

START TIME RECOMMENDATIONS, ETC.

“Every middle school and high school student deserves the opportunity to start school awake, alert, and ready to learn. The benefits of later school start times have gained attention in recent years in the eyes of the public, school boards, educators, researchers, and physician organizations. However, there are substantial gaps between published scientific knowledge and public awareness of the untoward consequences of early start times and, conversely, the important benefits of later start times. Based on the available evidence, the [AASM](#) calls on primary academic institutions, school boards, parents, and policy makers to raise public awareness and improve education in order to promote a national standard of middle school and high school start times of 8:30 am or later. The [AASM](#) also encourages a collaborative and participatory approach among all stakeholders to support school boards as they overcome a variety of real and perceived barriers to the implementation of delayed school start times.”---Nathaniel F. Watson, M.D., M.S., University of Washington Medicine Sleep Disorders Center and Department of Neurology, University of Washington, Jennifer L. Martin, Ph.D., Veteran Affairs Greater Los Angeles Health System, David Geffen School of Medicine, University of California, Los Angeles, Merrill S. Wise, M.D., Methodist Healthcare Sleep Disorders Center, Memphis, Tennessee, Kelly A. Carden, M.D., Saint Thomas Medical Partners - Sleep Specialists, Nashville, Tennessee, Douglas B. Kirsch, Carolinas Healthcare Medical Group Sleep Services, Charlotte, North Carolina, David A. Kristo, M.D., University of Pittsburgh, Pittsburgh, Pennsylvania, Raman K. Malhotra, M.D., SLUCare Sleep Disorders Center; Department of Neurology, Saint Louis University, Eric J. Olson, M.D., Division of Pulmonary/Sleep/Critical Care, Mayo Clinic, Kannan Ramar, M.D., Division of Pulmonary/Sleep/Critical Care, Mayo Clinic, Ilene M. Rosen, M.D., M.S., Division of Sleep Medicine, Department of Medicine, Perelman School of Medicine, University of Pennsylvania, James A. Rowley, M.D.; Wayne State University, Detroit, Michigan, Terri E. Weaver, Ph.D., R.N., College of Nursing, University of Illinois at Chicago, & Ronald D. Chervin, M.D., M.S., University of Michigan Sleep Disorders Center, University of Michigan. (Watson, Martin, Wise, Carden, Kirsch, Kristo, Malhotra, Olson, Ramar, Rosen, Rowley, Weaver, & Chervin, [Delaying Middle School and High School Start Times Promotes Student Health and Performance: An American Academy of Sleep Medicine Position Statement](#) (2017) 13 J. Clinical Sleep Med. 4, p. 624.

“Physicians, especially those who treat adolescents, have campaigned since 1994 to allow teenagers to start school later. It would be hard to imagine that their argument has weakened given the evidence from this study that delayed school start times of later than 8:30 AM suggest improved attendance and graduation rates. [¶] The overall findings from this study are consistent with, and extend the evidence in the literature. Improved attendance rates increase the likelihood of graduation completion. Every student should have an equal opportunity to graduate from school. If a delayed start time of later than 8:30 AM promotes improved student access to attending, learning, and graduating, then all of society benefits because increased graduation completion impacts quality of life.”---Pamela Malaspina McKeever, Ed.D., Educational Leadership, Policy, and Instructional Technology, Central Connecticut State University, Linda

Clark, Ph.D. (McKeever & Clark, in press, [Delayed high school start times later than 8:30 am and impact on graduation rates and attendance rates](#) (Feb. 1, 2017) *Sleep Health*, p. 6.)

“We ... urge school districts to put adolescent students’ health as top priority and implement school start times consistent with their developmental needs. [¶] Whereas substantial evidence illustrating adverse consequences of inadequate sleep on psychological and physical health, and recommendations exist to adapt daytime school schedules to match sleep needs have been released, actual implementation of these recommendations have been limited. [¶] This is a call to action for the implementation of [AAP/CDC](#) recommendations across the state and nation.”---Margaux Barnes, Ph.D., Assistant Professor, Department of Pediatrics, Division of Gastroenterology, Hepatology and Nutrition, University of Alabama at Birmingham, Krista Davis, M.A., R.D., Postdoctoral Fellow, Department of Pediatrics, Division of General Pediatrics and Adolescent Medicine, University of Alabama at Birmingham, Mackenzie Mancini, M.S.N., P.N.P., Nutrition Trainee, Department of Pediatrics, Division of General Pediatrics and Adolescent Medicine, University of Alabama at Birmingham, Jasmine Ruffin, B.A., Social Work Trainee, Department of Pediatrics, Division of General Pediatrics and Adolescent Medicine, University of Alabama at Birmingham, [Tina Simpson](#), M.D., M.P.H., Associate Professor, Department of Pediatrics, Division of General Pediatrics and Adolescent Medicine, University of Alabama at Birmingham, [Krista Casazza](#), Ph.D. R.D.N., Associate Professor, Department of Pediatrics, Division of General Pediatrics and Adolescent Medicine, University of Alabama at Birmingham. (Barnes, Davis, Mancini, Ruffin, [Simpson](#), & [Casazza](#), [Setting adolescents up for success: promoting a policy to delay high school start times](#) (Jul. 2016) 86 *J. School Health* 7, p. 552.

