specific controlled conditions, one's biological clock can be adjusted by the introduction of certain types of light at specific times within the circadian cycle. (Dement, 2000).

The hormones of puberty also can reset the biological clock; in fact, one of the first signs of puberty is change in sleep schedule. With the onset of puberty, the rush of hormones literally rewires the cerebral cortex of the brain, increasing the amount of growth hormone, which is secreted during sleep. In addition, hormones such as testosterone, follicle-stimulating hormone (FSH) and leuteinizing hormone (LH), which

control physical and sexual development, are also released during sleep. Melatonin, the hormone that communicates the pulse of the biological clock to the body and tells the body to prepare for sleep, is secreted later in the evening for adolescents than for younger children, pushing teens' natural fall-asleep time later and creating a "forbidden zone" around 9 or 10 pm for falling asleep. (Carskadon 1999) Of course, this also pushes the natural wake-up time later. In her research, Carskadon discovered that the students' melatonin levels were still elevated into the school day. "Their brains are telling them it's nighttime," she says, "and the rest of the world is saying it's time to go to school."

***How much sleep do teenagers need for optimal physical, mental, and emotional functioning?***

Many researchers say that teen sleep needs are even higher than those of younger children—teenagers need 9-10 hours of sleep per night to be at their best both physically and mentally. Dr. Carskadon reports that in her surveys and in her field studies, her researchers see that, on average, teens are getting about 7½ hours of sleep on school nights. Moreover, 25% of the kids are getting 6½ hours of sleep or less on school nights. In the context of what they need to be optimally alert, which Dr. Carskadon says is 9¼ hours of sleep, teens are building huge sleep deficits, night after night after night. (Carskadon, 1999) Classes, extracurricular activities, and homework squeeze the time available for sleep into shorter and shorter periods. Moreover, the last morning sleep cycle—consisting of both REM and slow-wave sleep—gets shortchanged. "Sleep becomes the stepchild of our lives, pushed aside by social and work demands." (Dement 2000). For America's teenagers, school schedules should be added to the list of demands.

***Don't teenagers make up for lost sleep by sleeping in on the weekends?***

Yes, somewhat. Sleep deprivation is cumulative. Researchers call this cumulative sleep deprivation "sleep-debt". The lack of sleep must be made up or paid back in order for optimal brain functioning to occur. Dr. William Dement (The Promise of Sleep) and the University of Minnesota's evaluative study (CAREI, 1998 and 2001) have investigated the relationship between sleep patterns and sleep-debt. Dr. Mary Carskadon, at Brown University Medical School, has also studied sleep-debt and how teenagers make up for lost sleep. They observe an adolescent pattern of a "sleep binge-ing" on the weekends to resolve sleep debt. However, Dr. Carskadon and others have found that sleeping longer than a couple of hours past one's usual wake-up time can wreak havoc on the adolescent biological clock, making the Monday morning return to school more difficult than ever.

***Why should we care?***

The National Sleep Foundation states "sleeplessness, whether it's the result of a sleep disorder or an overextended lifestyle, invites diminished quality of life and deteriorating health." (National Sleep Foundation, www.sleepfoundation.org). Sleep deprivation, in both adults and children, has been linked to cognition problems, information-processing

and memory deficit, irritability, anxiety and depression, decreased creativity, inability to handle complex tasks, stimulant abuse, mood and behavior problems, and vulnerability to fall-asleep motor vehicle accidents.

## II. The Relationship between Sleep and Learning

Sleep research has been going on for decades. Only recently has attention focused on adolescents and their special needs for more sleep than previously assumed. Sleep researchers have found that the average teenager's fall-asleep time is around 11 pm—their hormonal and biochemical clocks preclude their falling asleep earlier. Considering that Wilton teenagers, like others, need an average of 9+ hours of sleep per night to be at their best and that they must wake up to catch a bus or a ride for a 7:35 opening bell, their sleep quotient gets short-changed every night and their sleep-debt accumulates.

Extensive research exists on the relationship between sleep and learning: animal and human studies, student surveys, longitudinal and correlation studies, and laboratory-based experiments performed both in the U.S. and abroad. Here, we will review the findings that our group found to be the most relevant for our discussion.

Researchers like Dr. Mary Carskadon (1999), Dr. Ronald Dahl (1999), Dr. William Dement (1996), and Dr. Amy Wolfson (1998) have explored the learning consequences of insufficient sleep in several laboratory-based studies at leading universities. They agree that the most significant consequences of sleep deprivation are:

- lack of concentration,
- decrease in critical thinking,
- memory lapses,
- difficulty in undertaking tasks requiring planning or completing a complex sequence of actions
- decrease in divergent, or creative, thinking.

Researchers have also documented the importance of sufficient sleep—both rapid eye movement (REM) and slow-wave sleep—to mastering and consolidating a new skill to be practiced over several days. (Graham, 1999) (Stryker, 2001). The PBS Frontline program *Inside the Teenage Brain* (PBS, 2002) reported on some of this learned-task research from Professor Carlyle Smith's research at Trent University in Canada.

Researchers at Brown University Medical School (Carskadon and Wolfson, 1998) have found that students who described themselves as struggling or failing in school (C's/ D's/F's) got less sleep than students who get A's and B's. Also, they found that students with the worst grades reported greater shifts in their sleeping schedule on weekends than did those with the better grades.

Besides the extensive amount of general research on adolescent sleep patterns, there is also adolescent sleep research that is specifically related to later school start times. The University of Minnesota, through its Center for Applied Research and Educational Improvement (CAREI), has done 2 major research–based studies (November 1998 and August 2001) evaluating the later school start time experience. They did so at the request of 2 Minnesota districts, Edina and Minneapolis, which had decided to change their start times in the late 1990s. (Edina, MN is a small affluent city near Minneapolis with a very fine school system, similar to Wilton. See Attachment V. for a description of Edina and its school district.)

