

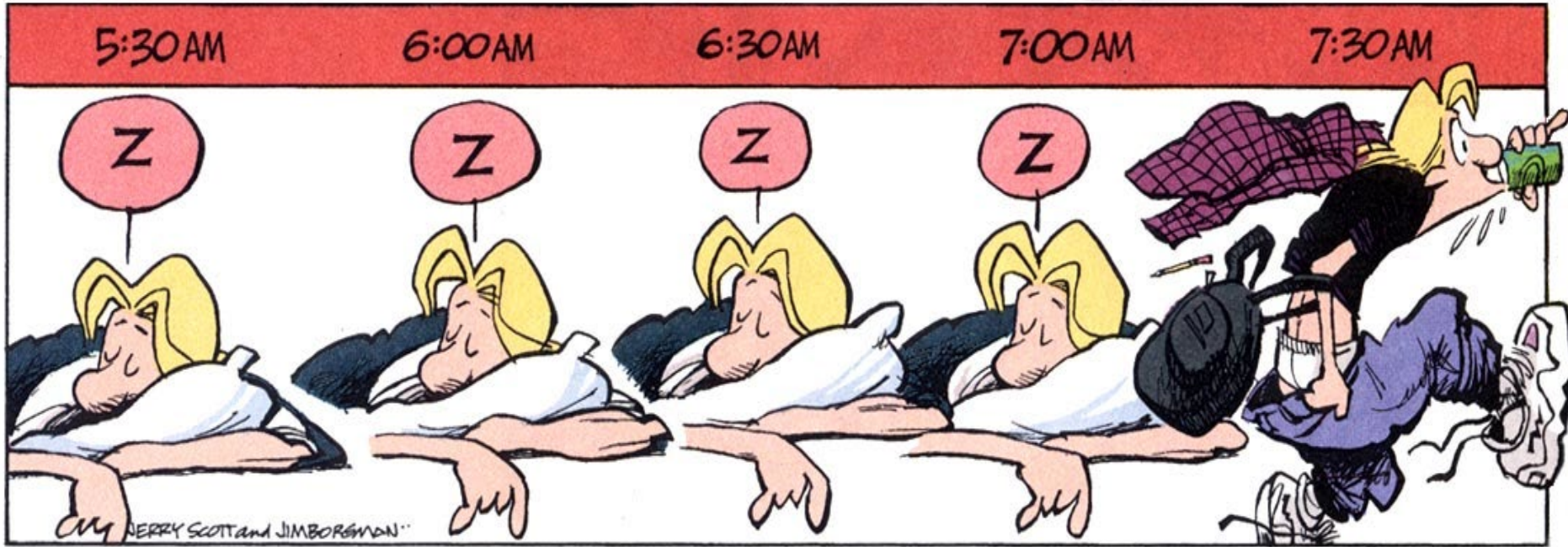
Youth Sleep Needs & School Bell Times: Baltimore and Beyond

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Loyola University Maryland

The logo for Loyola University Maryland, featuring the word "LOYOLA" in a stylized, green, italicized font with a white outline and a black drop shadow.



No Disclosures!

21st Century Parent's Perspective ...

Courtesy of Mary
Carskadon, 10/24



My [13-y-o] son's sleep is a phase-shifted nightmare. That, too, seemed to happen overnight. I spent his early childhood wishing I could sleep past 5:30 on a Saturday morning, and now I spend most of Saturday trying to get him out of bed by dinner.

Adolescent Sleep Myths

1. Adolescents would go to sleep earlier if parents just made them.

2. Some teens might need 9 hrs of sleep, but my child needs only 6 hours (and so do I!)

3. If school starts later, adolescents will just stay up later!

4. Adolescents can make up lost sleep by sleeping in on weekends or going to school later one day/week.

5. Adolescents need to learn to get up early; that's real life!

6. They'll survive!

Adolescents' "Real World" Sleep Schedules



Report less sleep than younger children.



Report different school vs. weekend-night schedules, known as social jetlag.



Report markedly delayed bed and rise times, especially weekends.



Report school rise times based on school start times and commute times.

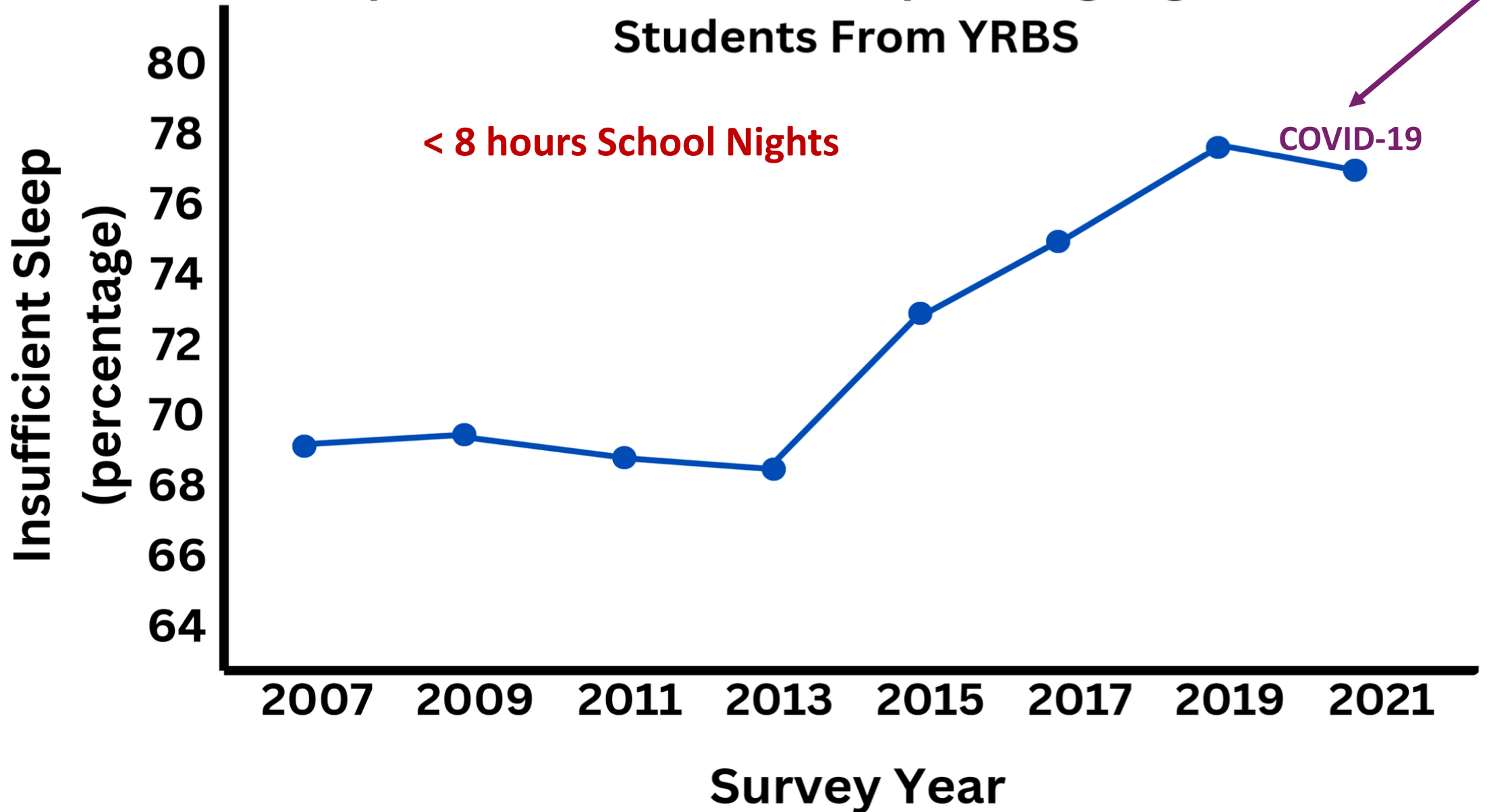


School-night sleep duration declines over adolescent years, weekend sleep changes less.