“The [Council on Science and Public Health Report] recommends that our American Medical Association: (1) encourage school districts to aim for the start of middle schools and high schools to be no earlier than 8:30 a.m., in order to allow adolescents time for adequate sleep; (2) encourage physicians, especially those who work closely with school districts, to become actively involved in the education of parents, school administrators, teachers, and other members of the community to stress the importance of sleep and consequences of sleep deprivation among adolescents, and to encourage school districts to structure school start times to accommodate the sleep needs of adolescents; (3) reaffirm policy H-60.930, [Insufficient Sleep in Adolescents](#), identifying adolescent insufficient sleep and sleepiness as a public health issue and supporting education about sleep health as a standard component of care for adolescent patients; and (4) encourage continued research on the impact of sleep on adolescent health and academic performance. [¶] In testimony, the Council on Science and Public Health was praised for its report on the issue of adolescent sleep. While there was some acknowledgment regarding the potential burden a later start time may have on families, there was recognition of the important role that exists for physicians to use this paper with their own local school boards. The AAP recommended adding the word ‘biologic’ to stress

that more sleep is a biological need not just a preference.” (Am. Med. Assn. House of Delegates, [Delaying School Start Time To Prevent Adolescent Sleep Deprivation](#) (2016) Rep. of Reference Comm. D, pp. 9-10; see also, Am. Med. Assn. (Jul. 14, 2016) [AMA Supports Delayed School Start Times to Improve Adolescent Wellness.](#))

“Sleep is not a luxury; it’s a biological necessity. Adolescents are not receiving the optimal amount of sleep; they should be getting 8-and-a-half hours a night[.] Sleep deprivation is a strong argument in favor of later start times for high schools -- like 9 a.m.” ---[Xue Ming](#), M.D., Ph.D., Professor of Neuroscience and Neurology, Rutgers New Jersey Medical School, Associate Editor, *Journal of Pediatric Neurology*. (Verbanas, [Texting at Night Affects Teens’ Sleep, Academic Performance](#) (Jan. 22, 2016) Rutgers Today.)

“Delaying middle and high school start time to 8:30 h or later can be an effective method to: [¶] 1. improve important sleep outcomes in adolescence, including weeknight total sleep time and reduce daytime sleepiness; [¶] 2. improve health and academic outcomes, such as depression, caffeine use, tardiness to class and staying awake in class; and[¶] 3. circumvent changes in weeknight bedtime or reduced participation in extracurricular activities.”---[Karl Minges](#), M.P.H., Yale School of Nursing, [Nancy Redeker](#), Ph.D., R.N., Beatrice Renfield Term Professor of Nursing, Yale School of Nursing. ([Minges & Redeker, Delayed school start times and adolescent sleep: A systematic review of the experimental evidence](#) (2016) 28 *Sleep Med. Rev.*, p. 90.)

“My suggestion would be that high schools should optimally start in the area of 8:30 to 8:45 such as the two later starting jurisdictions in our two studies[.]”---[Robert Vorona](#), M.D., Associate Professor of Internal Medicine, Eastern Virginia Medical School in Norfolk, Virginia, after leading his second high school start time/crash rate study finding significantly reduced automobile accident rates among later starting teen drivers. (Doyle, [Earlier school start times may be tied to teen driving accidents](#) (Nov. 14, 2014) Reuters; see [Vorona, Szklo-Coxe, Lamichhane, Ware, McNallen, & Leszczyszyn, Adolescent Crash Rates and School Start Times in Two Central Virginia Counties, 2009-2011: A Follow-up Study to a Southeastern Virginia Study, 2007-2008](#) (2014) 10 *J. Clinical Sleep Med.* 11, pp. 1169-1177.)

“[I]t may be strongly argued that both the urgency and the magnitude of the problem of sleep loss in adolescents and the availability of an intervention that has the potential to have broad and immediate effects are highly compelling. [¶] The American Academy of Pediatrics recognizes insufficient sleep in adolescents as a public health issue, endorses the scientific rationale for later school start times, and acknowledges the potential benefits to students with regard to physical and mental health, safety, and academic achievement. The American Academy of Pediatrics lends its strong support to school districts contemplating delaying school start times as a means of optimizing sleep and alertness in the learning environment and encourages all school administrators and other stakeholders in communities around the country to review the scientific evidence

regarding school start times, to initiate discussions on this issue, and to systematically evaluate the community-wide impact of these changes (e.g., on academic performance, school budget, traffic patterns, teacher retention). [¶] Pediatricians and other pediatric health care providers (e.g., school physicians, school nurses) should provide scientific information, evidence based rationales, guidance, and support to educate school administrators, parent-teacher associations, and school boards about the benefits of instituting a delay in start times as a potentially highly cost-effective countermeasure to adolescent sleep deprivation and sleepiness. In most districts, middle and high schools should aim for a starting time of no earlier than 8:30 AM. However, individual school districts also need to take average commuting times and other exigencies into account in setting a start time that allows for adequate sleep opportunity for students.” – American Academy of Pediatrics, Policy Statement, School Start Times for Adolescents. (Adolescent Sleep Working Group, Committee on Adolescence, & Council on School Health, [School Start Times for Adolescents](#) (Aug. 25, 2014) 134 Pediatrics 3, pp. 646, 647, Recommendation no. 4.)

“Synchronizing education start times to adolescent biology is the obvious way to address the problem of chronic sleep deprivation currently experienced by adolescents on school days. Astronomical time data and changes in sleep patterns from international studies show at the age of 10 biological wake time is about 06:30, so synchronized school starting times would be 08:30-09:00. At the age of 16 biological wake time is about 08:00, and synchronized school start times 10:00–10:30, and at 18 biological wake time is about 09:00, and synchronized education start times 11:00–11:30. [¶] Unfortunately almost all previous studies of later school start times used times *before* 09:00, an approach that significantly underestimated the scale of change needed.”---[Paul Kelley](#), Ph.D., Honorary Research Associate, Sleep and Circadian Neuroscience Institute, University of Oxford, [Steven Lockley](#), Ph.D., Associate Professor of Medicine, Harvard Medical School, [Russell Foster](#), Ph.D., [F.R.S.](#), [C.B.E.](#), Professor of Circadian Neurosciences, Head of the Nuffield Laboratory of Ophthalmology, Director of the Sleep and Circadian Neuroscience Institute, University of Oxford, [Jonathan Kelley](#), Ph.D., Professor of Sociology, University of Nevada, Reno. ([Kelley, Lockley, Foster, & Kelley, Synchronizing education to adolescent biology: 'let teens sleep, start school later'](#) (Aug. 1, 2014) Learning, Media and Technology, pp. 8-9, citation omitted.)