Among other things, their study looked at high school students' letter grades pre- and post-time-change. Their research showed a slight, but not significant, improvement in grades. However, they also found several other results that were statistically significant, including:

- Attendance among all students increased between 1995-2000.
- Minneapolis's drop out rate dropped 2% each year for all students.

Another part of the Minnesota research surveyed students regarding sleep, school, and lifestyle in 3 similar school systems—one of which had changed its start time. These are the statistically significant findings related to learning:

- Students in the school with a later start time reported an almost identical bedtime to that of students in other schools. In other words, as a group, the students with a later start time are **not** staying up any later because, as some people have theorized, they know they can make up their sleep in the morning. Consequently, teens in schools that changed their start times were receiving about 5 hours more sleep a week than students in schools that had not made the switch.

- Fewer students reported falling asleep in class, arriving late to school, and feeling tired during the school day in the later-starting school than in other schools.

- Students in all three districts who reported less sleep overall were the sleepiest in school and were the ones who reported receiving the lowest grades.

- The students at the later-starting school reported higher grades overall than those in districts with earlier start times.

This last finding was supported by yet another study at Patrick Henry High School in San Diego. In this case, UCLA researchers correlated GPA with wake up times and quality of sleep.

- Students with higher GPAs reported waking up less often during the night than those with lower GPAs.

- The **later** the students reported waking up on school days, the **higher** the GPA.

Two local surveys add yet another dimension to our discussion of sleep and school schedules. First, the Wilton LWV's study group surveyed professional staff at Wilton High School and Middlebrook School—the local middle school that comprises grades 6-8. With a return rate of 37% and 39%, respectively, teaching staff at both schools favored a later start. At Wilton High School, staff favored it by a 2:1 ratio. Moreover, teachers overwhelmingly agreed that early morning classes—when students were still sleepy—and the last classes of the day—when sleep deprivation was catching up with students—were the most unproductive for learning. The survey polled teachers on both advantages and disadvantages of a later start time as well as the effect of a later school start time on their employment. Complete results are presented in Attachment II.

Wilton High School also surveyed students to assess student opinion about a later school start time. Students overwhelmingly favored a later start, even in light of the necessity for later dismissal and a later start to after-school activities. See Wilton High School's survey results in Attachment III.

## Discussion—Sleep and Learning

Interpreting the scientific evidence of the effect of school start times on learning is complex. Sleep researchers, in numerous studies, have found statistically significant correlations between:

- amount of sleep and mastering learning-related skills,
- amount of sleep and later school start times,
- amount of sleep and self-reported academic performance,
- later school start times and lowered absenteeism, tardiness, and drop-out rates.

These studies do not imply a cause and effect relationship. However, they indicate correlations that are unlikely to occur by chance alone.

Although these research findings—especially from the UCLA study, the Brown Medical School studies, and the University of Minnesota studies—show substantial agreement in their results and statistically significant correlations (except where indicated), there are many possible factors to be considered in interpreting the reasons for the results. One of those factors *may* be the extra hour of sleep associated with later school start times. There may be others as well.

Regarding school drop-out rates and absences, our group recognizes the importance of regular attendance to student learning: we assume that dropping-out and absenteeism jeopardize optimal learning. Although suburban school districts like Edina, MN and Wilton, CT may not wrestle with high drop-out rates or absenteeism, the urban centers

of Connecticut may find particular relevance in Minneapolis's success in improving school attendance.

After discussing the research on learning and sleep and school start time, the League study group observed that research in education or the social sciences is often open to interpretation. Policy makers frequently must make decisions based upon the best available research, accompanied by professional experience, careful observation, community norms and values, and common sense.

## VI. Sleep and the Effect on Student Safety, Health, and Behavior

### 1. Sleepiness and Safety Issues

The National Institutes of Health (NIH) have identified adolescents and young adults (ages 12 to 25 years) as a population at high risk for problem sleepiness.

In 1996, at the request of Congress, the National Highway Traffic Safety Administration (NHTSA) along with the National Center on Sleep Disorders Research (the agency of NIH which coordinates all sleep-related research) embarked on a program, focusing especially on young people, to combat the problems of fatigue, sleep deprivation, and inattention on America's highways.

They focused on teenagers because study after study that analyzed accidents by gender and age group found that young people were the most likely to be involved in fall-asleep crashes. Fall-asleep crashes carry a high potential for human injury and severe property damage. (Pack et al., 1995; Horne, Reyner, 1995b; Maycock, 1996). These are NOT fender benders.

- A recent NC DMV study showed that young drivers under 25, males in particular, were involved in >50% of fall-asleep crashes.
- New York DMV studies have confirmed this.
- As a matter of fact, one study (Carskadon, 1990), found that boys with the greatest extracurricular time commitments were most likely to report falling asleep at the wheel. The subgroup at greatest risk comprised the brightest, most energetic, hardest working teens.

Dr. Mary Carskadon (1990) offers age-specific reasons for the involvement of younger people, particularly adolescents, in sleep-related accidents. During this period, young people are learning to drive, experimenting and taking risks, and testing limits. At the same time, this age group is at risk for excessive sleepiness because of the following:

- Maturational changes that increase the need for sleep.

- Changes in sleep patterns that reduce nighttime sleep or lead to circadian disruptions.
- Cultural and lifestyle factors leading to insufficient sleep, especially a combination of schoolwork demands and part-time jobs, extracurricular activities, and late-night socializing.

Besides youth involvement in fall-asleep crashes, researchers have also investigated sleepiness and alcohol consumption. They have shown that the *combination* of sleepiness and alcohol adversely affects psychomotor skills to a greater extent than sleepiness or alcohol alone (Roehrs et al. 1994; Wilkinson, 1968; Huntley, Centybear, 1974; Peeke et al., 1980). Driving simulation tests support this finding, even with *modest* reductions in sleep and *low* blood alcohol concentrations. As a matter of fact, Dr. William Dement in his book, The Promise of Sleep, quotes studies at Henry Ford Hospital in Detroit showing that sleep deprivation increases the effects of blood alcohol two-fold. NHTSA says that teenagers are generally unaware of the interaction of sleepiness and alcohol and just don't recognize the impairments they experience.

