

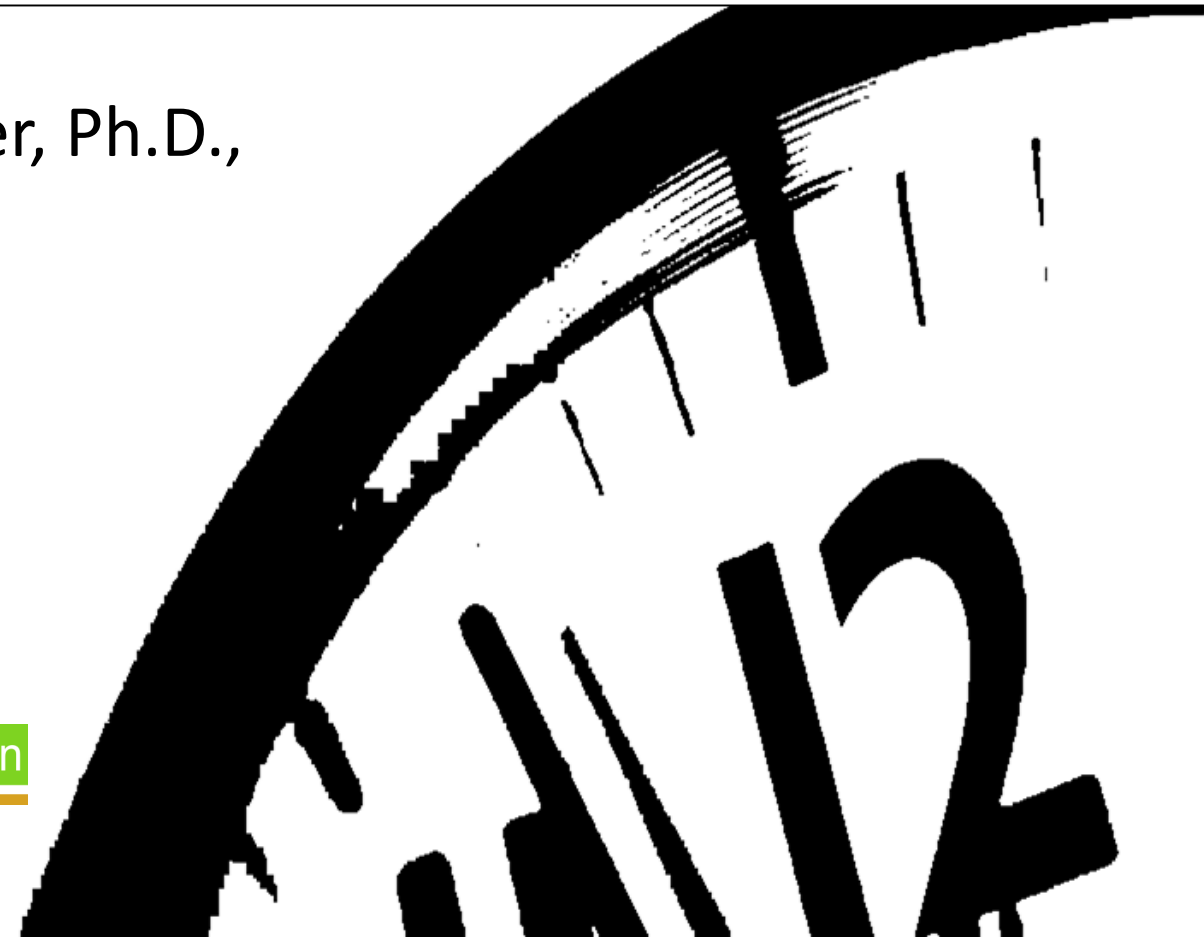
Advocating for School Start Time Changes in Order to Improve Student Sleep, Academic Performance, and Physical/Mental Health