“[G]iven the analyses summarized here, there are clear benefits for students whose high schools start at 8:30 AM or later. This would include, for teens who reported they got at least 8 hours of sleep per night, that they were more likely to say they have good overall health and were less likely to report being depressed or using caffeine and other substances (e.g., alcohol, tobacco, other drugs). Other positive findings include a significant reduction in local car crashes, less absenteeism, less tardiness, as well as higher test scores on national achievement tests. ... [¶] ... [T]here are empirically-based positive outcomes for adolescents whenever the start time of their high school is moved to a later time – with the starting time of 8:30 AM or later clearly showing the most

positive results.”---[Kyla Wahlstrom](#), Ph.D., Director, Center for Applied Research & Educational Improvement ([CAREI](#)), Univ. Minn.; Beverly J. Dretzke, Ph.D., Research Associate, Univ. Minn.; [Molly F. Gordon](#), Ph.D., Senior Research Analyst, Univ. Chicago Consortium on Chicago School Research; Kristin Peterson, M.A., Research Fellow, Univ. Minn.; Katherine Edwards, B.A., Research Assistant, Univ. Minn.; Julie Gdula, M.A., Research Assistant, Univ. Minn. ([Wahlstrom](#), Dretzke, [Gordon](#), Peterson, Edwards, & Gdula, [Examining the Impact of Later School Start Times on the Health and Academic Performance of High School Students: A Multi-Site Study](#) (Feb. 2014) [CAREI](#), Univ. Minn., p. 52.)

“There are at least three policy changes that will assist in the prioritization of sleep: 1) healthcare policy requiring the inclusion of sleep questions on health service intake forms and health provider prompts, in much the same way that smoking or exercise are routinely discussed; 2) education policy mandating school start times no earlier than 9 a.m. for adolescents; and 3) medical education policy limiting the hours of medical interns’ and residents’ shifts.”---[Alison Chopel](#), DrPH, M.P.H., [Director](#), California Adolescent Health Collaborative, Public Health Institute ([Chopel](#), [Sleep is Healthy: A Simple, Old Idea with Big Consequences](#) (Spring 2013) Policy Matters J.)

“During the school year, many teenagers find themselves nodding off during their early morning classes as high school bells ring around 7:30 a.m. While parents and teachers may attribute falling asleep during class to staying up too late checking Facebook statuses and texting with friends, medical evidence suggests that an early school start time before 8:30 a.m. is a greater culprit because classes are occurring when students’ brains and bodies are still in biological sleep mode.”---[Kyla Wahlstrom](#), Ph.D., [CAREI](#) Director, Univ. Minn. ([Wahlstrom](#), [Later High School Start Times Improve Student Learning and Health](#) (Aug. 24, 2012) Univ. Minn., College of Education & Human Development, Vision 2020 Blog.)

“High school should start at 8:45 a.m., or better at 9 o’clock.”---[Jeffrey Deitz](#), M.D. ([Deitz](#), [Children’s Sleep: Time For A Wake-Up Call](#) (Dec. 11, 2011) Huffpost: Healthy Living.)

Relying upon studies by [Edwards](#) ([here](#)), [Carrell](#), et al. ([here](#)), the biological evidence, and data reflecting the prevalence of sleep deprivation among adolescents attending early starting schools, economists from Columbia University and the University of Michigan “conservatively” estimate that shifting middle and high school start times “from roughly 8 a.m. to 9 a.m.[,]” will increase academic achievement by 0.175 standard deviations on average, with effects for disadvantaged students roughly twice as large as advantaged students, at little or no cost to schools; i.e., a 9 to 1 benefits to costs ratio when utilizing single-tier busing, the most expensive transportation method available. ([Jacob & Rockoff](#), [Organizing Schools to Improve Student Achievement: Start Times, Grade Configurations, and Teacher Assignments](#) (Sept. 2011) Hamilton Project, Brookings Inst.,

pp. 5-11, 21, n. 7 [considering study by [Cortes](#), et al. ([here](#)), distinguishing study by [Hinrichs](#) ([here](#))].) “This impact is equivalent to an additional two months of schooling.” (Policy Brief, [Organizing Schools to Improve Student Achievement: Start Times, Grade Configurations, and Teacher Assignments](#) (Aug. 2011) Brookings Inst., Hamilton Project, p. 4.) “When translated into earnings, the average student who starts school later would make about \$17,500 more over the course of her life.” (*Ibid.*; [Jacob](#) & [Rockoff](#), [Organizing Schools to Improve Student Achievement: Start Times, Grade Configurations, and Teacher Assignments](#), *supra*, Hamilton Project, Brookings Inst., pp. 6, 10 [accord].)

Sleep medicine and pulmonary specialist Dr. Robert Geck suggests high schools begin classes between 9 a.m. and 10 a.m. (Arja, *Classes too early for teens?* (Jul. 18, 2011) My Fox Tampa Bay.)

“The study strongly recommends that middle schools should consider delaying the school starting time by *at least* one hour. Such a change could enhance students’ cognitive performance by improving their attention level, increasing rate of performance, as well as reducing their mistakes and impulsivity.” ---Dubi Lufi, Ph.D., Emek Yezreel College, Emek Yezreel, Israel, Orna Tzischinsky, Ph.D., Emek Yezreel College, Emek Yezreel, Israel, Sleep Laboratory, Faculty of Medicine, Technion-Israel Institute of Technology, Haifa, Israel, Stav Hadar, M.A., Emek Yezreel College, Emek Yezreel, Israel. (Lufi, Tzischinsky, & Hadar, [Delaying School Starting Time by One Hour: Some Effects on Attention Levels in Adolescents](#) (Apr. 2011) 7 J. Clinical Sleep Med. 2, p. 137, italics added [study shifted start times from 7:30 a.m. to 8:30 a.m.].)