## 2. **Use of Stimulants/ Substance Abuse**

One of the most common health concerns over adolescent sleep deprivation is an increase of stimulant use. The NIH clearly reports the use of stimulants (coffee, among them) to compensate for lack of sleep. (Carskadon, 1990). Students try to counteract the message of their biological clocks by using stimulants to stay up late to finish their homework. Then, when awakened early for school, they try once more to overcome the effects of their late night hours *and* their high morning melatonin levels by using more stimulants.

Furthermore, the Edina study has found a correlation with the dislike of school and substance abuse. The longitudinal studies observe an increase of substance abuse with the negative outlook on school.

## 3. Behavioral Issues

Proponents of delayed high school start times argue that a later start and later dismissal would limit the time adolescents are unsupervised in the afternoon. The hours shortly after school appear to be a critical time for assessing safety risks among adolescents. Those returning home from school to an empty house (latch-key children) are more prone to risky behaviors during this time compared to their peers who are at home with supervision. Several studies, including the 1996 Carnegie Council report, *Matter of Time: Risk and Opportunity in the Nonschool Hours*, discuss negative conduct during the after-school hours.

According to many national studies, teenage substance-abuse, sex, and violence commonly occur between the hours of 2 p.m. and 8 p.m., with the highest incidence

from 2 p.m. to 4 p.m., the hours most likely to be unsupervised. (Wahlstrom and Freeman, 1997 and FBI Statistics, Center for the Study of the Prevention of Violence, 1998)

The University of Minnesota study (CAREI, 1998) finds that students who reported the least sleep also expressed the most frequent feelings of depression. Other studies indicate that sleep loss may lead to inability to control, inhibit, or adjust emotional responses. Signs of sleepiness, such as inability to stay focused, to pay attention, or to complete tasks, can resemble the signs of Attention Deficit/Hyperactivity Disorder. (Dahl, 1999)

## VII. Arguments Against Later School Start Times

Transportation

Our group assumed that the financial implications of changing to a later school start time would pose the biggest challenge to a community—costs of transportation and those costs associated with operations and staffing. We decided to take a closer look to see what we could find published about this, specifically for schools around the country that had made the switch. We also talked with local people about possible implications for Wilton.

The University of Minnesota researched this issue for both Edina and Minneapolis—school districts that had adjusted their school start times in the late 1990s. They found that **neither community has experienced a significant change in costs of transportation**. Connecticut's Office of Legislative Research—the department that researches the background information for legislative initiatives—explored this question, too. Their research confirmed that these two Minnesota school districts had found methods to change their high school start times without increasing transportation costs. (CT Office of Legislative Research, 2001)

On June 24, 1998, Congresswoman Zoe Lofgren introduced House Bill 4131, called the "Z's to A's Act". The purpose of this bill is to address the effects of sleep deprivation on students' performance and safety. This legislation encourages school districts to move their secondary schools' starting times to 9 a.m. by helping—through grants up to $25,000—to defray any costs involved in making the shift. So far, legislators have not passed this bill.

Operating Costs

Locally, our group found that operations and staffing costs would be minimally affected, if at all, by a change in the start times at the high school and middle school:

- Wilton High School and Middlebrook School buildings are already open/maintained during hours being considered.

- Most WHS/MB staff are currently, by contract, at work between 7:20 am-3:20 pm. A later high school start time would necessitate a *schedule shift*, but would not increase the *number of hours* worked.

Scheduling of Sports and Clubs

The group explored the argument that changing school start times would adversely affect participation in sports programs and extra-curricular activities. It has been said that WHS sports teams have frequent, long practices because the Connecticut Interscholastic Athletic Conference (CIAC) dictates that we must. Most sports have a 20 game schedule (except football with 10), necessitating three trips to out-of-conference schools, because there are only 17 schools that Wilton High School can play in-conference (source: WHS Athletic Director).

Our research about other schools that have delayed their starting times and our meetings with Wilton school officials have revealed the following:

- Statistics from Edina, MN indicate that participation in groups actually increased with a later school opening. (University of Minnesota CAREI, 1998)

- Fairfield County Interscholastic Athletic Conference (FCIAC) sets up its own rules within CIAC rules. CIAC dictates only how much practice time is required before first game of season, not the length and frequency of weekly practices. WHS teams practice for 1 ½ to 2 ½ hours an average of 4 times per week, supplemented by games (Source: WHS Athletic Director)

- Wilton High School students are currently dismissed at 2:10 pm; practices officially begin at 3:30 pm (Source: WHS Athletic Director). Various approaches to change in school dismissal time would affect athletic practices differently.

- WHS athletes currently miss no classes given 2:10 dismissal and a 4:00 pm usual start time for away games. Darien athletes miss one class, Greenwich miss two. If a later school start time were approved, Wilton High School athletes might have to be dismissed early for the 3 out-of-conference games, because of extended travel time.

- Only for 2-3 weeks in November are outdoor sports impacted by lack of daylight. (Source: WHS Athletic Director)

- Some teams (hockey, swimming, gymnastics) currently practice before school. If a later start time were approved, other teams could use before-school time for practices or for parts of practices.

- In Wilton, many clubs do not meet daily, but weekly or monthly, often in the evening. Scheduling for these clubs would be minimally affected.

Scheduling "extra help" from teachers

The group explored the argument that scheduling extra help from teachers would be difficult with a later school opening time. However, we found that teachers are currently under contract to be at school from 7:20 am to 3:20 pm. Extra help currently is scheduled either before or after school, depending on teacher preference. A later start and later dismissal would not necessitate a change in number of hours worked, but possibly a shift—or partial shift—in the scheduling of extra help, especially for those teachers who prefer to offer extra help only after school.