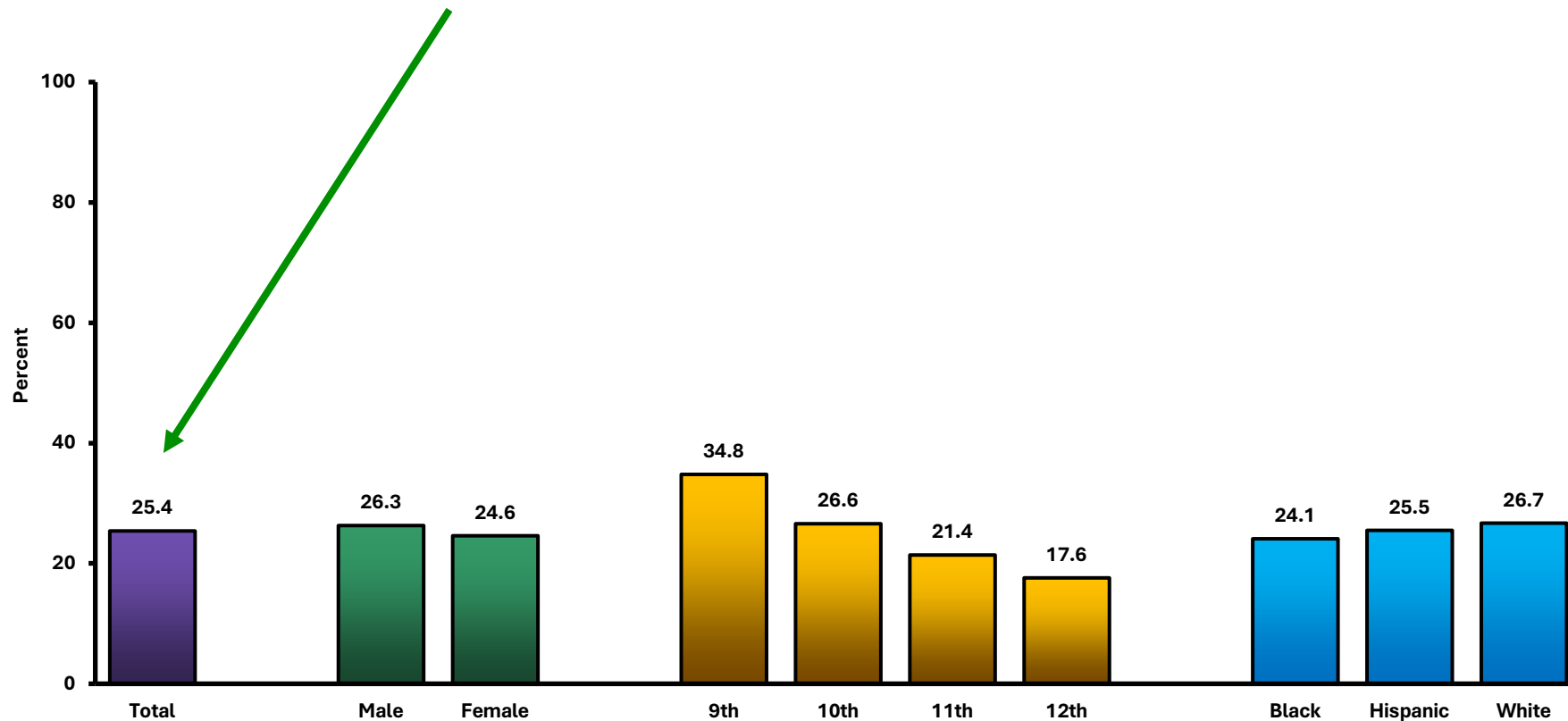


Size of school-night-to-weekend discrepancy & insufficient sleep tied to poor academic performance, depressed mood, other negative outcomes.

Reported Insufficient Sleep Among High School Students From YRBS



Percentage of High School Students Who Got 8 or More Hours of Sleep on Average School Night by Sex, Grade,[†] and Race/Ethnicity



[†]9th > 10th, 9th > 11th, 9th > 12th, 10th > 11th, 10th > 12th, 11th > 12th (Based on t-test analysis, $p < 0.05$.)

All Hispanic students are included in the Hispanic category. All other races are non-Hispanic.

Note: This graph contains weighted results.

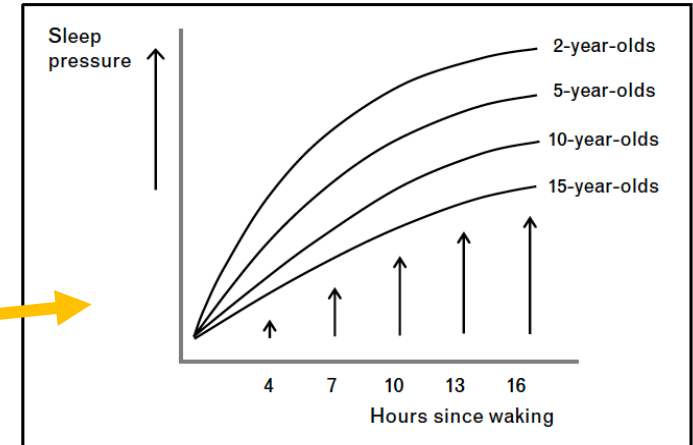


Not New Anymore
Adolescent Development:
Sleep and Circadian Timing

*Carskadon et al., 1997; Wolfson & Carskadon, 1998; Carskadon et al., 1998, 1999;
Taylor et al., 2005; Jenni et al., 2005; Carskadon, 2011; Crowley et al., 2011; Crowley et al., 2018*

Sleep & Circadian Biological Changes During Puberty

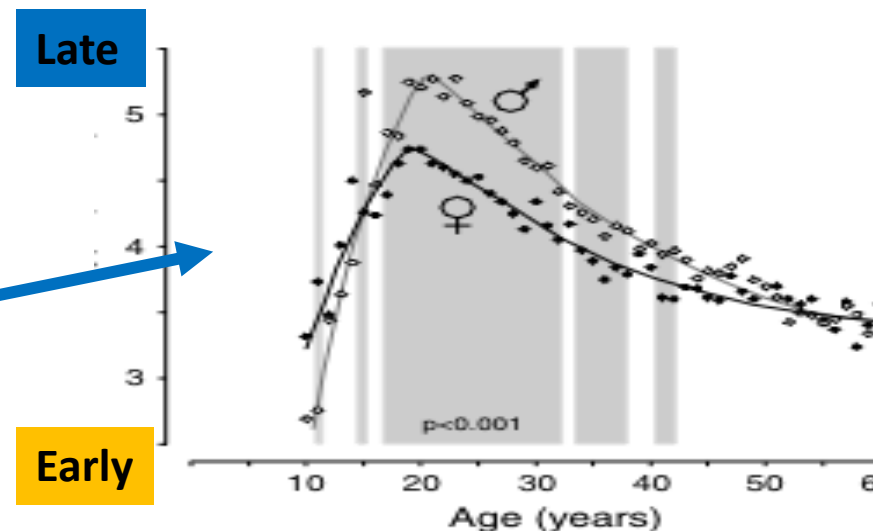
- Homeostatic Sleep System
 - Balances sleep and wake
 - Pressure for sleep builds more slowly in older vs. younger
 - Sleep need stable at close to 9.2 hours



Proposed developmental changes in accumulation of sleep pressure as a function of time since waking depicted for different ages. Sleep pressure accumulates more slowly during the day with increasing age.

- Circadian (~24-hour) Clock
 - Internal clock that signals sleep and wake
 - Needs bright days and dark nights
 - Circadian clock later in older vs. younger

...adolescents have difficulty falling asleep as early as younger siblings/peers

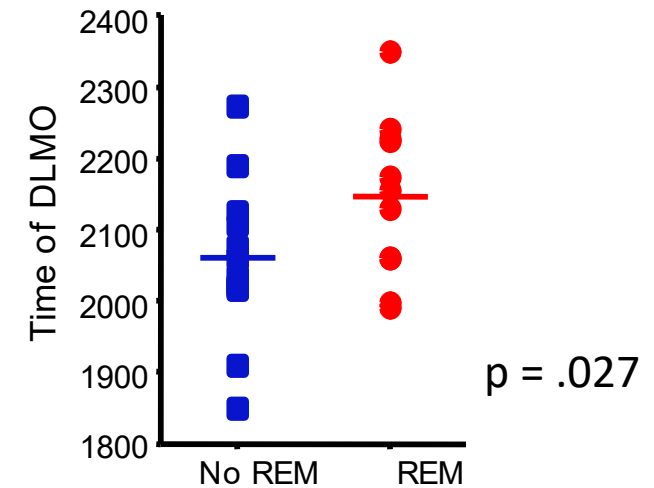
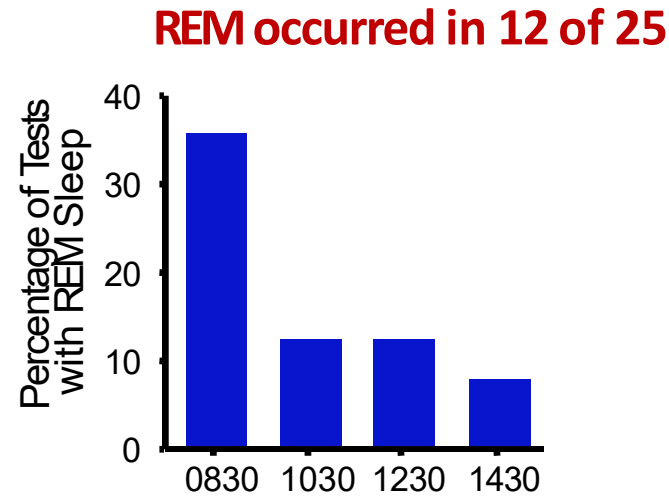
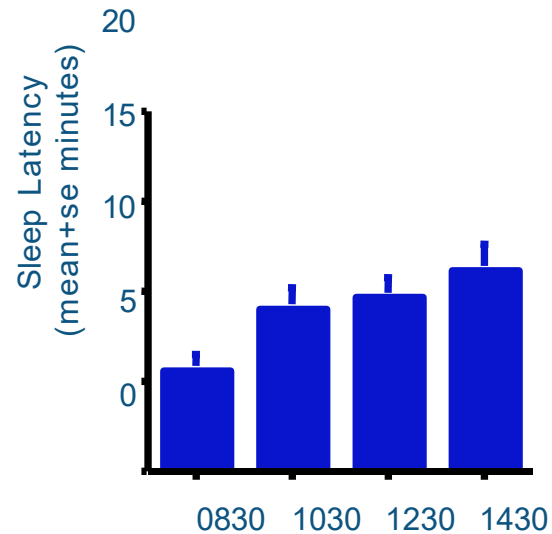