“Probably, 9 o’clock would be the ideal start time for high schools.” ---[Judith Owens](#), M.D., M.P.H., Director, Center for Pediatric Sleep Disorders, Associate Professor of Neurology, Boston Children’s Hospital. (Burns, [No More Dozing Off in First Period](#) (Aug. 1, 2010) Pacific Standard; cf. [Owens](#), Belon, & Moss, [Impact of Delaying School Start Time on Adolescent Sleep, Mood, and Behavior](#) (Jul. 2010) 164 Archives Pediatrics & Adolescent Med. 7, pp. 608-614.)

[Martin Ralph](#), Ph.D., Professor of Psychology, and [Director](#), Centre for Biological Timing & Cognition, University of Toronto, recommends that high school classes begin at 11 a.m. (Kruszelnicki, [Teenage Sleep](#) (May 3, 2007) ABC Science; see, Lim, [Maas Pushes for Later Start Time at Schools](#) (Feb. 26, 2009) Cornell Daily Sun [Harvard study finds teen brain doesn’t fully awaken until 11 a.m.]; [Preckel](#), [Lipnevich](#), Boehme, Brandner, Georgi, Könen, Mursin, & Roberts, [Morningness-eveningness and educational outcomes: the lark has an advantage over the owl at high school](#) (2011) British J. Education Psychology, pp. 1-21 [among 9th and 10th graders, larks (morningness chronotypes) outperform owls (eveningness chronotypes) on exams administered from 10 a.m. to noon].)

“A long-term solution to chronic sleep deprivation in adolescents that others conducting research on adolescent sleep behaviors support may mean that high school

start times should be no earlier than 8:30 A.M.”---Heather Noland, M.Ed., James Price, Ph.D., M.P.H., Professor, Department of Health and Rehabilitative Services, University of Toledo, Joseph Dake, Ph.D., M.P.H., Associate Professor, Department of Health and Rehabilitative Services, University of Toledo, Susan Telljohann, HSD, CHES, Professor, Department of Health and Rehabilitative Services, University of Toledo. (Noland, Price, Dake, & Telljohann, [Adolescents' Sleep Behaviors and Perceptions of Sleep](#) (2009) 79 J. School Health 5, p. 230.)

“The often serious impact of this chronic under-sleeping is now evident in both high school and middle school students. [¶] For all students one of the most salient – and correctable – social factors contributing to student sleep deprivation, is school start times. [¶] The circadian biology of sleep would predict that among individual children, those who are predisposed to be ‘night owls’ would be even more likely to suffer the consequences of sleepiness in a school system that imposes start times before 9 a.m. [¶] In brief, there are two features of the circadian rhythm especially important to understand regarding sleep in teenagers: (1) the drowsy signal that cues bedtime is dependent on the dampening of circadian-dependent alertness; and (2) the physiology of puberty causes a shift in the circadian rhythm which delays the timing of this biological bedtime by about an hour. These two biological factors underlie the main difficulties faced by adolescents attending school before 9:00 a.m.: the general problem that one cannot easily fall asleep before their biological bedtime, and the additional problem that puberty creates a tendency for even later bedtimes. [¶] Though research has not yet identified an ideal school schedule, the wealth of evidence reviewed in this chapter and elsewhere strongly suggests that students have a better opportunity to be rested and ready to learn by delaying school start time to 8:30 a.m. or later.”--- [Edward O'Malley](#), Ph.D., Assistant Professor of Medicine, New York University School of Medicine, Director, Norwalk Hospital Sleep Disorders Center, [Mary O'Malley](#), M.D., Ph.D., Clinical Instructor, Department of Psychiatry, New York University, Fellowship Director, Norwalk Hospital Sleep Disorders Center. (O'Malley & O'Malley, [School Start Time and Its Impact on Learning and Behavior](#), publish. in, [Sleep and Psychiatric Disorders in Children and Adolescents](#) (Ivanenko edit., Informa Healthcare 2008) pp. 79, 83-84, 89.)

“Adopt a single start time (8:30-3:30) for all ... Middle and High Schools.”--- Chattanooga Crime Task Force Committee, [Roger Thompson](#), Ed.D., Committee Chair, Associate Professor, Criminal Justice, University of Tennessee, Chattanooga. (Chattanooga Crime Task Force Comm. (2008) [Crime Task Force Rep.](#), p. 15, Recommendation No. 7.)

“Right now, high schools usually start earlier in the morning than elementary schools. But if school start times were based on sleep cycles, elementary schools should start at 7:30 and high schools at 8:30 or 8:45 – right now it's the reverse. School systems should be thinking about changing their start times. It would not be easy – they would have to

change the busing system – but it would increase their student’s sleep time and likely improve their school performance.”---[Richard Schwab](#), M.D., Associate Professor of Pulmonary Medicine, University of Pennsylvania, Co-Director, Penn Sleep Center. ([Start School Later in the Morning, Say Sleepy Teens](#) (May 21, 2007) Science Daily; see, Scott, [The Squeeze on Zs, Part 2: Teens Struggle with Sleep Time](#) (Feb. 6, 2012) Town & Country-Manchester Patch [“It really makes sense for elementary school students to go to school first.”---[John Spivey](#), M.D., board certified specialist, pediatric sleep medicine, pediatric pulmonology]; but see, Keller, Smith, Gilbert, Bi, Haak, & [Buckhalt](#), [Earlier School Start Times as a Risk Factor for Poor School Performance: An Examination of Public Elementary Schools in the Commonwealth of Kentucky](#) (2015) 107 J. Educational Psychology 1, pp. 236-245 [middle and upper class elementary school students perform better on standardized tests at later starting schools; no change found for disadvantaged students]; Li, Arguelles, Jiang, Chen, Jin, Yan, Tian, Hong, Qian, Zhang, Wang, & Shen, [Sleep, School Performance, and a School-Based Intervention among School-Aged Children: A Sleep Series Study in China](#) (Jul. 10, 2013) Plos One [school aged-children starting school at 8:30 a.m. slept longer and reported less daytime sleepiness than children starting at 7:30 a.m. or 8 a.m.]; Epstein, Chillag, & Lavie, [Starting times of school: effects on daytime functioning of fifth-grade children in Israel](#) (May 1998) 21 Sleep 3, 250-256 [significant sleep deprivation reported for 5th grade students starting school twice weekly at 7:10 a.m. or 7:15 a.m.]])

