



# Evaluation of School Start Times Research Findings

**Guilderland Central School District**

**Fall 2018 - Fall 2019**

# Physiology of Adolescent Sleep

- **Delayed sleep phase syndrome**

- Experimental studies found that a **normal shift in circadian rhythms occurs in adolescence, coinciding with pubertal onset as well as increasing chronological age.**
- This biologically based shift to later natural sleep onset and wake times unfortunately conflicts with most school districts in the United States. The result is a chronic-deficient (insufficient and inappropriately timed) sleep in the vast majority of American teenagers and in many around the globe.



# Recommended Sleep Duration in Adolescents

Based on the literature it is strongly recommended that adolescents sleep **8.5 to 10 hours per night**. It has been documented that in school districts that have made changes to their school start times, about 44% of students get more sleep.



# Benefits of Adequate Adolescent Sleep

- Medical and Mental Health
- Academic and Cognitive
- Public Health and Safety



# Medical and Mental Health Effects

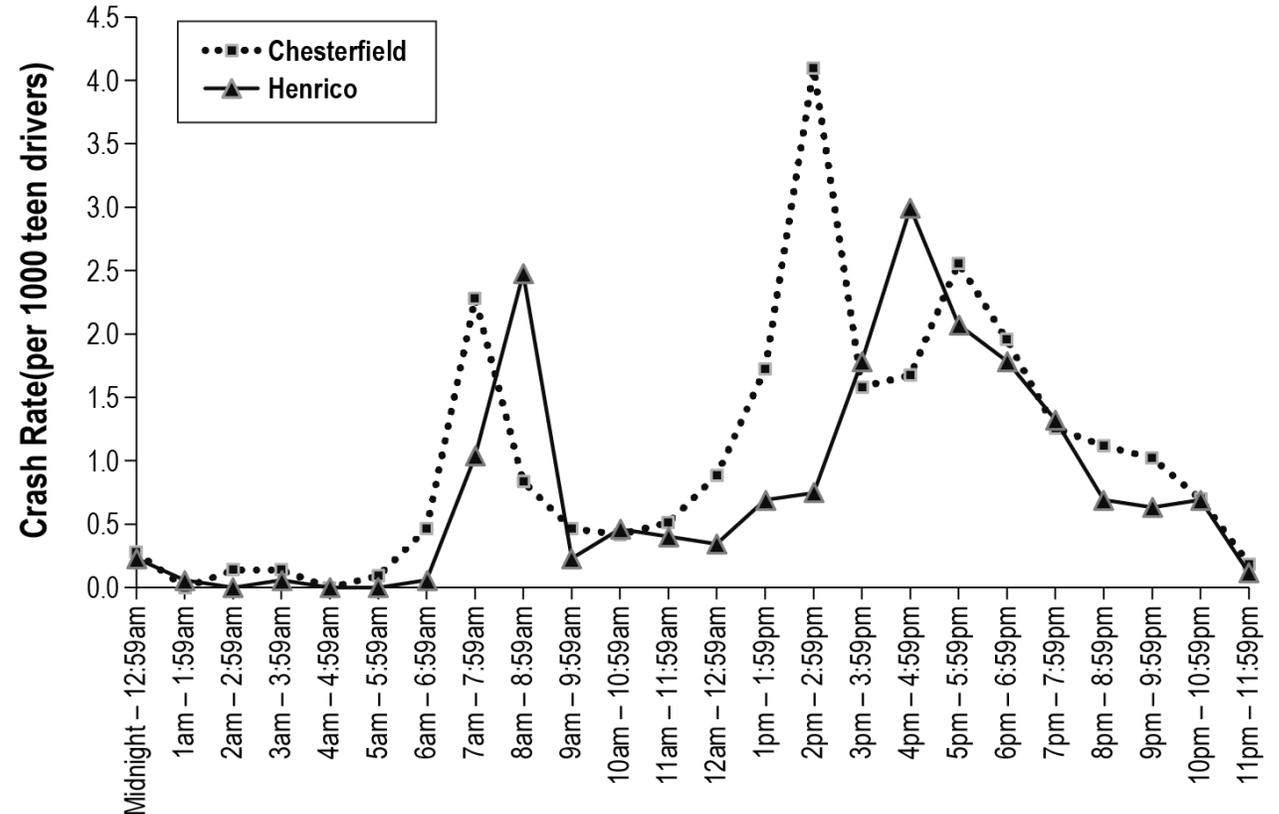
- Increased obesity risk
  - Sleep 2010
- Metabolic dysfunction
  - Archives of Diseases in Childhood, 2006
- Increased risk of caffeine consumption, risk of toxicity/overdose
  - Pediatrics 2014
- Nonmedical use of stimulant medications
  - American Journal of Health Behavior 2010
- Increased risk for anxiety, depression, suicidal ideation
  - Child Development 2004, JAMA Pediatrics 2010, Sleep 2012