## Discussion

**First, could we change school start times in Wilton without incurring substantial costs to transportation, maintenance, and staffing?**

Our discussions with several local officials indicate that building maintenance and staffing patterns would be minimally affected by a later start time in Wilton's middle and high schools.

However, the effect of a later start time on transportation costs would depend on policy decisions beyond the scope of the League study and better left to the Board of Education. Discussions with school personnel have led our group to conclude that, up until now, Wilton has not thoroughly investigated the various transportation options or the cost implications of each, *with the explicit goal of instituting a later start time.* Strategies such as staggered school opening schedules, reversal of elementary schedules with middle and high school start times, varying elementary school opening times to allow parents an early school vs. late school choice, adding additional bus runs, or shifting all schools in a district to a later start time are just some of the options that other communities have explored.

When evaluating different transportation options and the costs/benefits of each, a community must assess its resources, its school configuration, family preferences, traffic patterns, and student habits against its commitment to help students make the most of their time in the classroom. This initial exploration of the various ways to keep transportation costs to a minimum should be made independently of issues such as the perceived impact of a later high school/middle school start time on athletic participation, commuter traffic, or elementary school schedules.

**Second, can we start middle school and high school later in Wilton and still maintain a vigorous program of extra help, student activities, and athletics?**

Our discussions with school officials lead us to conclude that scheduling time for extra help from teachers would not pose a major logistical problem for either Middlebrook or Wilton High School. Because teachers, by contract, are currently at their schools between 7:20 a.m. and 3:20 p.m., a shift in start time may necessitate a partial shift—or an adjustment—to some teachers' schedule for providing extra help, but not an increase in overall hours on the job.

Student participation in clubs and extra-curricular activities has not been negatively impacted in other communities with later start times. Edina, MN has actually seen an increase in participation since implementing later start times. It estimates that more than 90% of its students participate in some form of extra-curricular or sports activities in the course of a year. In Wilton, the percentage has been estimated at more than 75%. Because many student organizations and clubs meet weekly or monthly—frequently in the evening, a shift in the school day schedule should minimally affect these organizations.

Finally, the study group believes that our school system can maintain its strong standing in interscholastic athletics *and* align school schedules with adolescents' biological clocks. We appreciate the thoughtful consideration that our school officials gave to our questions about school athletics and to several scenarios suggested by our study group. Among the issues that the Board of Education, in developing a plan for a later start time, may wish to pursue are:

1. the duration and frequency of practices for athletics

2. the possibility of re-scheduling some practices to the morning—as swim teams and hockey teams currently do—if a later school start and dismissal would preclude adequate afternoon practices. This option would require only those athletes choosing to participate in a seasonal athletic team to awaken early, not the entire student body.

3. the experience of surrounding towns that have granted team members an occasional early dismissal for travel time to out-of-conference away-games.

4. encouraging other FCIAC schools to adjust their school start times in order to coordinate athletic schedules conference-wide. It would be possible for schedule modifications to be made without the participation of other schools in our conference, but it would be ideal if they would follow Wilton's lead. Wilton's State Representative State Representative Toni Boucher has noted that, if Wilton were to take a lead, this could possibly move some other towns that may not wish to rock the boat for fear of criticism, even if they believe it is the right thing to do. (June 2002, Personal communication.)

## VIII. Conclusion and Recommendations

According to numerous research studies, adolescents are the most sleep-deprived segment of our population. Unfortunately, where teenage sleep is concerned, biology is destiny. Studies overwhelmingly confirm the need for 9-10 hours each night for optimal adolescent learning and health. However, because of puberty's effect on the timetable of daily melatonin production and the resulting phase-delay in teenagers' circadian rhythms, the average teenager cannot fall asleep much before 11 p.m., regardless of parental urging or individual desire. When teenagers must awaken at 6 a.m. in order to prepare for catching the bus, their daily sleep requirements fall short and sleep-debt accumulates. The negative effects of sleep-deprivation upon cognition, mood, safety, and behavior are well documented.

On a positive note, studies reveal that schools that have opted to delay their start times, by aligning school schedules with the adolescent biological clock, enjoy several benefits: more sleep for their students, a positive correlation with better grades, lower drop-out rates, more participation in extra-curricular activities, less tardiness and absenteeism, and a more positive school atmosphere.

Teachers—the people who observe adolescent students every morning and throughout the school day—appear to concur. According to the LWV's recent survey of Wilton High School and Middlebrook School professional staff, a majority of teachers favor a later school start time. When asked to state a preference, those in favor of a later start recommended a 1-hour delay for both schools. Their comments and observations are included in the Attachments.

Can Wilton students fit an extra hour of sleep into their busy schedules?
Students at Wilton High School—77% of those responding to a recent survey—are willing to try, even if it means staying later in the afternoon for after-school activities. While it is true that the majority of WHS students participate in at least one sport and/or other extra-curricular activity, rescheduling them to fit into an altered school-day schedule should not be an insurmountable problem and may result in even broader student participation, as the Edina experience demonstrates. Furthermore, because the duration and frequency of sports practices are not dictated by the CIAC or FCIAC regulations, WHS teams have flexibility in scheduling their practices. As interest in later start times grows, other FCIAC towns may wish to re-consider game schedules, as well. Concerns about the perceived impact of a delayed school start time on athletics should not preclude an exploration of creative ways to re-schedule extra-curricular activities. For the student whose afternoons and evenings are completely—and unalterably—booked until late evening with daily activities that cannot be re-scheduled, extra sleep in the morning may, indeed, require parental re-thinking of priorities for their adolescents' time.

Our study group believes that adjusting start times for adolescents is a worthwhile investment in the health and well-being of our youth.

Specifically, the League recommends that:

- the Wilton Board of Education devise a plan to implement a later school starting time at Wilton High School and at Middlebrook School, thereby setting a high priority on the health and safety of its adolescent students and offering Wilton students the opportunity to learn when they are most alert and receptive.