Circadian Phase & Sleepiness – Disturbing Finding



Jr High School SST = 8:25 am

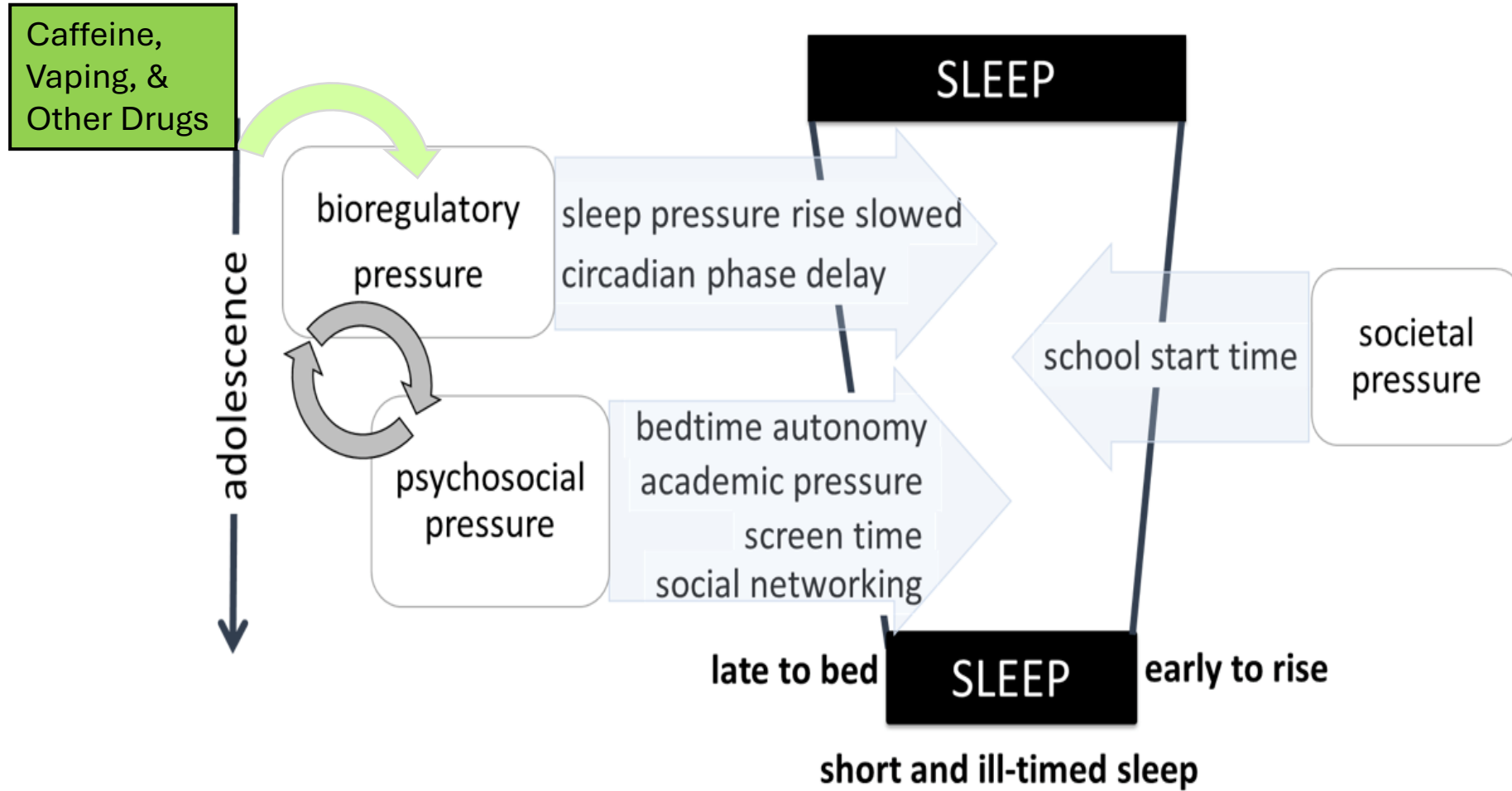
High School Start Time = 7:20 am



DLMO: dim light melatonin onset

Carskadon, Wolfson, et al., 1998

Result: The Perfect Storm

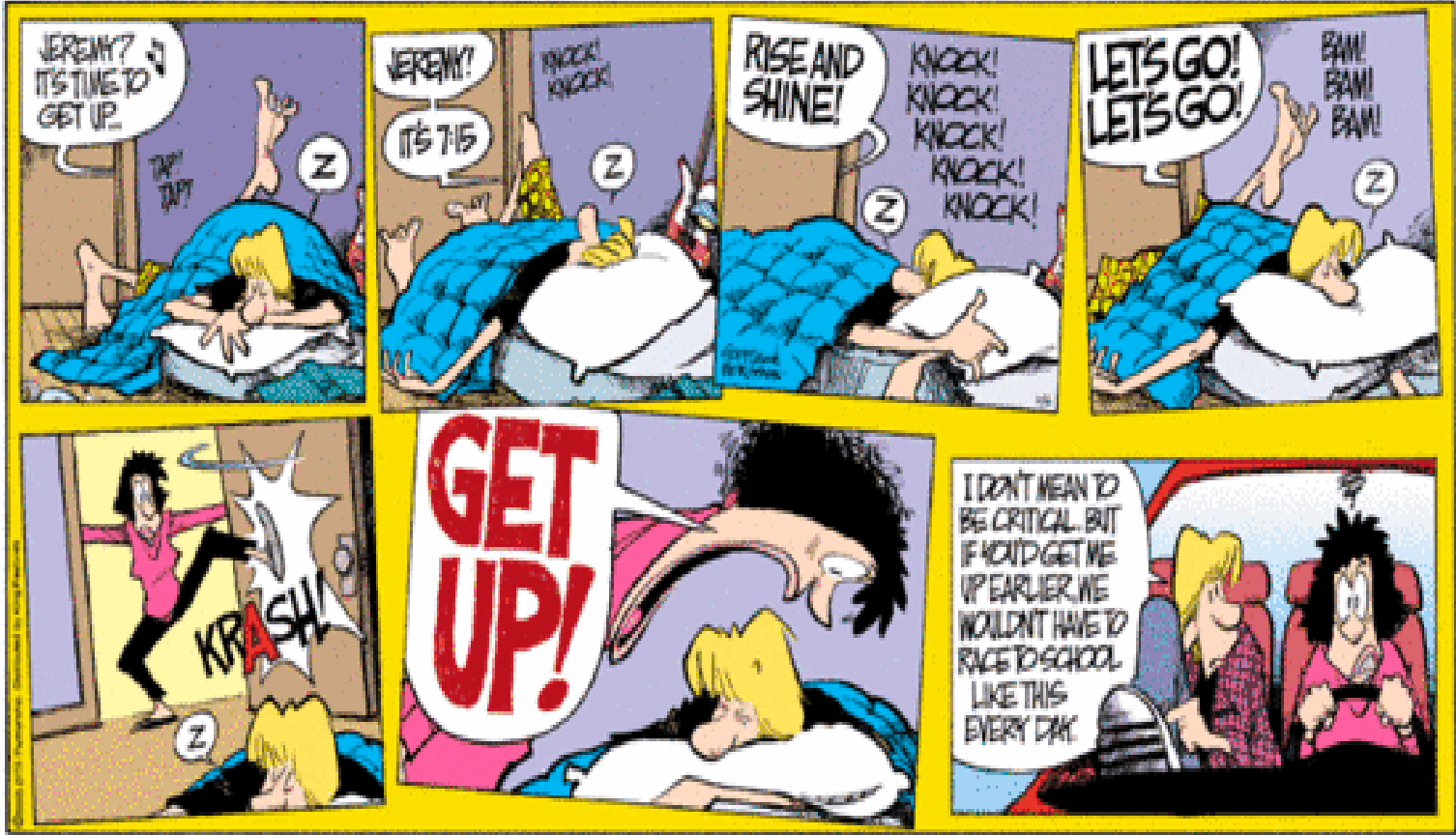
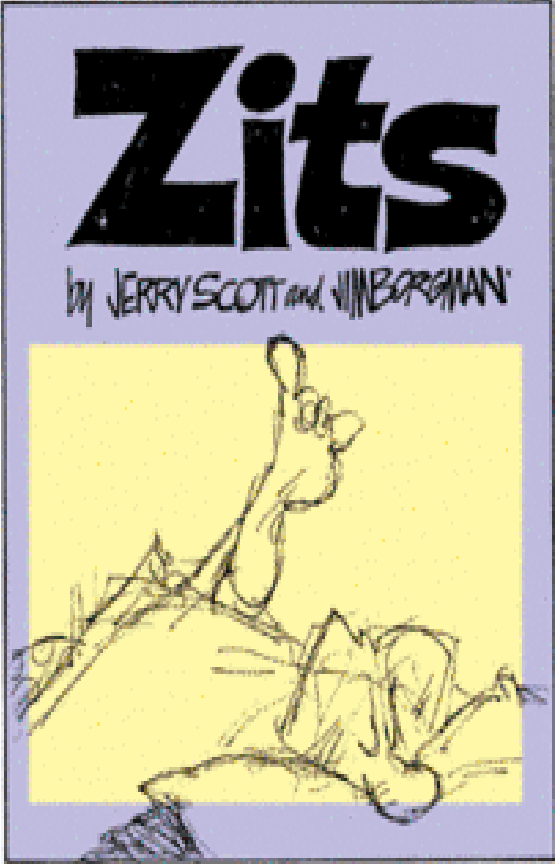


short and ill-timed sleep

CONSEQUENCES

Accidents, Depression/Anxiety, Suicide risk, learning challenges, health concerns.....

Carskadon 2011; Crowley, Wolfson et al., 2018



Consequences!

- Excessive Daytime sleepiness
- Learning, attention, memory deficits
- **Mood instability, depression risk**
- Impulsivity, Aggression
- Substance use/abuse
- **Suicidality, Suicides**
- **Motor vehicle accidents**
- Weight gain, colds, other health concerns





Insufficient, Misaligned Sleep and Suicide

- Over 60 studies report associations between chronic insufficient sleep and suicide.
- *“Unlike other suicide risk factors, sleep complaints may be particularly amenable to treatment.” (pg. 1)*
- *Bernert & Joiner, Sleep disturbances and suicide risk: A review of the literature (2007)*

Table 1. Mean self-reported sleep and wake-up times from seven reports in the 133 studies.