# Academic and Cognitive Effects

- Cognitive deficits, especially with more complex tasks
  - Pediatrics 2005
- Impairments in executive function
  - Pediatrics 2005
- Impairments in attention and memory
  - Pediatrics 2005
- Lower academic achievement
  - Sleep Medicine Reviews 2010
- Poor school attendance
  - Sleep Health 2017
- Increased drop out rates
  - Sleep Health 2017

# Public Health and Safety Impacts

- **Fewer motor vehicle accidents**
  - Delayed start time had significant effect on crash rates (J of Clinical Sleep Med 2008, J of Clinical Sleep Med 2011, and 2014)
- Accidents and other unintentional injuries are the leading cause of death in teens 15-19.



# Professional societies supporting delayed school start times

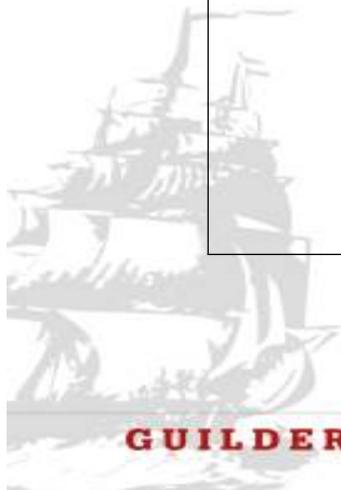
Societies	Recommendation
<p><b>American Academy of Sleep Medicine</b></p>	<p>(2017) specifically calls for start times of <b>8:30 am or later</b> for middle and high school citing many reasons but particularly the circadian rhythm issues.</p>
<p><b>American Academy of Pediatrics</b></p>	<p>(2014) specifically calls for start times of <b>8:30 am or later</b> for middle and high schools.</p>
<p><b>Society of Behavioral Medicine</b></p>	<p>(2017) calls for start times of <b>8:30 am or later</b> for middle and high schools.</p>
<p><b>American Medical Association (AMA)</b></p>	<p>(2016) calls for start times of <b>8:30 am or later</b> for middle and high schools.</p>
<p><b>National Sleep Foundation</b></p>	<p>(2014) did not call for specific school start time, but has since "commended" the AAP statement which specifically calls for <b>8:30 am or later</b>.</p>
<p><b>Centers for Disease Control and Prevention</b></p>	<p>(2015) calls for start times of <b>8:30 am or later</b> for middle and high schools.</p>
<p><b>American Thoracic Society</b></p>	<p>(2015) recommends "age based" recommendations, and for teens recommend "school start times be delayed to align with physiological circadian" rhythms.</p>

# Professional societies supporting delayed school start times

Societies	Recommendation
American Thoracic Society	(2015) recommends "age based" recommendations, and for teens recommend "school start times be delayed to align with physiological circadian" rhythms.
National Association of School Nurses	(2016) policy statement advocating start times of <b>8:25 am or later</b> for "adolescents".
Society of Pediatric Nurses	(2016) joint statement with National Association of School Nurses above.
American Academy of Child and Adolescent Psychiatry	(2014) official support of AAP position which is <b>8:30 am or later</b> for middle and high school.
American Sleep Association	(2016) middle and high schools should start <b>no earlier than 8 am</b> . A time closer to 9 am or later would be preferable.
National Education Association	(2017) supports school schedules that follow research based recommendations regarding the sleep patterns of age groups.
National Parent Teacher Association	(2017) - resolution encouraging middle and high schools to start classes at times to allow adequate sleep.

# Behavioral intervention that are supported by the literature

<b>Limit</b>	<b>Encourage</b>
<ul style="list-style-type: none"><li>• Use of technology before going to bed (TV, videogames, internet)</li><li>• Electronics that emit blue light</li><li>• Caffeine consumption</li></ul>	<ul style="list-style-type: none"><li>• Exercise routine</li><li>• Exposure to natural light during the day</li><li>• Dark and comfortable sleeping environment</li><li>• Night time routine</li><li>• Homework be finished earlier</li></ul>



# Challenges of changing school start times

## Challenges

- Transportation (coordination and more buses)
- Afterschool athletics and extracurricular activities
- BOCES programs
- After school care
- Parents work schedules
- Parents managing schedules for adolescent children and their younger siblings

## Overcoming the challenges

- Limit late evening activities
- Awaiting SWOT recommendations

# Limitations and Other Considerations

## Limitations of the current studies

- Many of the studies are based on self-reported surveys.
- The studies done on the biological basis of adolescent sleep have been done in a controlled laboratory.
- Time frame of studies were not longer than two years
- None of the studies discuss sleep quality.
- Differences in the health and academic benefits were observed in some studies.