Amy Plog, Ph.D., Lisa J. Meltzer, Ph.D.,
Janise McNally, Ed.S.,



Robert Wood Johnson Foundation

Evidence for Action





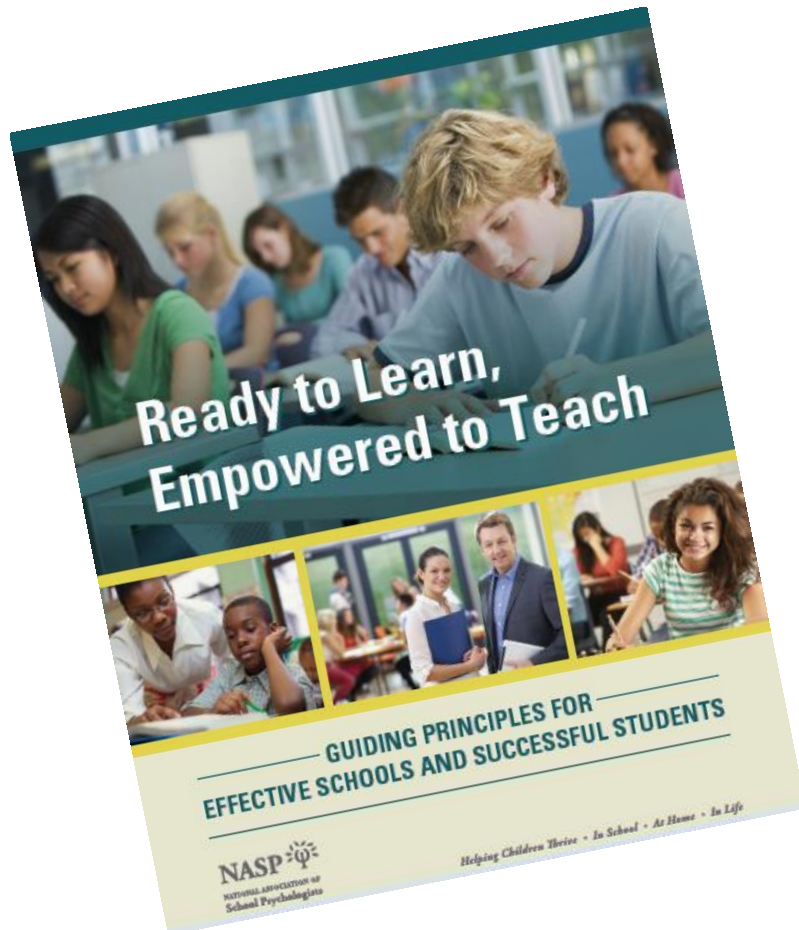
Overview

- Start times & mental health in schools
- Science behind changing start times
- Process of changing start times
- Preliminary outcomes
- Advocating for change

Start Times and Mental Health in Schools

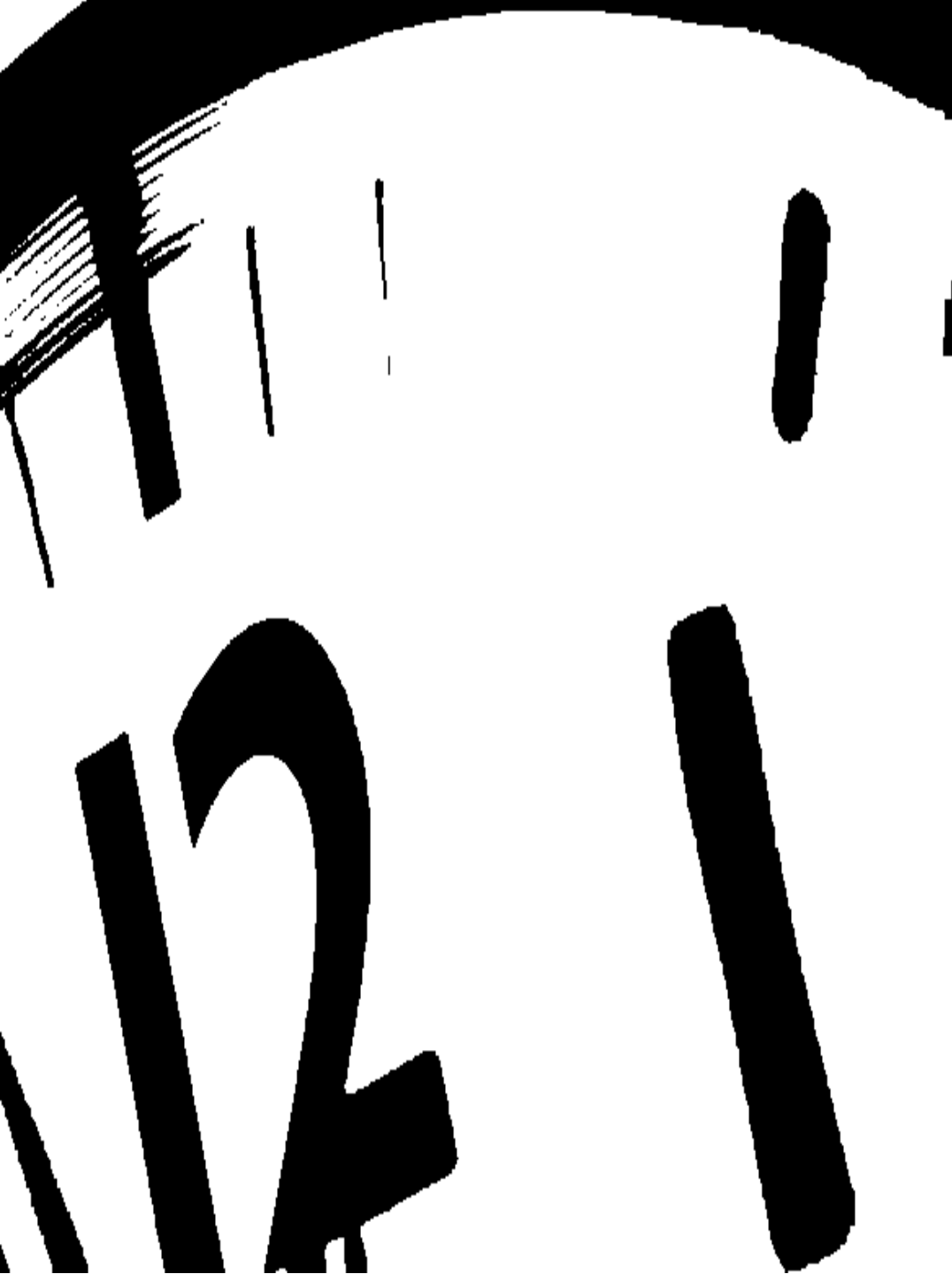
- Failure to obtain sufficient sleep impacts academics & physical/mental health.
- Sleep listed among factors thought to play a role in increasing mental health concerns in the U.S. (Hidaka et al., 2012; Knell et al., 2019; Orben & Przybylski, 2019; Pearson et al., 2019).
- Sleep quantity and quality may contribute to racial/ethnic disparities in academic achievement (Levy et al., 2016).
- School mental health professionals should play a larger role in discussions of policies that impact student sleep (Buckhalt et al., 2009).