“Overall, many adolescents confront a major challenge if schools begin earlier than 8:30 a.m.; many schools start too early in the morning for adolescents to get adequate sleep, whether in the United States or in other countries such as Canada, Israel, Brazil, or Italy. [¶] [S]chool administrators are being urged to acknowledge the evidence and to adjust school schedules accordingly (e.g., delay high school start times).”---[Amy Wolfson](#), Ph.D., Professor of Psychology, Vice President for Academic Affairs, Loyola University, Maryland, [Mary Carskadon](#), Ph.D., Professor of Psychiatry & Human Behavior, Brown University School of Medicine, Director of Chronobiology and Sleep Research, Bradley Hospital. ([Wolfson & Carskadon, A Survey of Factors Influencing High School Start Times](#) (Mar. 2005) 89 Nat. Assn. Secondary School Principals Bull. 642, pp. 49, 50, citations omitted.)

“Schools with start times before 8:30 a.m. place students at a disadvantage in terms of arousal and alertness, not only for early morning classes but also throughout the day because adolescents’ biological rhythms are out of sync with typical school routines.”---Peg Dawson, Ed.D., [N.C.S.P.](#), Staff Psychologist, Center for Learning and Attention Disorders, Seacoast Mental Health Center, past president of the New Hampshire Association of School Psychologists, the National Association of School Psychologists, and the International School Psychology Association. (Dawson, [Sleep and Adolescents](#) (Jan. 2005) Counseling 101, p. 12; see also, Dawson, [Sleep and Sleep Disorders in Children and Adolescents: Information for Parents and Educators](#) (2004) Nat. Assn. School Psychologists Resources.)

Citing research to support their position, the California Student Advisory Board on Legislation in Education recommended delaying start times throughout the state to 8:40 a.m. The student board noted the detrimental effects of early start times on attendance, academic performance, and behavior. The board's fiscal analysis predicted that delaying start times would increase attendance "resulting in more ADA money for schools" and test scores "will rise. Higher test scores (API) will insure greater levels of federal funding." The students concluded, "even with the implementation of state-sponsored pilot programs, the costs will be far outweighed by the benefits of the program." ([Cal. Assn. Student Councils](#) (2004) Cal. Student Advisory Bd. on Legislation in Education, [School Starting Time](#), pp. 10-11.)

"Although providing a home environment to promote healthy sleep is the first step to eliminating sleep deprivation in adolescents, increased public awareness of the impact of sleep on learning and behavior is important. For this to occur legislation to ensure that high school start times not begin before 9:00 a.m. may help in reducing sleep deprivation leading to improved academic performance and behavior[.]"---Georgios Mitru, M.Ed., Daniel Millrood, M.Ed., M.S.P.T., New York Medical College faculty, [Jason H. Mateika](#), Ph.D., Professor of Physiology, Wayne State University. (Mitru, Millrood, & [Mateika](#), [The Impact of Sleep on Learning and Behavior in Adolescents](#) (Jun. 2002) 104 Teachers College Record 4, p. 721.)

"In 1913, Terman and Hocking (1913) reported that sleep in adolescents in the western U.S. was longer than that previously reported in studies of English (n=6180) (Ravenhill 1910) or German (Bernhard 1908) children and adolescents. One of the factors that they felt explained this difference was that school start times were an hour later (9:00 AM) in the U.S. than those in Germany and England (7:00-8:00 AM). They go so far as to state, 'The American practice of beginning at 9 o'clock is far wiser, and should never be changed unless for very special reasons.' " ([Colrain & Baker](#), [Changes in Sleep as a Function of Adolescent Development](#) (2011) 21 Neuropsychology Rev., p. 13, quoting Terman & Hocking, [The sleep of school children, its distribution according to age, and its relation to physical and mental efficiency: Part III. The conditions of children's sleep](#) (1913) 4 J. Ed. Psychology 5, p. 271.)

Implicit Recommendations

On January 26, 2012, Brown University Professor of Medicine [Richard Millman](#) encouraged a one hour delay in morning classes at [Barrington High School](#). (Rupp, [Barrington Studies Later School Start Time For Teens](#) (Jan. 27, 2012) East Greenwich Patch.) The present start time is 7:40 a.m. (Rupp, [Moving School Start Time Gets Push](#) (Oct. 21, 2011) Barrington Patch). The district has posted a [video](#) of Professor [Millman](#)'s presentation; the professor notes the value of a one hour delay at approximately 1:18:20, 1:23:00, and 1:53:00.

In 2008, following a presentation by Cornell University Professor of Psychology [James Maas](#) concerning the “conflict” between “academic clocks” and “teenagers’ body clocks,” [Deerfield Academy](#) delayed start times from 7:55 a.m. to 8:30 a.m. ([Lim, Maas Pushes for Later Start Time at Schools](#), *supra*, Cornell Daily Sun.)

“Of all the arguments I’ve heard over school start-times, not one person has argued that children learn more at 7:15 a.m. than at 8:30.”--- [Mark Mahowald](#), M.D., Professor of Neurology, University of Minnesota Medical School, Director, Minnesota Regional Sleep Disorders Center. ([Bronson, Snooze or Lose](#) (Oct. 7, 2007) N.Y. Magazine, web p. 3.)