## Other Considerations

- Studies focus mostly on adolescents and not elementary school children.
- Some studies suggest that delaying school start times have short-term gains.

# Reasons for start time change

Delaying school start times may be beneficial in **reducing**:

- Tardiness
- Sleepiness in the classroom
- Disruptive behavior
- Depression and Anxiety
- Anxiety over academic pressure
- Sports injuries
- Automobile accidents
- Caffeine Consumption
- Drug, cigarette and alcohol consumption

Delaying school start times may be beneficial in **increasing**:

- Improvement in academic performance and attention span
- Increase in GPA
- Emotional regulation
- Peer and family interactions

# Research Group Members

Catherine Barber-Former GCSB Member

Beth Bini Ed.D. - Principal Westmere Elementary

Rebecca Butterfield M.D. - Albany Medical Center

Magdia De Jesus Ph.D. - SUNY Albany, Biomedical Sciences

Mary Fontana - GHS Library Assistant

Barbara Fraterrigo - GCSD Board

Nicholas Harris Ph.D. - GHS School Psychologist

Michelle Rispole- L.A. Coordinator/Reading Specialist, Pine Bush Elementary



# References

- Adolescent Sleep Working Group, "School start times for adolescents," *Pediatrics* 2014; 134 (3): 642-9.
- Bryant Ludden A, "Understanding adolescent caffeine use: connecting use patterns with expectancies, reasons, and sleep," *Health Education Behavior* 2010; 37 (3): 330-42.
- Cespedes, et al, "Chronic insufficient sleep and diet quality: contributors to childhood obesity," *Obesity* 2016; 24 (1): 184-190.
- Dewald J et al, "The influence of sleep quality, sleep duration and sleepiness on school performance in children and adolescents: a meta analytic review," *Sleep Medicine Reviews* 2010; 14: 179-89.
- Fredriksen, et al, "Sleepless in Chicago: Tracking the effects of adolescent sleep loss during the middle school years," *Child Development* 2004; 75 (1): 84-95.
- Hansen M, et al, "The impact of school daily schedule on adolescent sleep," *Pediatrics* 2005; 115 (6): 1555-1561.
- Lee, et al, "Insufficient sleep and suicidality in adolescents," *Sleep* 2012; 35 (4): 455-60.
- McKeever, et al, "Delayed high school start times later than 8:30 am and impact on graduation rates and attendance rates," *Sleep Health* 2017; 3: 119-125.
- Millman, R, "Excessive sleepiness in adolescents and young adults: causes, consequences, and treatment strategies," *Pediatrics* 2005; 115: 1774.
- NTSB "Crashes and Fatalities Related to Driver Drowsiness/Fatigue" 1994
- Owens, et al, "Impact of delaying school start time on adolescent sleep, mood and behavior," *JAMA Pediatrics* 2010; 164 (7): 608-614.
- Taheri, et al, "The link between short sleep duration and obesity: we should recommend more sleep to prevent obesity," *Archives of diseases in childhood* 2006; 91 (11): 881-884.
- Terry-McElrath, et al, "Sleep and Substance Use among US Adolescents, 1991-2014," *American Journal of Health Behavior* 2016 40 (1): 77-91.
- Verhulst SL, "Sleep duration and metabolic dysregulation in overweight children and adolescents," *Archives of Diseases in Children* 2008; 93 (1): 89-90.
- Vorona RD, et al, "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," *Journal of Clinical Sleep Medicine* 2014; 10 (11): 1169-77.
- Vorona RD, et al, "Dissimilar teen crash rates in two neighboring southeastern Virginia cities with different high school start times," *Journal of Clinical Sleep Medicine* 2011; 7(2): 145-51.
- Weiss, et al, "The Association of sleep duration with adolescents' fat and carbohydrate consumption," *Sleep* 2010; 33 (9): 1201-1209.
- Wolfson, et al, "Understanding adolescents' sleep patterns and school performance: a critical appraisal," *Sleep Medicine Reviews* 2003; 7 (6): 491-506.