Author	Year	Country	Sample Size	Mean Sleep Time (h:m)	Mean Wake-up Time (h:m)
Wahlstrom et al.	2014	USA	1,000	8:00	6:30
Wahlstrom et al.	2014	USA	1,000	8:00	6:30
Wahlstrom et al.	2014	USA	1,000	8:00	6:30
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ADOLESCENT SLEEP NEEDS AND PATTERNS

Research Report
SIB Research Guide

What is the current state of research on adolescent sleep needs and patterns? This report reviews the literature on adolescent sleep needs and patterns, including the impact of school start times, technology use, and caffeine consumption. It also discusses the role of parents and schools in promoting healthy sleep habits.

BEHAVIORAL SLEEP MEDICINE

Behavioral sleep medicine is a branch of sleep medicine that focuses on the use of behavioral interventions to treat sleep disorders. This includes cognitive behavioral therapy (CBT) for insomnia, relaxation techniques, and stimulus control. Behavioral sleep medicine is often used in conjunction with other treatments, such as medication.

Economics of Education Review

Journal homepage: www.eber.harvard.edu/economics

What is the impact of school start times on academic performance? This review examines the relationship between school start times and academic performance, including the role of sleep and circadian rhythms. It also discusses the economic implications of different school start times.

PEDIATRICS

What time should the school day begin? This article discusses the impact of school start times on children's health and academic performance. It reviews the literature on adolescent sleep needs and patterns, and discusses the role of parents and schools in promoting healthy sleep habits.

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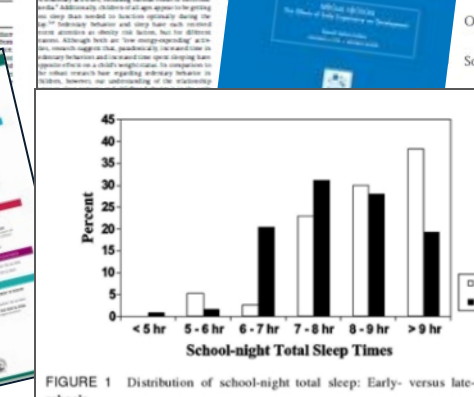


FIGURE 1 Distribution of school-night total sleep: Early- versus late-starting middle schools.

Examining the Impact of Later High School Start Times on the Health and Academic Performance of High School Students: A Multi-Site Study

Final Report
February 2014

Kyla L. Wahlstrom, Ph.D.
Project Director/Lead Investigator

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SD) values for sleep and daytime functioning parameters, and intelligence tasks as a function of adolescent school nights

	Insufficient (<8 h TST)	Borderline (8-9 h TST)	Sufficient (≥9 h TST)
(time)	23.15 hours (121.77) ^a	22.15 hours (61.0) ^b	21.38 hours (63.7)
(min)	68.3 (52.3) ^a	30.8 (22.8)	21.6 (18.0)
(h)	07:02 hours (51.2) ^a	07:10 hours (47.0) ^b	07:27 hours (48.6)
(w)	07.15 hours (66.8) ^a	07.25 hours (59.7)	07.35 hours (58.7)
(time)	00:38 hours (174.1) ^a	23:52 hours (130.8)	23:46 hours (169.0)
(h)	44.3 (54.5) ^a	25.0 (29.8)	20.2 (21.2)
(m)	8.3 (2.2) ^a	9.2 (1.6)	9.4 (1.5)
(s)	10:01 hours (182.7)	09:31 hours (146.3)	09:27 hours (143.8)
(m)	10:30 hours (174.9)	09:57 hours (130.4)	09:47 hours (157.1)
(h)	12 (0.7) ^a	1.9 (0.7)	1.7 (0.8)
(m)	10 (0.9) ^a	1.6 (0.9)	1.5 (0.8)
(s)	9 (0.9) ^a	1.2 (0.8)	1.0 (0.8)
(m)	7 (0.9) ^a	1.3 (0.9)	1.0 (0.9)
(s)	1 (1.0)	1.5 (0.8)	1.3 (0.9)
(s)	1 (1.0)	0.8 (0.9)	0.6 (0.9)
(h)	4 (0) ^a	13.2 (3.4)	11.7 (4.7)
(m)	3 (19) ^a	0.79 (0.17)	0.76 (0.19)
(h)	4 (1)	12.3 (2.8)	11.0 (2.9)

ARCHIVES OF PEDIATRICS & ADOLESCENT MEDICINE

Research Team/Report
Kyla L. Wahlstrom, PhD, Principal Investigator
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Middle School Start Times: Night's Sleep

Center for Applied Research and Educational Improvement

What is the impact of school start times on middle school students' sleep? This report examines the relationship between school start times and sleep, including the role of circadian rhythms and the impact of technology use. It also discusses the role of parents and schools in promoting healthy sleep habits.

SLEEP AND BIOLOGICAL RHYTHMS

Journal of Adolescent Health

What is the relationship between sleep and biological rhythms? This article discusses the impact of school start times on children's health and academic performance, including the role of sleep and circadian rhythms. It also discusses the economic implications of different school start times.

SLEEP MEDICINE

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From Adolescent Sleep & CR Science to Later School Start Times for Adolescent Health

1993: Carskadon et al
landmark study:
association between more
mature pubertal
development and later
circadian preference

“[T]he starting time of
school puts limits on the
time available for sleep.
This is a nonnegotiable limit
established largely without
concern for sleep.”

Adolescent Sleeplessness Epidemic

Individual vs. Structural Interventions

Individual/small group Focus

- Sleep Hygiene Strategies
- Sleep Disorders/Challenges
- Prevention

Structural societal Change

- **School/Class Start Times**
- Institutions (e.g., work load, extracurricular/athletic demands; driving regulations; employment schedules)
- Environment (e.g., ban use of electric lighting!)
- Library hours
- Context –Living/sleep environment (? College dorms)
- Social norms/attitudes (e.g., celebrating sleep deprivation)

- **Addressing individual level has minimal impact if structural roots not addressed.**
- **Social Justice: Structural approach allows youth from disadvantaged home environments, etc. to reap greater benefits of delaying school.**

School Start Time Policy Statements: First from AAP in 2014

Professional medical and public health organizations have reviewed all of the available sleep research on adolescent health. They have recommended a start time for all middle/high schools.



**Recommend middle/high school start at
8:30am or later**

American Academy of Child & Adolescent Psychiatry
American Academy of Pediatrics
American Academy of Sleep Medicine
American Medical Association
American Psychological Association
American Sleep Association
American Thoracic Society
Centers for Disease Control
Massachusetts Medical Society
National Association of School Nurses
National Institutes of Health
National Parent Teacher Association
National Sleep Foundation
Sleep Research Society
Society of Behavioral Medicine
Society of Pediatric Nurses

**Recommend middle/high school start
before 8:30am**

No organization has found that starting middle or high schools before 8:30am is safe or healthy for our children.



Masconomet Chapter | Massachusetts
health, safety and equity in education



Senator Anthony J. Portantino
REPRESENTING THE 25TH DISTRICT

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Governor Signs SB 328 CALIFORNIA to Lead the Nation on School Start Time Policy Children Will Sleep More & Excel With Later Start Times



Monday, October 14 2019

Sacramento, California – Our Kids win today as State Senator Anthony J. Portantino's (D – La Cañada Flintridge) school start time bill SB 328 has been signed by Governor Gavin Newsom. California will become the first state in the country to mandate that high schools and middle schools start later in the morning. The bill is based on over three decades of research on teen health, sleep patterns and brain chemistry. SB 328 seeks to align school start times with the biology of teens. Overwhelming research shows that when the school day starts later, our children are significantly healthier and perform better in school. The California PTA sponsored and supported SB 328. While pediatricians and researchers from across the country united behind the bill, it faced stiff opposition. That opposition led to a veto from Gov. Brown last year. This year, Gov. Newsom appropriately saw things differently and put our children's health and welfare at the forefront of education policy.

"Today, Governor Newsom displayed a heartwarming and discerning understanding of the importance of objective research and exercised strong leadership as he put our children's health and welfare ahead of institutional bureaucracy resistant to change. Generations of children will come to appreciate this historic day and our Governor for taking bold action. Our children face a public health crises. Shifting to a later start time will improve academic performance and save lives because it helps our children be healthier. The PTA, researchers, doctors, educational advocates and every parent and child who worked tirelessly and passionately on this three-year effort should take pride in what we have accomplished with the passage of SB 328. When I heard the good news I literally got choked up because of the overwhelming positive impact this will have on our children and for the deep appreciation for everyone who took this journey together. I am beyond excited that now our work begins to implement this necessary educational and public health reform," commented Senator Portantino.

Beginning over three decades ago in Minneapolis, researchers began studying the brain chemistry of teens. They found that teens require almost 10 hours of sleep per night to be healthy but receive far less in today's complicated society. By moving school start time later teens achieve more sleep and consequently are healthier and happier. SB 328 was sponsored by the California PTA, EdVoice, and Start School Later. It has near unanimous support from the healthcare community and is based on the recommendation of the American Academy of Pediatrics. Assemblymember Todd Gloria was a stalwart supporter of SB328 helping to shepherd it through the State Assembly.

What are the new Florida school start times under HB733?

The new law signed by Gov. Ron DeSantis prevents middle schools from beginning the "instructional day" earlier than 8 a.m., while high schools will be barred from starting the school day before 8:30 a.m.

The start times will be required to take effect by the 2026-2027 school year, giving school districts three years to develop plans.