Less Specific Recommendations

“The onset of puberty has been shown to be associated with a phase delay with later sleep onset and wake times. Lifestyle and social factors often mean a chronic sleep debt accumulates during the week, which the teenager attempts to address by sleeping in on weekends, which is ineffective and further contributes to the circadian disruption. Interestingly, the delay of school start time by half an hour from 8:00 to 8:30 A.M. results in a significant increase in sleep duration, with concomitant improvements in alertness, motivation, and mood in adolescents [¶] For adolescents, we suggest that school start times be delayed to align with the physiological circadian propensity of this age group.”---[Sutapa Mukherjee](#), M.B.B.S., F.R.A.C.P., Ph.D., Assistant Professor, Clinician Investigator, University of Toronto, [Sanjay R. Patel](#), M.D., M.S., Professor of Medicine, Director, Sleep and Cardiovascular Outcomes Center, Medical Director, University of Pittsburgh Sleep Laboratory, [Stefanos N. Kales](#), M.D., M.P.H., Associate Professor of Medicine, Harvard Medical School, [Najib T. Ayas](#), M.D., M.P.H., Associate Professor of Critical Care Medicine, University of British Columbia, [Kingman P. Strohl](#), M.D., Professor of Medicine, Case Western Reserve University, [Program Director](#), Sleep Medicine, University Hospitals Case Medical Center, [David Gozal](#), M.D., Herbert T. Abelson Professor of Pediatrics, Physician-in-Chief, University of Chicago Medicine, [Atul Malhotra](#), M.D., Professor of Medicine, Division Chief, Pulmonary and Critical Care Medicine, Director of Sleep Medicine, University of California, San Diego, School of Medicine. ([Mukherjee, Patel, Kales, Ayas, Strohl, Gozal, & Malhotra, An Official American Thoracic Society Statement: The Importance of Healthy Sleep. Recommendations and Future Priorities](#) (Jun. 15, 2015) 191 Am. J. Respiratory & Critical Care Med. 12, pp. 1452, 1453, citations omitted.)

“We believe that high schools should take a close look at having later start times to align with circadian rhythms in teens and to allow for longer sleep times. Too many teens in this country obtain insufficient sleep. A burgeoning literature suggests that this may lead to problematic consequences including mood disorders, academic difficulties and behavioral issues.”--- [Robert Vorona](#), M.D., Associate Professor of Internal Medicine, Eastern Virginia Medical School in Norfolk, Virginia, after finding, *inter alia*,

41% higher teen crash rate in Virginia Beach, Virginia, where high school classes began at 7:20–7:25 a.m., than in adjacent Chesapeake, Virginia, where classes started at 8:40–8:45 a.m. ([Teen Automobile Crash Rates are Higher When School Starts Earlier](#) (May 12, 2010) Am. Acad. Sleep Med.; see, [Vorona, Szklo-Coxe, Wu, Dubik, Zhao, & Ware, Dissimilar Teen Crash Rates in Two Neighboring Southeastern Virginia Cities with Different High School Start Times](#) (Apr. 2011) 7 J. Clinical Sleep Med. 2, 145-151; [Crash rates may be higher for teen drivers who start school earlier](#) (Apr. 12, 2011) Am. Acad. Sleep Med.)

“These analyses suggest that earlier high school-start times contributed to an increase in crash rates amongst teenagers in the United States. They are additional data suggesting that high school start times should be delayed to increase the amount of sleep that teenagers get during the school week and, hence, reduce the amount of sleep deprivation they incur.”---[Stuart Quan](#), M.D., Professor of Medicine, Harvard Medical School, Senior Physician, Division of Sleep Medicine, Department of Medicine, Brigham and Women’s Hospital, commenting on the [study](#) by [Vorona](#), et al., *supra*. ([Quan, Podcast Transcript](#) (Apr. 2011) 7 J. Clinical Sleep Med. 2, p. 1.)

The single most profound difference we could make [i]n education ... would be to let teens sleep on nature’s schedule (midnight to 9 a.m. or later).---[JoAnn Deak](#), Ph.D., Educator and Psychologist. (Large, [Shedding light on the teen brain](#) (Jun. 8, 2009) The Seattle Times.)

[Russell Foster](#), Ph.D., [F.R.S.](#), [C.B.E.](#), Professor of Circadian Neurosciences, Head of the Nuffield Laboratory of Ophthalmology, Director of the Sleep and Circadian Neuroscience Institute, Oxford University, says teenagers are biologically wired to stay up late and wake late, making a 9 a.m. start too early. (Critchley, [Sleepy teens want later start](#) (May 4, 2007) Herald Sun.) In 2007, Professor [Foster](#) suggested classes not begin until the afternoon because teens’ body clocks can be delayed between two and four hours. ([Making teens start school in the morning is ‘cruel,’ brain doctor claims](#) (Dec. 1, 2007) London Evening Standard; see also, Hansen, [Janssen](#), Schiff, [Zee](#), & [Dubocovich](#), [The Impact of Daily Schedule on Adolescent Sleep](#) (Jun. 2005) 115 Pediatrics 6, pp. 1555-1561 [high school seniors perform better in the afternoon than in the morning on vigilance tests, symbol copying, visual search tasks, and logical reasoning].) More recently, however, Professor [Foster](#) has endorsed “an extra hour in bed” and expressed approval of the [UCL Academy](#) “later” start time; i.e., 10 a.m. ([Foster, Why teenagers really do need an extra hour in bed](#) (Apr. 22, 2013) New Scientist; see, Parsons, [Could a one-hour lie-in improve pupils’ exam results? UK schools ‘could move class start times back to 10am’](#) (Mar. 18, 2013) Yahoo! News.)

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“Adolescence is a time when sleep patterns change and biological clocks alter, often leading to poor quality and insufficient sleep. Their ability to concentrate, problem-

solve and assimilate new information is impaired. SPN and NASN encourage all parties involved to consider implementing later school start times for teens.”---[Society of Pediatric Nurses](#) and [National Association of School Nurses](#). ([Society of Pediatric Nurses](#) & [Nat. Assn. of School Nurses](#), *Consensus Statement* (Feb. 2015) [Early School Start Times](#).)

“Among the possible public health interventions for increasing sufficient sleep among adolescents, delaying school start times has the potential for the greatest population impact by changing the environmental context for students in entire school districts.”--- Anne G. Wheaton, Ph.D., Division of Population Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention ([CDC](#)), Gabrielle A. Ferro, Ph.D., Division of Population Health, National Center for Chronic Disease Prevention and Health Promotion, [CDC](#), Janet B. Croft, Ph.D., Division of Population Health, National Center for Chronic Disease Prevention and Health Promotion, [CDC](#). (Wheaton, Ferro, & Croft, [School Start Times for Middle School and High School Students – United States, 2011–12 School Year](#) (Aug. 7, 2015) Centers for Disease Control and Prevention, 64 *Morbidity & Mortality Weekly Rep.* 30, pp. 812-813.)