- the Wilton Board of Education, as part of its plan, include a thorough review of the various strategies to implement an earlier start time in order to determine the best possible ways to minimize any costs associated with a later school start and to maintain participation in extra-curricular activities.

As one League member asked, "…in light of emerging research, don't we have an obligation to do the right thing—to give our children the opportunity to take best advantage of the education we offer?" The League is confident that a later start time would contribute so significantly to student learning, health, and safety that solutions can be found for any logistical challenges that may arise.

## Attachment I.
**School Start Times-An Annotated Resource List**


Carskadon, M. PhD, Brown University School of Medicine. When Worlds Collide, *Phi Delta Kappan*. 1999. 80(5). Dr. Carskadon is Professor of Psychiatry, Brown University School of Medicine and Director, Sleep Research Laboratory at Bradley Hospital, Providence, RI

Carskadon, M. PhD, Brown University School of Medicine, Editor, Adolescent Sleep Patterns, Cambridge University Press. 2002.

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http://www.nhlbi.nih.gov/about/ncsdr/index.htm
Sleep research is done by:

National Heart, Lung, and Blood Institute (NHLBI)
National Institute on Aging (NIA)
National Institute on Alcohol Abuse and Alcoholism (NIAAA)
National Institute of Child Health and Human Development (NICHD)
National Institute on Drug Abuse (NIDA)
National Institute of Mental Health (NIMH
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- Establish sleep-smart schools.
- School boards should integrate sleep-related education into curriculum so students can learn about the physiology of sleep, the consequences of sleep deprivation, and the importance of sleep to their general health
- Educate school personnel to recognize signs of adolescent sleep deprivation
- Create sleep-smart homes. Parents/ guardians must make sufficient sleep and a regular sleep schedule for their adolescents a top priority at home.

The National Sleep Foundation regularly updates its list of school systems that have adjusted their start times as well as those who are considering it.

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**Personal Interviews**

Our thanks to the following public officials and other individuals for meeting with us to discuss later school start times: **Colleen Fawcett**, MSW, Youth Services Director, Town of Wilton; **James Crofts**, Coordinator, Transportation Services, Town of Wilton; **Doug Rubin**, Athletic Director, Wilton High School; **Guy Whitten**, Former Athletic Director, Wilton High School; **Robert S. Krueger**, Ph.D, Psychologist, Private Practice; **Susan Finkelstein**, MD, Psychiatrist, Private Practice.

Also, thanks to our Connecticut legislators, Senator **Judith Freedman** and Representative **Toni Boucher** for their perspective, interest, and personal support for this study.

**Legislative Initiatives**

**Zzzz's to A's Act** . U.S. Congresswoman **Zoe Lofgren** (D-San Jose, CA) has reintroduced legislation (H.R. 1313) that encourages high schools to delay their openings so that students will be well rested. The legislation proposes grants up to $25,000 to support transition costs of adjusting school start times. http://www.house.gov/lofgren/body4h-za.html

**An Act Concerning School Day Start Times**. CT State Senate President Pro Tempore **Kevin B. Sullivan** (D-West Hartford) introduced a bill (Committee Bill No.14) to prohibit instructional classes in public schools from commencing prior to 8:30 a.m. http://www.cga.state.ct.us/2001/tob/s/2001SB-00014-R01-SB.htm

Attachment II.

P.O. Box 71 Wilton, CT 06897

## WHS/Middlebrook PROFESSIONAL STAFF SURVEY

**The Wilton League of Women Voters is currently involved in a study of school start times. We are conducting personal interviews and examining the existing research on:**

- **adolescent sleep patterns,**
- **effect of school start times on academic performance,**
- **relationship between sleep patterns and various adolescent health issues, and**
- **experience of school systems around the country who have modified their school opening times.**

**As educators, you offer valuable experience and a unique viewpoint on this subject! Would you please share your thoughts with us by completing this brief questionnaire? Thank you in advance for your help**.

Your position at WHS/Middlebrook: _____ Teacher ____ Administrator ____Other (please specify.)

If a teacher, please indicate the subject you teach._____.

1. **a. What would be the advantages for students if school started approximately an hour later than it does now?**

   **b. What would be the disadvantages?**

2. **In your experience, does time of instruction have an effect on student learning?**

   ____No ___Yes (Please specify.) _____.

3. **Do you, as an educator, favor starting high school later in the morning?**

   _____No ____Yes. (By how much time? _____) ___Maybe, if_____.(Please specify.)

4. **How would a later school start time affect your employment experience at WHS/Middlebrook?**

5. **Other Comments?**

_____**Name** (optional)

**Thank you for your help!**
Please return the questionnaire to the Main Office—box provided—by Friday, March 22,2002.
Questions? Please contact Louise Herot, **Wilton LWV**, at www.lwvct.org/wilton at lherot@herot.com or 762-3889.

**Wilton High School/Middlebrook School**
**Professional Staff Survey March 2002**

**RESULTS**

The Wilton LWV surveyed professional staff at both Wilton High School and Middlebrook School (grades 6-8) to gather their opinions, observations, and experience regarding a later start time for their schools. We had a 37% and 39% return rate, respectively, using an identical questionnaire containing five questions.