Benefits of Later School Start Times

- Review 38 studies (Wheaton et al, '16); Meta-analysis of 20 studies (Bowers & Moyer, '17); other studies:

- **Increased TST by 30-60 min, later WTs, consistent BTs**, fewer sleep problems, less social jetlag, decreased sleepiness
- Reduced tardiness (as much as 4X)
- Increased attendance
- Reduced drop-out rates
- Improved standardized test scores, particularly Math & Reading
- Improved GPAs
- Increased/stable engagement sports, extracurricular activities
- Improved time allocation

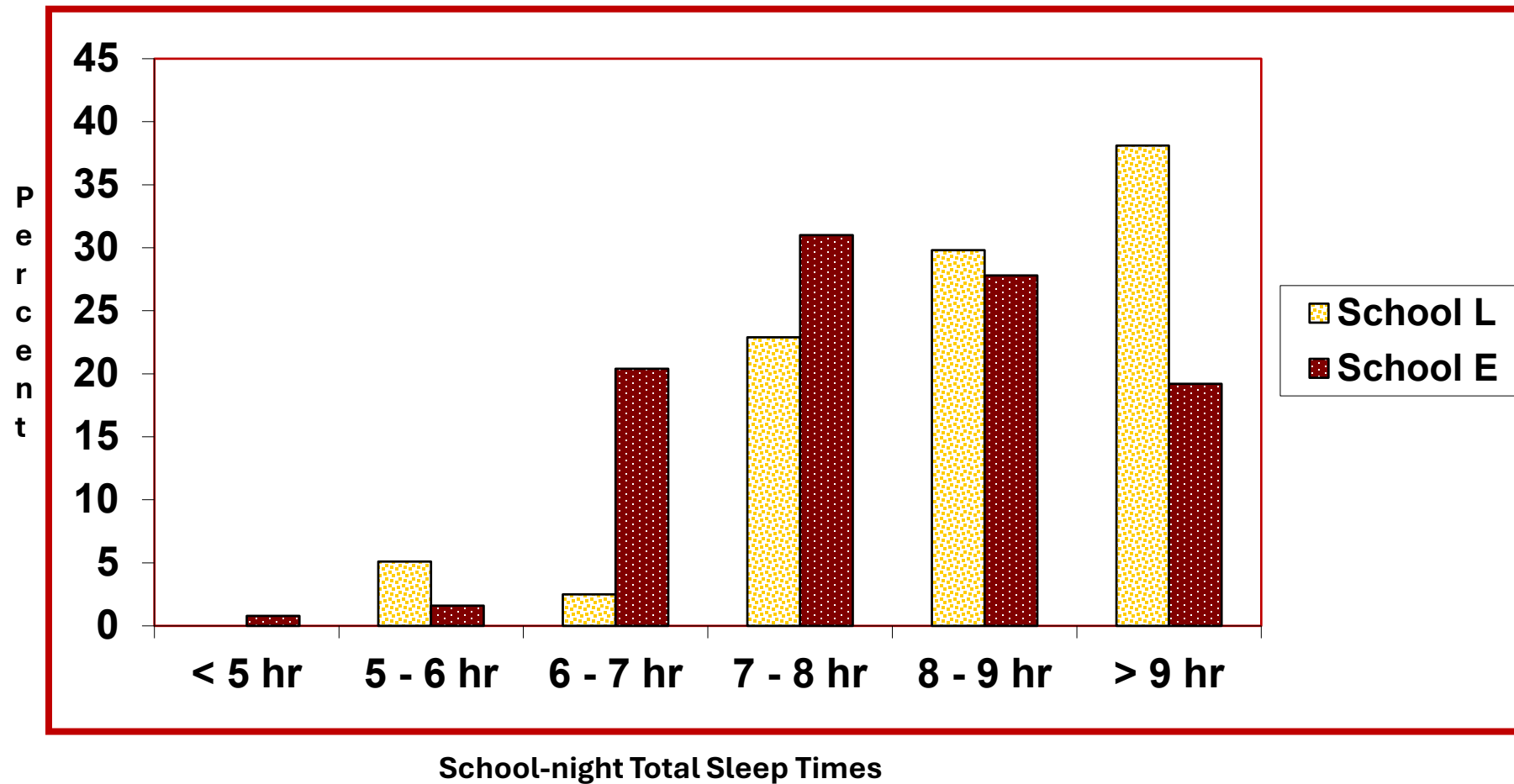
- Improved mood
- Improved mental health
- Decreased delinquent type behavior
- Decreased health center visits
- Improved family well-being (decreased family conflict)
- Decreased sleep-driver accidents
- Decreased substance abuse
- Less time on social media, computer games



- Economic benefits far exceed costs in real dollars by ratio of **6:1 as early as 2 years out**

Wolfson et al., 2007; Edwards, 2012; Wheaton et al., 2016; Jacob & Rockoff, 2011; Bowers & Moyer, 2017; Hafner et al., 2017; Wahlstrom, 2001, 2014; Owens et al., '10, '17; Berger et al 2018; Sleep Health special issue, '17, Semenza et al., 2019, Groen et al., 2019, Dunster et al., 2018, Nahmod et al., 2017, etc.

Distribution of School-night Total Sleep: Early versus Late Starting Middle Schools



COVID-19 Instructional Approaches, School Start Times, and Sleep...

Methods: Self-report (N = 5,245) community-dwelling adolescents (grades 6–12), recruited via Fa Oct/Nov 2020.

- Reported instructional approach (in-person, online/synchronous, online/asynchronous), SSTs (person or online/synchronous days), BTs & WTs by school type (school/ no school days).

Results:

- Racially, geographically diverse (~50% female) participants.
- **BT & WT earliest in-person instruction.**
- **Sleep Opportunity longer without scheduled instruction** (>1.5 h longer online/asynchronous VS. in-person).
- Obtained **sufficient sleep** with later SSTs (however, even with same SSTs, **sufficient sleep > with online instruction**).
- **Greater night-to-night variability** sleep-wake schedules with **in-person hybrid schedules** VS. with online/synchronous + asynchronous schedules.

Conclusions: Similar findings for other COVID-19 adolescent sleep and SST studies.

BUT, post COVID most school districts returned to earlier SSTs...back to commute times, etc.

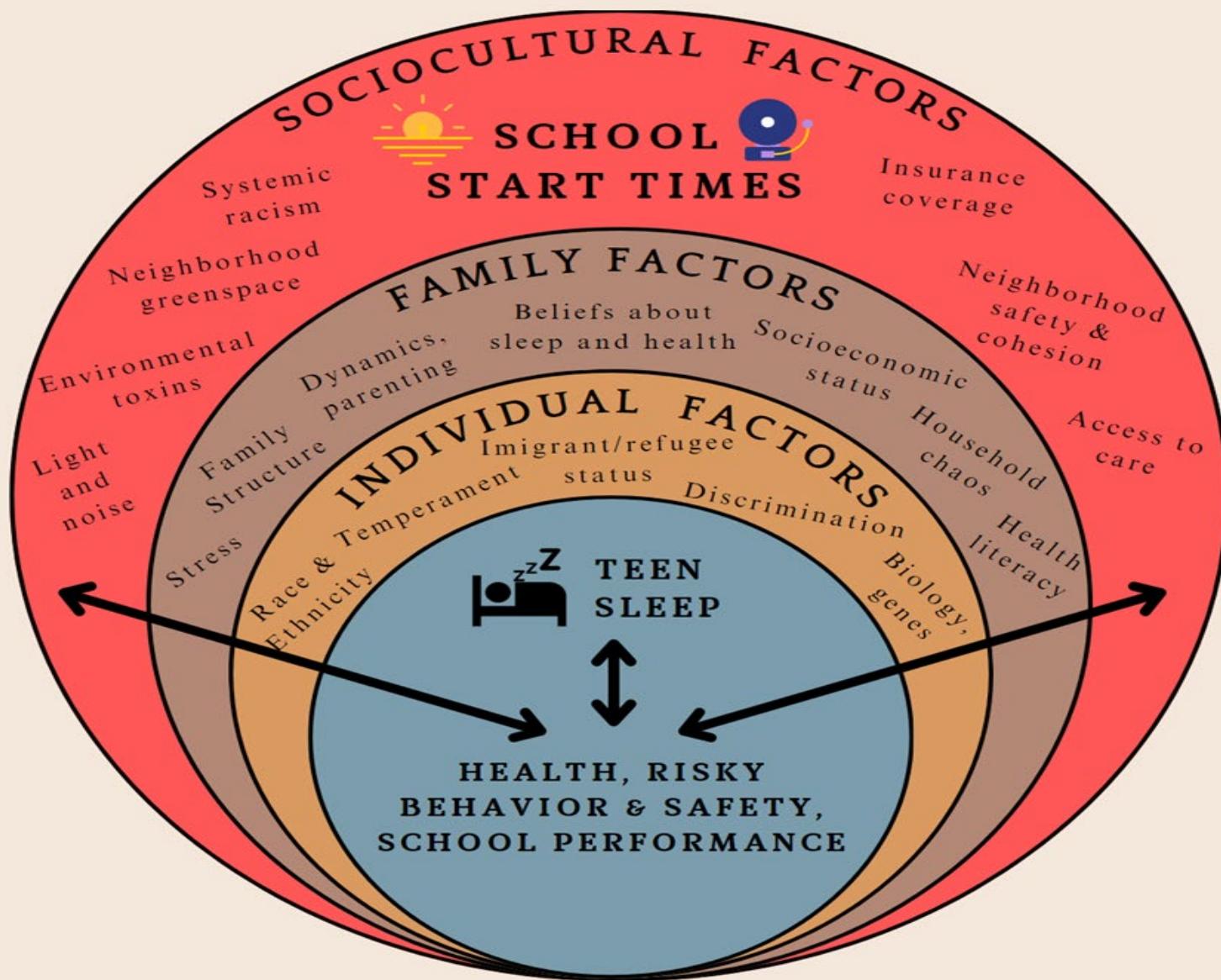


Delaying School Start Times: Social Justice Solution!