“While implementation may be complex, particularly when a change would bring a school’s schedule out of sync with neighboring systems, delaying school start times so that adolescents begin their instructional day later provides numerous benefits to the students and their broader community alike.”---American Psychological Association. (Children, Youth, & Families Office, [Later School Start Times Promote Adolescent Well-Being](#) (2014) *Am. Psychological Assn.*)

“Epstein and colleagues’ study of 811 10-12-year-olds from 18 Israeli schools with starting times that ranged from 7:10 a.m. to 8:30 a.m. demonstrated the importance of delaying school start times for pre- and early adolescents.”---[Amy Wolfson](#), Ph.D., Professor of Psychology, Vice President for Academic Affairs, Loyola University, Maryland, Michaela Johnson, Clinical Research Coordinator, Dana-Farber Cancer Institute. ([Wolfson](#) & Johnson, *Sleep and School Start Times*, publish. in, [Principles & Practice of Pediatric Sleep Medicine](#), 2nd ed. (Elsevier Inc., Sheldon, Kryger, Ferber, & Gozal edits., 2014) p. 391, citing Epstein, Chillag, & Lavie, [Starting times of school: effects on daytime functioning of fifth-grade children in Israel](#), *supra*, 21 *Sleep* 3, pp. 250-256.)

“Of particular concern is that the growing public support for delaying middle and high school start times is often at the expense of making elementary school start times earlier. Indeed, this has already occurred in two counties in Kentucky (Fayette and Jessamine; National Sleep Foundation, 2005a, 2005b). This is often done in order to preserve staggered bus scheduling (Kirby et al., 2011). Our findings suggest that these policy changes may simply be shifting the problem from adolescents to younger children, instead of eliminating it altogether. On the one hand, elementary school children are not experiencing the puberty-related phase shift in sleep-wake regulation. Therefore,

earlier bedtimes and improved sleep hygiene may more readily prevent sleep deprivation in this student group. Nevertheless, if parents do not alter their children's sleep behavior in response to earlier start times, elementary school performance may suffer, and these reductions in early student learning may have implications for academic achievement over the long term (G. W. Ladd & Dinella, 2009). On the other hand, making school start times later for all grade levels may be a feasible solution for some school districts (Kirby et al., 2011).” --- (Keller, Smith, Gilbert, Bi, Haak, & [Buckhalt](#), *Earlier School Start Times as a Risk Factor for Poor School Performance: An Examination of Public Elementary Schools in the Commonwealth of Kentucky* (Jun. 2014) (2015) 107 J. Educational Psychology 1, pp. 236-245.)

“In summary, although the decision to implement a later start time for middle and high school students is seldom without controversy, this study adds to a growing body of evidence suggesting compelling health benefits with even a very modest delay in school start time to align more closely with adolescents' circadian rhythms. Furthermore, our results suggested that high school students in earlier grades and those with lower baseline sleep amounts were more likely to benefit from the delay in school start time. The findings indicate the importance of systemic countermeasures to mitigate against chronic sleep loss in adolescents.” ---[Julie Boergers](#), Ph.D., Associate Professor of Psychiatry and Human Behavior (Clinical), Associate Professor of Pediatrics (Clinical), Christopher Gable, B.A., Division of Pulmonary and Sleep Medicine, Children's National Medical Center, [Judith Owens](#), M.D., M.P.H., Director, Center for Pediatric Sleep Disorders, Associate Professor of Neurology, Boston Children's Hospital. ([Later School Start Time Is Associated with Improved Sleep and Daytime Functioning in Adolescents](#) (Jan. 2014) 35 J. Developmental & Behavioral Pediatrics 1, p. 16.)

“The National Education Association believes that overall health and performance are best achieved with adequate rest on a regular basis. The Association supports school schedules that follow research-based recommendations regarding the sleep patterns of age groups. The Association further supports programs within the education framework that promote understanding of the importance of adequate rest.” (Nat. Ed. Assn. (2013) [2012-2013 Handbook](#), p. 250, Resolution C-3.)

“Any factors that demand early rise times are likely to have a negative impact on sleep duration, particularly in light of the strong biological tendency of adolescents to delay sleep. This study provides further support that U.S. adolescents would benefit from later school start times. ... Early school start times as well as early morning sport training or study may have a negative effect on sleep and flow-on effects to daytime alertness and functioning. [P]arental help in maintaining a limit on late night activities may similarly have a protective role.” ---[Michelle Short](#), Ph.D., Post Doctoral Research Fellow, University of South Australia, [Michael Gradisar](#), Ph.D., M.Psyc., Associate Professor of Psychology, Flinders University, [Leon Lack](#), Ph.D., Professor of Psychology, Flinders University, Helen Wright, Ph.D., Flinders University, Julia

Dewald, M.Sc., University of Amsterdam, [Amy Wolfson](#), Ph.D., Professor of Psychology, Vice President for Academic Affairs, Loyola University, Maryland, & [Mary Carskadon](#), Ph.D., Professor of Psychiatry & Human Behavior, Brown University School of Medicine, Director of Chronobiology and Sleep Research, Bradley Hospital. ([Short, Gradisar, Lack, Wright, Dewald, Wolfson, & Carskadon, *A Cross-Cultural Comparison of Sleep Duration Between U.S. and Australian Adolescents: The Effect of School Start Time, Parent-Set Bedtimes, and Extracurricular Load* \(2012\) Health, Education, & Behavior, p. 5.\)](#)