# Wilton High School Results

**Surveys Distributed : 130**
**Surveys Returned: 48**
**Rate of Return: 37%**

1. **a. What would be the advantages for students if school started approximately an hour later than it does now?**

| Item | Frequency of Response |
|---|---|
| Greater mental alertness, focus, attentiveness in class……. | 22 |
| Students get more sleep and generally are more rested…….. | 13 |
| Less tardiness and better attendance…….. | 6 |
| Students could eat breakfast…… | 5 |
| General adolescent health advantages…… | 2 |
| More time for extra help before school…….. | 2 |
| More time for homework at night or in morning …….. | 2 |
| Teachers more alert …… | 1 |
| Fewer delayed openings…… | 1 |
| Fewer sleep-deprived new drivers on the road…….. | 1 |
| Less hurried, stressed children…… | 1 |
| No advantages (or left blank)…… | 7 |

**b. What would be the disadvantages?**

| Item | Frequency of Response |
|---|---|
| Interference with sports ……. | 22 |
| Interference with extra-curricular activities…… | 8 |
| Employment or work/study schedules…….. | 8 |
| Later school dismissal…….. | 5 |
| Students would stay up later anyway……. | 4 |
| Less time for homework…….. | 4 |
| Students are less attentive in afternoon…….. | 3 |
| Later dinnertime/family time disrupted…… | 3 |
| Traffic congestion for commuters and buses…….. | 2 |

| | |
|---|---|
| **Expense and disruption of bus schedules ……** | **2** |
| **Darkness would cause problems for new drivers…….** | **1** |
| **Younger children would be out in dark……..** | **1** |
| **Elementary school parents wouldn't like it……..** | **1** |
| **No disadvantages (or left blank)……..** | **9** |

2. **In your experience, does time of instruction have an effect on student learning?**

**(N =48)**

**Yes 32 No 9 N/A or No Answer 7**

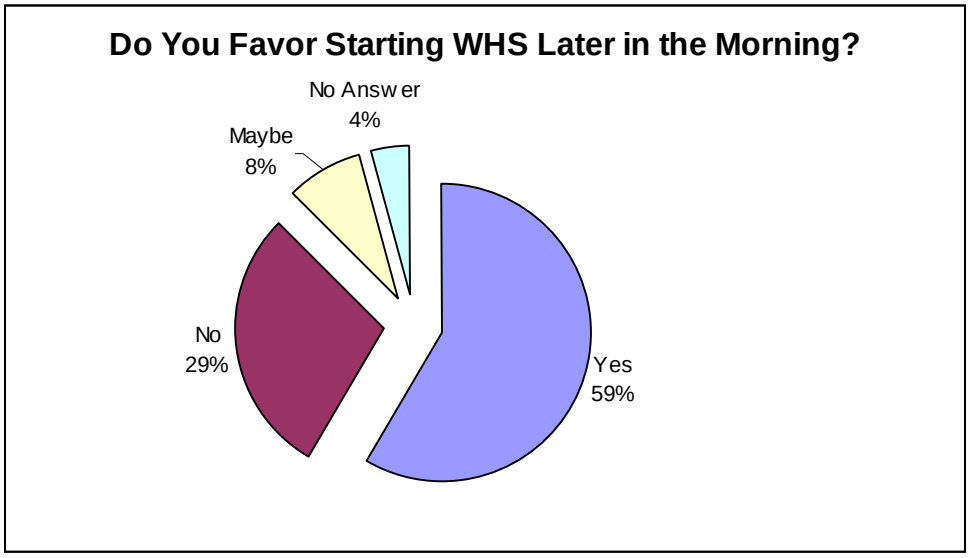
**Comments:**

| | |
|---|---|
| **Students are too sleepy to focus in early morning classes** | **15** |
| **Students are tired or too hyper in later afternoon classes** | **5** |
| **Late morning is best for learning** | **4** |
| **Students miss early classes b/c of tardiness** | **3** |
| **Teachers are tired in later afternoon classes** | **1** |
| **Skipping breakfast impedes learning** | **1** |
| **Chronic sleep deprivation affects learning, health, safety** | **1** |
| **Students are inattentive right after lunch** | **1** |

3. **Do you, as an educator, favor starting high school later in the morning?**

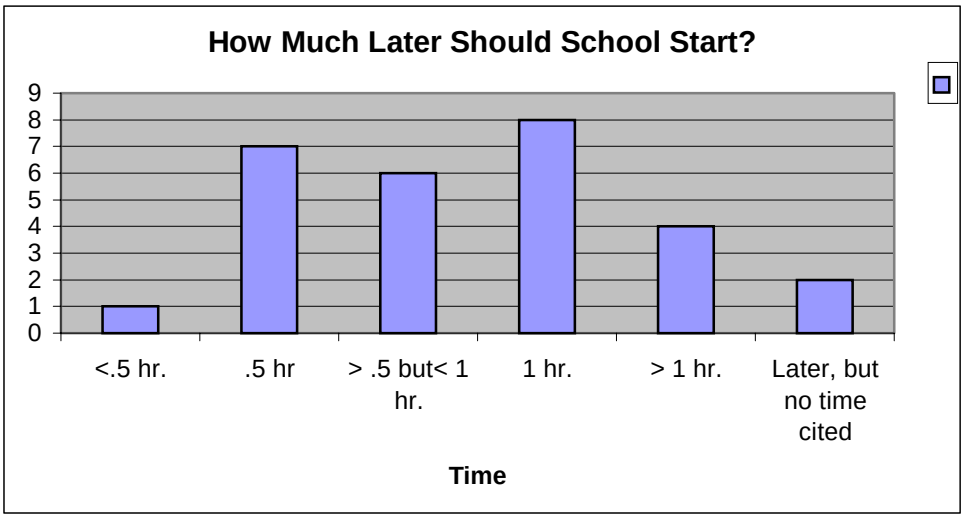
**(N = 48)**

**Yes 28 No 14 Maybe 4 N/A 2**



**If yes, by how much time?** **(N=28)**

| | |
|---|---|
| **< .5hr……..** | **1** |
| **.5 hr……** | **7** |
| **>.5 hr. but < 1 hr ……...** | **6** |
| **1 hr……** | **8** |
| **>1 hr……..** | **4** |
| **Yes, but no time suggested ……** | **2** |