- Racial/ethnic, socioeconomic disparities in adolescent sleep.
- Disparities in 1+ sleep outcomes including sleep duration, quality, bedtime, wake time, sleep/wake problems, daytime sleepiness, efficiency, night-to-night variability, and fragmentation.
- SSTs social determinant of health.
- Later SSTs improve performance among disadvantaged students by amount equivalent to having **highly effective teacher** (*Hamilton Report, 2011*).
- Later SSTs, higher test scores, **with magnitude of effect greater for economically disadvantaged students** (*Groen & Pabilonia, 2019*).
- Later SSTs associated with 2 percentile point gain in Math/Reading scores, **larger gains at lower end of SES spectrum** (*Edwards, 2012*).
- Delayed SSTs associated with **increases attendance & graduation rates** (*McKeever & Clark, 2017*).
- Later SSTs important & cost-effective strategy to minimize achievement & health gaps for socioeconomically disadvantaged students.

e.g., Guglielmo et al., 2017; Yip et al., 2024; Marco, Wolfson et al., 2012; Mayne et al., 2021; Zeringue et al., 2023

Figure 3. School Start Times as a Social Determinant of Health Contributing to Disparities in Sleep, Health, Behavior, and Well-being of Teens. Adapted from Billings et al., 2021.





Getting to
YES

2024 National Conference on Adolescent Sleep & School Start Times

Loyola University Maryland
October 18-19 | Baltimore

2022-2023:

Only 22.5% MD high school students (49.5% middle schoolers) obtaining 8+ hrs/sleep

2014 YOUTH RISK BEHAVIOR SURVEY RESULTS

Maryland High School Survey
Summary Tables - Weighted Data

QN88: Percentage of students who had 8 or more hours of sleep (on an average school night)

	Percentage	Total 95% confidence interval	N	Percentage	Male 95% confidence interval	N	Percentage	Female 95% confidence interval	N
Total	23.8	(23.2 - 24.5)	52,135	25.7	(24.9 - 26.5)	25,072	22.1	(21.3 - 22.9)	26,662
Age									
15 or younger	28.4	(27.6 - 29.2)	26,002	31.4	(30.4 - 32.4)	12,337	25.6	(24.6 - 26.7)	13,471
16 or 17	19.6	(18.8 - 20.5)	24,152	20.6	(19.6 - 21.7)	11,613	18.7	(17.8 - 19.7)	12,413
18 or older	19.0	(17.1 - 21.2)	1,889	19.4	(16.9 - 22.1)	1,096	18.6	(15.2 - 22.5)	772
Grade									
9th	32.0	(31.0 - 33.0)	14,414	35.7	(34.4 - 37.0)	6,975	28.4	(26.9 - 29.9)	7,371
10th	24.7	(23.8 - 25.6)	13,175	25.9	(24.6 - 27.3)	6,383	23.7	(22.6 - 24.8)	6,720
11th	20.4	(19.5 - 21.4)	12,727	21.8	(20.5 - 23.2)	6,082	19.1	(17.9 - 20.5)	6,589
12th	17.2	(16.2 - 18.3)	11,100	17.8	(16.3 - 19.4)	5,303	16.6	(15.4 - 17.9)	5,752
Race/Ethnicity									
Black*	21.9	(20.9 - 22.9)	11,047	23.2	(21.6 - 24.8)	5,130	20.7	(19.5 - 22.1)	5,887
Hispanic/Latino	23.8	(21.9 - 25.8)	5,618	25.1	(22.5 - 27.9)	2,707	22.6	(20.7 - 24.6)	2,848
White*	26.6	(25.8 - 27.4)	27,302	28.8	(27.9 - 29.8)	13,373	24.3	(23.4 - 25.3)	13,862
All other races*	18.1	(16.4 - 19.9)	3,581	20.9	(18.8 - 23.1)	1,818	14.9	(13.0 - 17.1)	1,728
Multiple races*	21.4	(19.9 - 23.0)	2,969	22.6	(20.0 - 25.3)	1,263	20.6	(18.5 - 22.8)	1,689

Note: 3,461 students were excluded from this analysis

School Start Times in Urban Environments: Baltimore Case Study



<https://abell.org/publication/school-start-times/>

SEPTEMBER 2024

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Later School Start Times for Adolescents in Baltimore City Public Schools:

Opportunities and Recommendations



Baltimore City Schools

2023-24 Student enrollment

75,811	37,709	16,321	21,781
total enrollment	students in pre-k to grade 5	students in grades 6 to 8	students in grades 9 to 12

2023-24 Student demographics

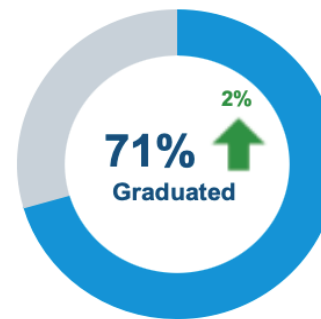
71%	18.6%	7.1%	<=5%	<=5%
African American	Hispanic/Latino	White	Asian	Multiracial

=<5%	=<5%	72.1%	12.5%
American Indian	Pacific Islander	Low income*	English learner

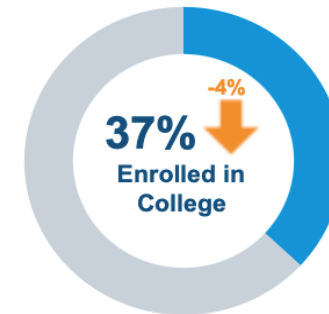
14.4%

Percentage of students with disabilities

4-Year Graduation Rate (Class of 2023)



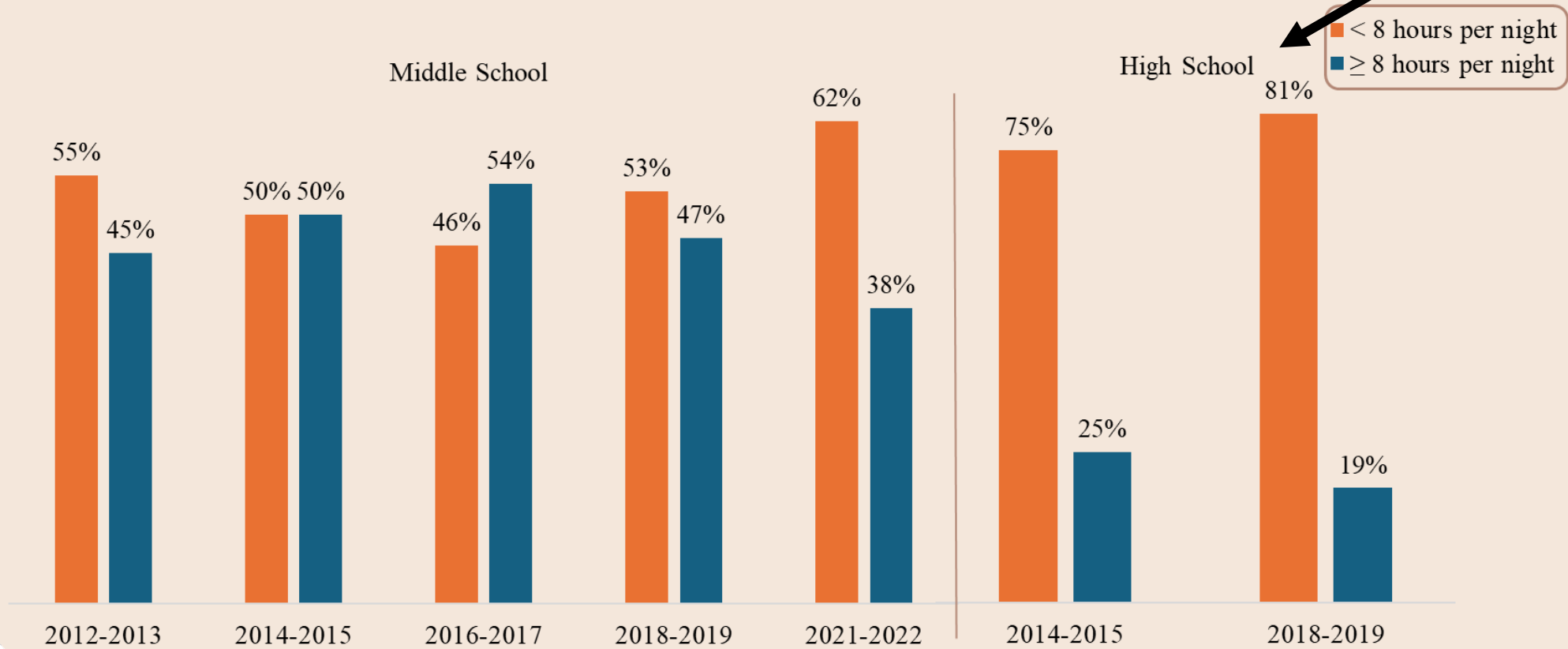
College Enrollment (Class of 2021)



<https://www.baltimorecityschools.org/page/district-overview>



Figure 8. Percentages of Baltimore Students Obtaining Sufficient Sleep on Average



Baltimore City Schools' Story...

- June 8, 2022, City Schools announced: 93 schools new “bell schedules” for 2022-23 school year;
- SST’s 30 min earlier, on average.
- Change largely to accommodate national school bus driver shortage.



Table 1. School Start and Dismissal Times and Enrollment by Academic Year and School Level

	2021 - 2022		2023 - 2024		Number of Schools
	School Start Time Range	Dismissal Range	School Start Time Range	Dismissal Range	
Elementary Schools	7:30-9:15	2:10-3:55	7:30-9:15	2:10-4:00	42
Elementary/ Middle Schools	7:30-9:15	2:10-4:00	7:30-9:15	2:20-4:00	70
Middle Schools	8:00-8:45	2:50-3:35	7:45-8:45	2:35-3:35	4
Middle/High Schools	8:00-9:00	2:50-3:50	8:00-9:00	2:50-3:50	8
High Schools	7:45-9:00	2:35-4:15	7:30-9:00	2:20-4:00	26
All Schools	7:30-9:15	2:10-4:15	7:30-9:15	2:10-4:00	150

Note: Table does not include data from 2022-2023 as there were few school start time changes from 2022-23 to 2023-24.