“Changing a school’s start and end time to be later for teenagers is not an easy undertaking. ... Sleep specialists can play an important role by educating school administrators about the potential adverse outcomes of very early school start times. [¶] Hopefully, in the near future, increased awareness of the sleep problems faced by teenagers should motivate schools across the country to synchronize school schedules with students’ circadian clocks. That way, teenagers are in school during their most alert hours to achieve their full academic potential.”--[Saiprakash B. Venkateshiah](#), M.D., F.C.C.P., Assistant Professor of Medicine, Emory University School of Medicine. ([Venkateshiah, *Teenagers and Sleep* \(Nov. 10, 2011\) Am. College Chest Physicians, Chest Physician Art.\)](#)

“The timing of education is also important. There is clear evidence for a phase shift during adolescence, with adolescents going to bed later and rising later than children. This phase shift is largely biological, with adolescents typically unable to fall asleep at earlier times. For the most part, school systems have not considered this adolescent phase shift, with many systems traditionally having earlier (rather than later) start dates for high school than for grade school students. By recognizing the shift in biological rhythms during adolescence and delaying school start times accordingly, classroom experience can be matched to the times when adolescents are most alert and attentive.”--[Donna Coch](#), Ed.D., Associate Professor and Chair, Department of Education, Dartmouth College, [Kurt Fischer](#), Ph.D., Charles Bigelow Professor of Education, Director, Mind, Brain, and Education Program, Harvard University, [Geraldine Dawson](#), Ph.D., Professor of Psychiatry and Behavioral Sciences, Pediatrics, Psychology and Neuroscience, Duke University Medical Center, Director of the Duke Center for Autism and Brain Development, Duke University. ([Coch, Fischer, & Dawson, *Human Behavior, Learning, and the Developing Brain: Typical Development* \(Informa Healthcare 2010\) pp. 382-383.\)](#)

“For policy makers, teachers and parents, these results provide a clear mandate. The effects of sleep deprivation on grades, car accident risk, and mood are indisputable. A number of school districts have moved middle and high school start times later with the goal of decreasing teenage sleep deprivation. We support this approach, as results indicate that later school start times lead to decreased truancy and drop-out rates.” (Hagenauer, Perryman, Lee, & [Carskadon, *Adolescent Changes in the Homeostatic and*](#)

[Circadian Regulation of Sleep](#) (2009) 31 *Developmental Neuroscience* 4, p. 282; see also, [Carskadon, *For better student health, start school later*](#) (Sept. 5, 2012) Brown Univ.)

“[C]hildren and adolescents with restricted sleep are at greater risk for increased oppositionality and irritability, as well as reduced attention, executive functioning, processing speed, behavioral/emotional regulation, motivation and academic achievement. ... Certainly this causal link between sleep loss and impaired functioning in children and adolescents provides the impetus for consideration of delaying school start times, particularly for adolescents, who are experiencing a natural delay in circadian rhythm.” (Crabtree & Witcher, [Impact of Sleep Loss on Children and Adolescents](#), publish. in, [Sleep and Psychiatric Disorders in Children and Adolescents](#), *supra*, p. 144.)

“[S]chools need to incorporate into their pedagogical proposal measures that would reduce the impact of phase delay on the student’s performance. [¶] The first step would be to reconsider the school’s temporal organization, in particular its class schedules, and systematize the results of possible interventions that aim to reduce the student’s daily sleepiness and thereby improve performance. [¶] The changes we propose are apparently simple modifications, such as delaying the beginning of morning classes.” (Louzada, Teixeira da Silva, Peixoto, & Menna-Barreto, [The Adolescence Sleep Phase Delay: Causes, Consequences and Possible Interventions](#) (Jul. 2008) 1 *Sleep Science*, p. 52.)

“Consider altering early high school start times to allow for the sleep patterns of teens.” ([Recommendation Rep.](#) (Mar. 2008) N.J. Teen Driver Study Commission, Recommendation No. 6.4, p. 46.)

“Recent research has focused on the effects of daytime sleepiness in the student population. Poor sleep quality has been linked to increased tension, irritability, depression, more frequent use of alcohol and illicit drugs, accidents, and lowered academic performance. Sleep problems are common and unrecognized in the student group. The influence of sleep on learning and behavior has recently captured the attention of school districts across the United States and school administrators increasingly need to weigh the factual information about the biology of student sleep patterns against the competing demands of teachers’ work preferences and athletic and after-school schedules. [¶] [T]here is increasing data that early school start times result in increased daytime sleepiness, and altering the times to a later time period has positive effects on academic performance and sleepiness.” ([Bijwadia & Dexter](#), *The Student with Sleep Complaints*, publish. in, [Sleep: A Comprehensive Handbook](#) (Lee-Chiong, edit., Wiley-Liss 2006) pp. 959, 960.)

“There is a need for educators to be more aware of the impact of school start times and academic scheduling, and to consider sleep problems as potential factors in students who fail to achieve or who exhibit behavioural problems. While it may be

administratively convenient to begin high school classes early, there is strong evidence in our data, supported by the literature, suggesting that later start times would be more appropriate for teens." (Gibson, [Powles](#), [Thabane](#), O'Brien, Molnar, Trajanovic, [Ogilvie](#), Shapiro, Yan, & Chilcott-Tanser, "[Sleepiness](#)" is serious in adolescence: Two surveys of 3235 Canadian students (May 2006) 6 Bio Med Central Pub. Health 116, p. 8.)

"Where possible, efforts should be made to encourage lighter homework loads and later school start times, so that adolescents can go to bed and wake up at times that are more suited to their bodily rhythms." ([Fredriksen](#), [Rhodes](#), Reddy, & [Way](#), [Sleepless in Chicago: Tracking the Effects of Adolescent Sleep Loss During the Middle School Years](#) (Jan./Feb. 2004) 75 Child Development 1, p. 94.)

"The Minnesota Medical Association urges all Minnesota school districts to eliminate early starting school hours for teenagers."---Barbara P. Yawn, M.D., Speaker, Minnesota Medical Association House of Delegates. ([Minn. Med. Assn. Letter to Superintendent Dragseth](#) (Apr. 4, 1994) [Edina Pub. Schools.](#))