**4. How would a later school start time affect your employment experience at WHS?**

| **Item** | **Frequency of Response** |
|---|---|
| **I would be more rested, would make job more pleasant** | **6** |
| **My early classes would be more productive** | **3** |
| **Negatively in general** | **2** |
| **Would negatively affect second job (includes coaching)** | **3** |
| **I would use morning time to meet with parents, offer extra help** | **2** |
| **Would make commute more difficult b/c of traffic** | **2** |
| **Would not like to stay any later in afternoon** | **2** |
| **My commute would be better** | **1** |
| **Would make child care easier** | **1** |
| **Would make child care more difficult** | **1** |
| **Would affect my after-school personal appointments** | **1** |
| **Times would be more in sync with business world** | **1** |
| **Would negatively affect my continuing education** | **1** |
| **Not sure when meetings would be held** | **1** |
| **I function best as a teacher early in morning** | **1** |
| **Would not affect employment at all** | **16** |

**5. Other Comments?**

- **Other school systems are successfully changing…Lewisburg, PA**
- **Isn't there state or federal funding for schools wanting to change their hours?**
- **Students are overly scheduled and pressured. Later start times would make for healthier students and faculty.**
- **Students desperately need extra time in morning for breakfast and sleep.**
- **Teachers with young children might have day care problems.**
- **School will have to re-think schedule for extra-curricular activities and athletic participation.**
- **Wilton's school bus transportation would cost too much**
- **Tell the kids to go to bed earlier, watch less TV, manage their time better**
- **Teachers will be more fatigued if they have to commute in worse traffic. This shifts the fatigue to another group.**
- **Hard to get whole state to agree. FCIAC athletics are a "deal breaker"**
- **Block scheduling would be good idea**

# Middlebrook School
# Results

**Number Distributed: 110**
**Number Returned: 43**
**Rate of Return: 39%**

1. **a. What would be the advantages for students if school started approximately an hour later than it does now?**

| Item | Frequency of Response |
|---|---|
| Students would get more sleep…… | 19 |
| Students would be more attentive, focused, awake in class…….. | 13 |
| Students would eat breakfast…….. | 6 |
| Less tardiness…….. | 3 |
| Students would not be at bus stops in the dark…….. | 2 |
| Faculty would be more awake……. | 1 |
| Friendlier environment in general……. | 1 |
| Students would have more time in morning with family……. | 1 |
| Students would be home alone for less time in afternoon……. | 1 |
| Might be better commute……. | 1 |
| No advantages (or left blank)…… | 7 |

**b. What would be the disadvantages?**

| Item | Frequency of Response |
|---|---|
| Interference with scheduling after-school activities, clubs….. | 11 |
| Interference with sports schedules ……. | 7 |
| Later dismissal from school…….. | 3 |
| Students will just stay up later……. | 3 |
| Students will become less focused later in afternoon……. | 4 |
| Commuter problems/traffic……. | 2 |
| Faculty meetings may have to be held early in morning….. | 1 |
| Extra help will be more difficult to schedule…….. | 1 |
| Child care problems later in afternoon or early am……. | 2 |
| Students will watch more TV at night…… | 1 |
| Some latchkey children unsupervised | 1 |
| No disadvantages (or left blank)……. | 8 |

**2. In your experience, does time of instruction have an effect on student learning? (N=43)**

**Yes 33 No 6 No Answer 4**

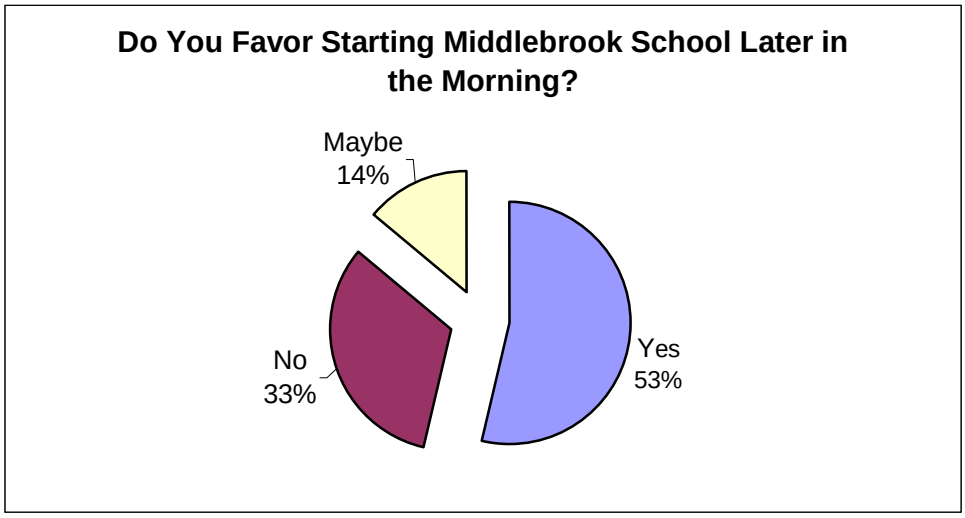
| Comments | Frequency of Response |
|---|---|
| Students are too sleepy during first period, "zombies" ……. | 15 |
| Students are more attentive, alert in later morning classes … | 6 |

| | |
|---|---|
| **Students learn better in the morning……** | **6** |
| **Students seem lethargic, tired later in the afternoon…** | **6** |
| **Later classes do better on tests…….** | **1** |
| **Learning depends on eating a good breakfast…….** | **2** |
| **Learning depends on the enthusiasm of the teacher…….** | **1** |
| **A rotating schedule helps learning…..** | **1** |
| **When school opening is delayed, everyone seems alert, friendlier…** | **1** |