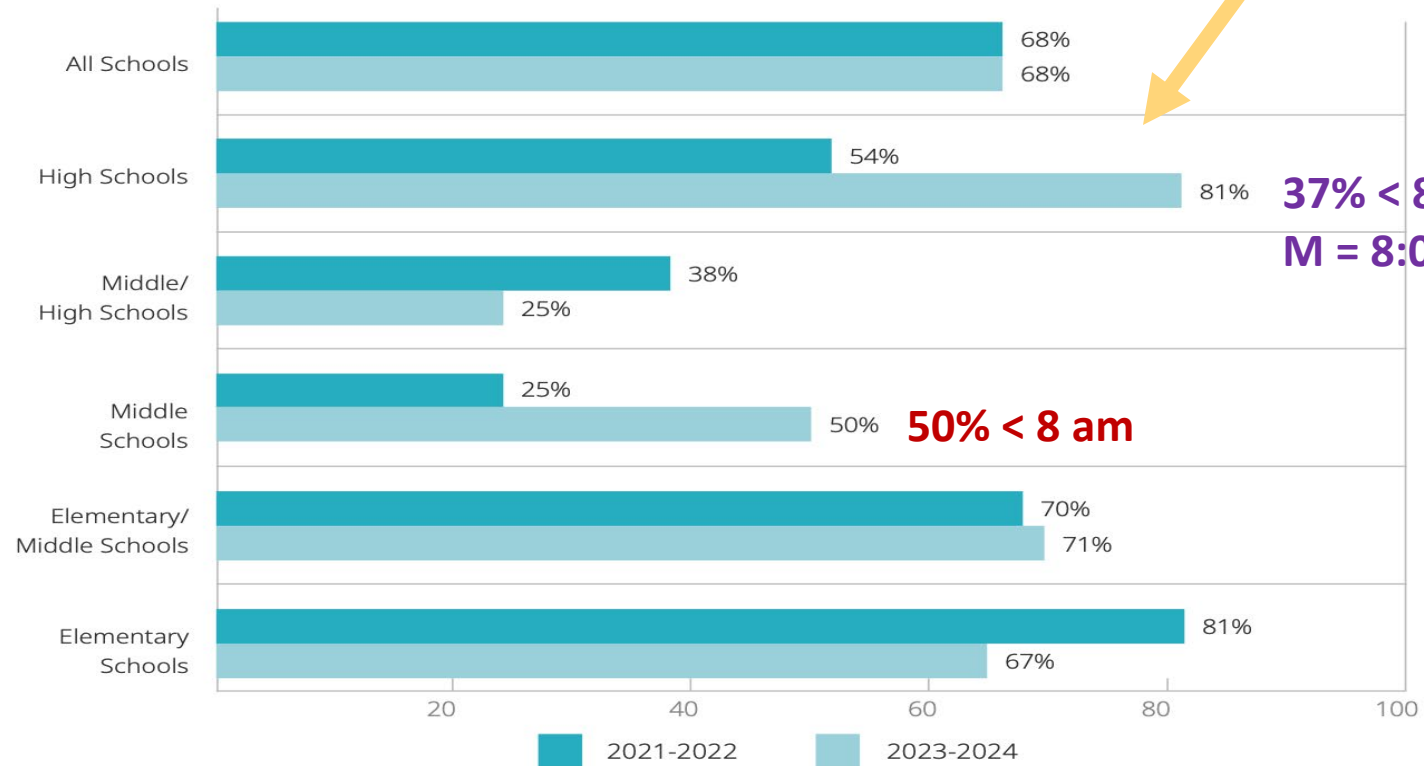
1.75 hr. range for SSTs



City Schools

Start Times < 8:30am

Figure 4. Percentages of BCPSS Schools with Start Times < 8:30 a.m.



37% < 8 am
M = 8:04 am

50% < 8 am



Transportation, Commute Times!



- Baltimore City only district in MD relies on public transportation
- Of 75,000 students, **only 5,000-6,000 use yellow buses (IEP, Unhoused, some ES students)**
- 2021 *Fund for Excellence* report, *Not in Service: Why public transit must aim to serve students*:
 - **73% MS & HS** students rely on MTA (18% annual MTA ridership).
 - **1-3 transfers** to get to school, average commute times **45-60 min.**
 - If not using MTA, students get rides from family and/or using Lyft, with relatively few students walking to/from school.
- If students live 1.5 miles from school choice, City Schools pay for public transportation to/from school between hours of **5 am & 8 pm only (ugh!)**

Figure 6. A Hypothetical Day in the Life of a Baltimore City High School Student with an Early School Start Time and Long Commute



MORNING ROUTINE
SCHOOL START TIME (7:30)



3 4 5 6 7 8 9 10 11 M 1 2 3 4 5 6 7

PM

AM

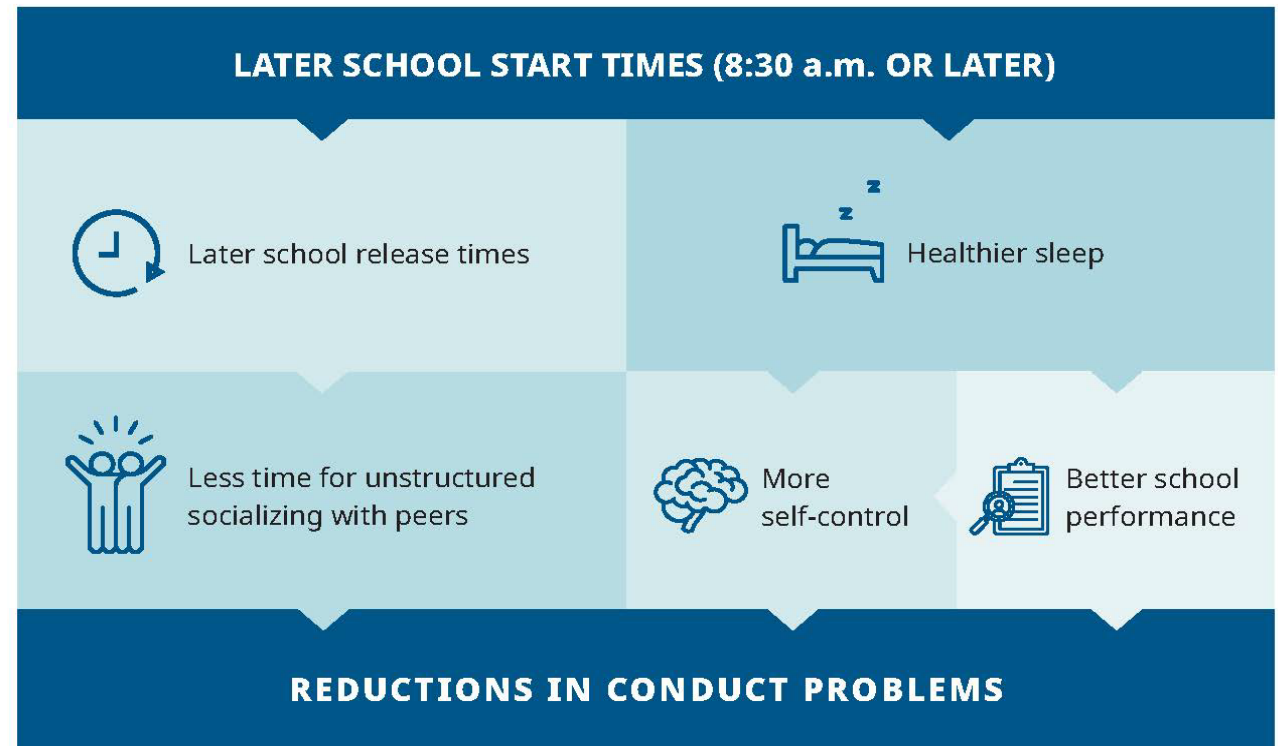
TIME

Leave time range = 6:48-7:58am

What about Later Release Times?

- Immediate hours following release are windows of opportunity for youth misconduct.
- National data: youth-involved violence peaks between 3 - 4 pm on school days.
- Changing rates in **unstructured socializing** explain delinquency trends.
- LOGIC: Later school release may reduce unstructured socializing, and thus delinquency.

Figure 2. Pathways from Later School Start Times to Reduced Delinquency and Misconduct. Adapted from Semenza et al., 2020.



Baltimore City Recommendations

1. Set district-wide parameters (“Guardrails”) limiting how Early schools can require attendance – **means 8:30 might be too early for long urban commutes.**
2. Community sleep health education and engagement.
3. Consider impact of unsupervised after-school hours.
4. Support statewide school start time legislation (MD HB 1418).
5. Address additional social determinants of health on adolescent Sleep.

Abell Report, 2024



Maryland and SSTs



Anne Arundel Co.

- Effective: August 29, 2022
 - ES: 8:00am
 - MS: 9:15am
 - HS: 8:30am

Howard Co.

- Effective September 20, 2023
 - MS: 7:50 – 8:30am
 - HS no earlier than 7:50am

Maryland House Bill 1418:

3 (3) BEGINNING IN THE 2026–2027 SCHOOL YEAR:

4 (I) FOR A MIDDLE SCHOOL, SHALL BEGIN INSTRUCTION NOT
5 EARLIER THAN 8 A.M.; AND

6 (II) FOR A HIGH SCHOOL, SHALL BEGIN INSTRUCTION NOT
7 EARLIER THAN 8:30 A.M.; and

What about Vulnerable Populations?

- Adolescents and emerging adults in the juvenile justice system
- Fostering sleep health for children/adolescents in foster care?