**3. Do you, as an educator, favor starting school later in the morning?**

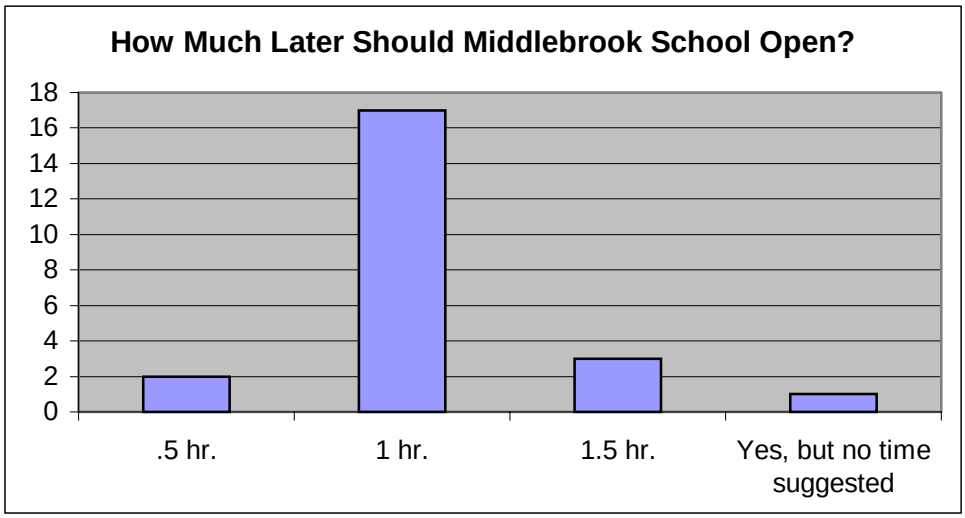
**(N = 43)**

**Yes 23 No 14 Maybe 6**




**If yes, how much later? (N =23)**

| | | | |
|---|---|---|---|
| **.5 hr….** | **2** | **>1 hr…** | **3** |
| **1 hr….** | **17** | **No Answer….1** | |



**4. How would a later school start time affect your employment experience at WHS/Middlebrook?**

| Item | Frequency of Response |
|---|---|
| I would be happier/ would be a nicer experience than it already is… | 8 |
| I would be more a more rested person, morning time to myself… | 7 |
| I fear a more difficult commute… | 7 |
| A later dismissal would bother me… | 3 |
| It would negatively impact my coaching responsibilities.. | 2 |
| Would like to eat breakfast and exercise before school… | 2 |
| It would cause child care problems… | 2 |
| It would alleviate some of my child care problems… | 1 |
| Better school atmosphere—more alert, healthier, better mood… | 1 |
| Would make stronger students and would be fine with me… | 1 |
| Would be able to eat lunch at a normal time… | 1 |
| A later start and dismissal would not bother me… | 1 |
| I might have an easier commute… | 1 |
| Would not affect my work here | 4 |

**5. Other Comments?**

a. Studies, research support later openings
b. Current middle school and high school schedule is not aligned with adolescent biological clock
c. Adolescents can not get to sleep early enough to get the sleep they need
d. The only reason we start so early is to accommodate buses and sports
e. Parents might get their students in on time instead of letting them sleep late
f. Later opening would improve teachers' child care options
g. Might be a problem with athletes using other facilities early in morning
h. A later start will necessitate students staying up later to finish homework
i. Would recommend 2 full-week vacations instead
j. FCIAC would have to change its schedule to avoid athletes missing too many classes
k. Would recommend some activities meet before school instruction starts
l. Schedule is fine as is!
m. Would welcome a longer day and shorter school year
n. Put the kids to bed earlier

**Wilton League of Women Voters**
**June 2002**
**www.lwvct.org/wilton**

**Attachment III.** **Excerpts From**

# WILTON HIGH SCHOOL

# SLEEP SURVEY

# (Pages 1-7)

# SPRING 2002

Sorry, these pages unavailable through e-mail.
For more information on this survey, please contact:

Ms. Deborah Low, Principal
Wilton High School
395 Danbury Rd.
Wilton, CT 06897
(203) 762-0381

**Attachment IV.** Information on Edina, Minnesota

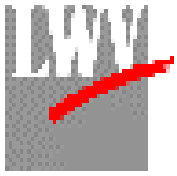
Edina. MN is a small city of 47,000 with 7,000 students. Last year Edina's high school had 13 National Merit Scholarship semi-finalists, all of whom became finalists, and 20 National Merit Scholarship Commended Students. Currently, it offers the largest Advanced Placement program in the state and one of the top AP programs in the Mid-west. Its high school is a Dept. of Education National School of Excellence and is ranked #1 in its athletic conference that includes 500 members. Although an affluent community, their class sizes are not significantly smaller than neighboring Minneapolis high schools and, in 2001, were slightly larger at the high school level.

Edina school system has been consistently selected as one of the top in the country. See http://www.edina.k12.mn.us/district/fastfact.htm .

- All three secondary schools and Creek Valley Elementary have received the National School of Excellence award from the U.S. Department of Education.
- In 2002, *SchoolMatch* service rated Edina as a parents' choice winner for schools that most match what parents want in a school district. Edina has won this award every year since its inception in 1992.
- *Newsweek* named Edina High School one of the best high schools in the nation (March 13, 2000).
- Offspring Magazine named Edina Public Schools one of the 100 Best School Districts (Sept/Oct 2000).
- Board/superintendent team identified as one of top three in the nation by New England School Development Council (June 2000).
- National Sleep Foundation awarded the 2000 Healthy Sleep Capital of the Nation Award to the district
- Edina KIDS Club, Edina Schools' quality, affordable care and enrichment program, was the first school-aged childcare program in the state to earn accreditation from the National Academy of Early Childhood Programs. It is available at each school site.

Edina adjusted their high school start times primarily in response to a public education campaign by the Minnesota Medical Association regarding adolescent sleep research, However, Edina says that their decision was also, in part, a response to the on-going national discussion about lengthening the school day and school year. School officials reasoned that, if students were actually awake and alert for more of the existing school day, a later start would, in effect, increase learning time. Focusing upon what is best for teaching and student learning helped them navigate the logistics of transportation, lunchtime changes, and after-school activities.

CYK
Wilton LWV www.lwvct.org/wilton
June 2002



The League
of Women Voters

A Voice for Citizens, A Force for Change