Four Interlocking Studies

Study 1: Sleep Environment Observational Study of DJS Facilities (Summer 2019)

Study 2: DJS Staff and Administrator Interview Study (Summer 2020)

Study 3: Juveniles' Perceptions of Sleep Quality and Environment During Detention (2021)

Study 4: Juveniles' Perceptions of Sleep Quality and Environment following Sleep Health Changes (2022)

Adornetti...Wolfson et al., 2023
Woodard...Wolfson et al., 2024

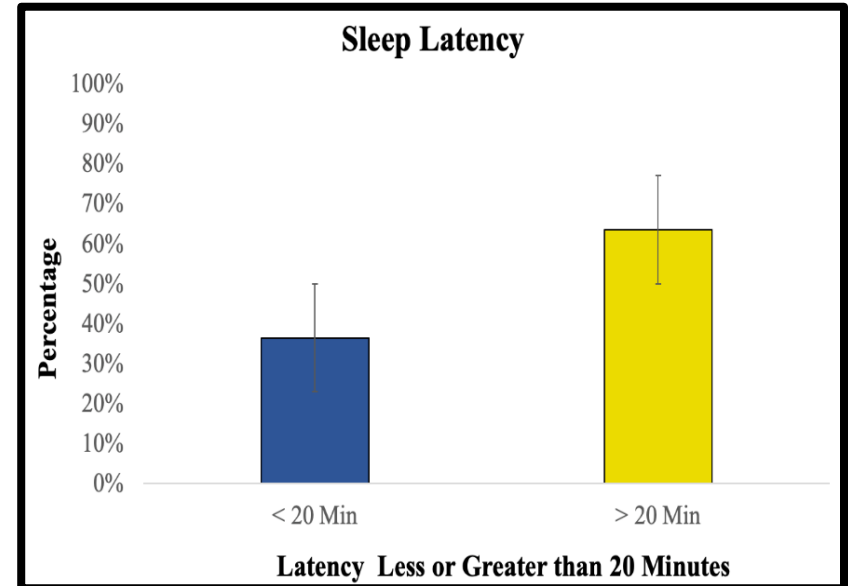
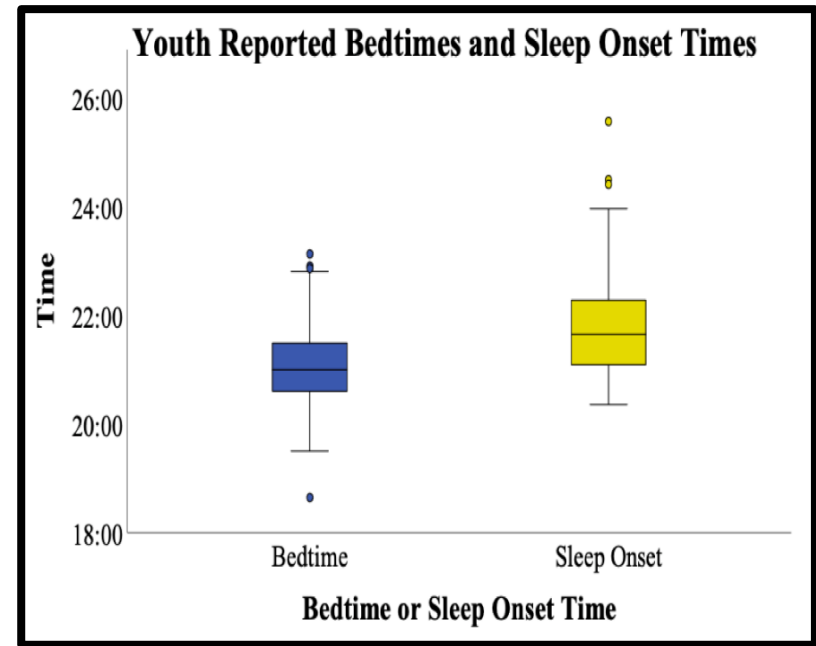
Findings

Schedules

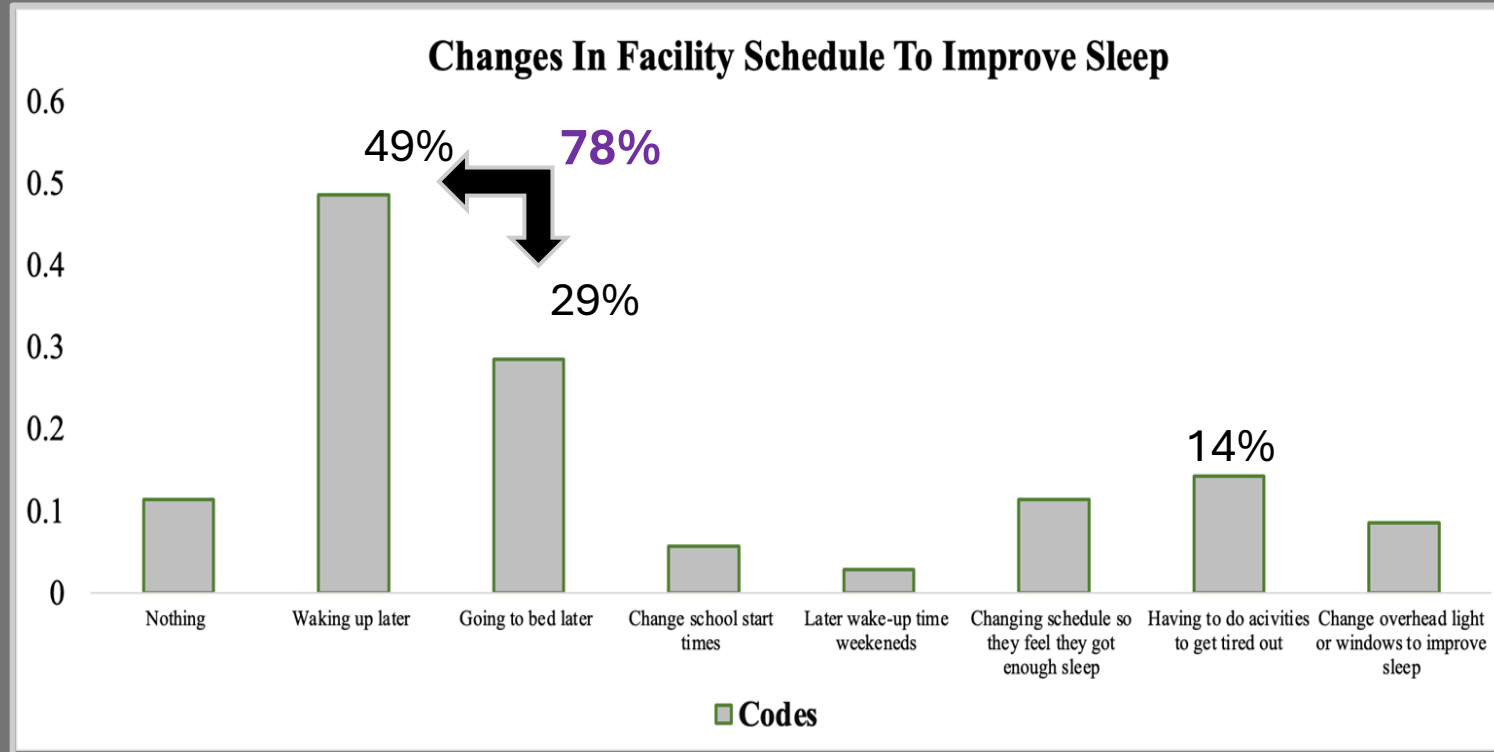
- Bedtimes / **Lights out times** ~50 min earlier than **sleep onset times**.
- Wake / **lights on times** ~20 minutes earlier than time youth reported **leaving their bed**.

Sleep Quality

- Youth reported M = 8.8 hours *sleep/night*.
- Reported M = **49 min to fall asleep**.
- Waking up M = **1.7 times** (17 min) per night.



Youth Perceptions: Debrief Responses



The pillow, the mattress, and the night overhead light which is too bright and on the whole night making it annoying. I am used to the dark. When I put the cover over my head to not see the light, but it's too hot and uncomfortable.

I would like a later wake time. The bedtime is reasonable, but I don't go to bed at that time. After I am locked in, in order to make myself tired, I exercise and read books.

DJS Diagnoses, Interventions, and Medication Use

DJS Behavioral Sleep Studies

- **36% of youth assessed via DJS behavioral sleep study**
- Reasons:
 - Youth complaint of sleep problems
 - Youth report difficulty falling/maintaining sleep
 - Inadequate sleep
 - Other (e.g., light, thrashing in sleep, meds not working)



Most Common Sleep/ Psychiatric Disorders

- **Insomnia: 39%**
- ADHD/Neurodev: 39%
- Trauma/Anxiety (e.g., PTSD): 24%
- Conduct/Impulse Control: 30%
- Substance Abuse: 19%

Psychotropic/Sleep Meds

- 53% one med
- 29% two meds
- **36% Melatonin**
- 21% Trazadone
- 29% SSRI

DJS Sleep Health Changes and Initiatives

System/School schedules

Shifting lights on/off times later

- Revised Schedule: 9pm to 6am
- **Need to delay school start time**

Environment

Dark at night & bright light during the day

- DJS created ability to dim lights at night and/or changing type night lighting
- Eyeshades for most youth to decrease light for sleep
- Increased daylight time & optimal lighting during day
- Decrease noise at night (e.g., TV)

Behavioral & Mental health

Supplemental programs/initiatives

- Sleep/circadian disorder assessments & referral?
- Sleep health education programs for staff!

What Can You Do as MD Sleep Society???

- **Education:** Create sleep health education programs for Baltimore and Maryland Community, particularly youth.
- **Action:**
 - Join the Baltimore City or your county's SSL Chapter to promote developmentally appropriate school hours!
 - Work with MD SSL to pass Start School Later legislation (HB 1418) in Maryland.
 - Publish position statement for Maryland!
- Engage in sleep health initiatives for vulnerable populations.

<https://www.startschoollater.net/md---statewide.html>

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Thank You!!!

Questions???

LOYOLA



 **MARYLAND
SLEEP SOCIETY**