“To be able to learn, children must come to school each day feeling healthy, safe, welcomed, and supported.”



Whole School **Whole Community** Whole Child

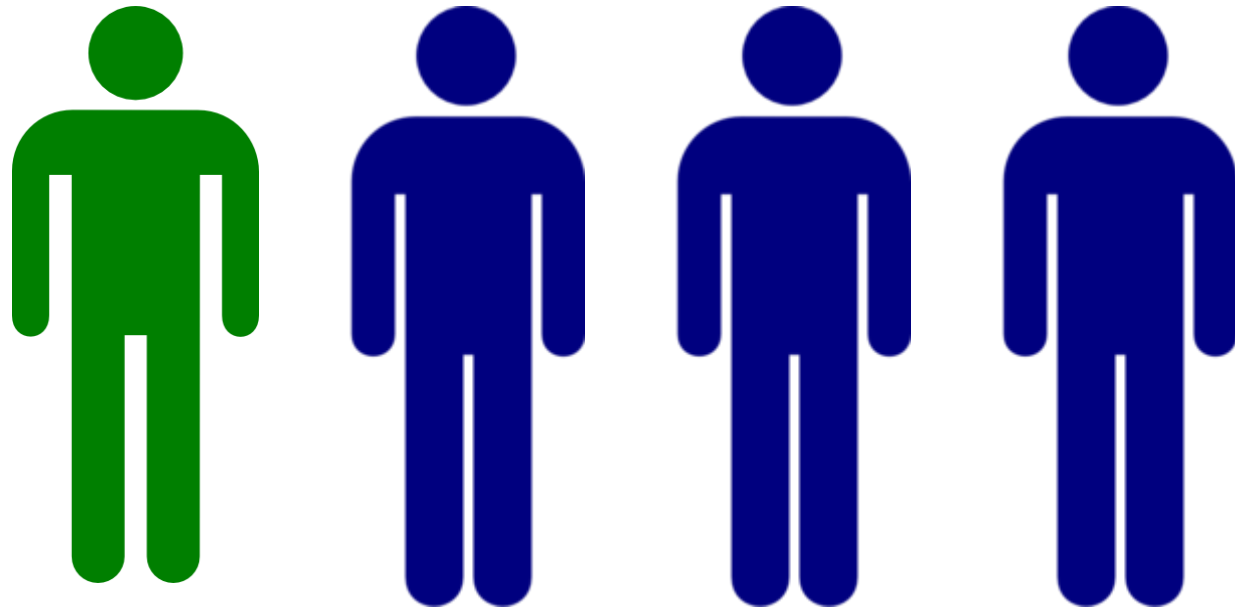




*Science Behind
Changing Start
Times*

**Adolescents need 8.5 to 9.25 hours
of sleep per night**

**75% of adolescents in the United States
get 7 hours or less per night**



So?

Sleep doesn't matter

I sleep less than that and do just fine

Sleep is for slackers

WRONG!!

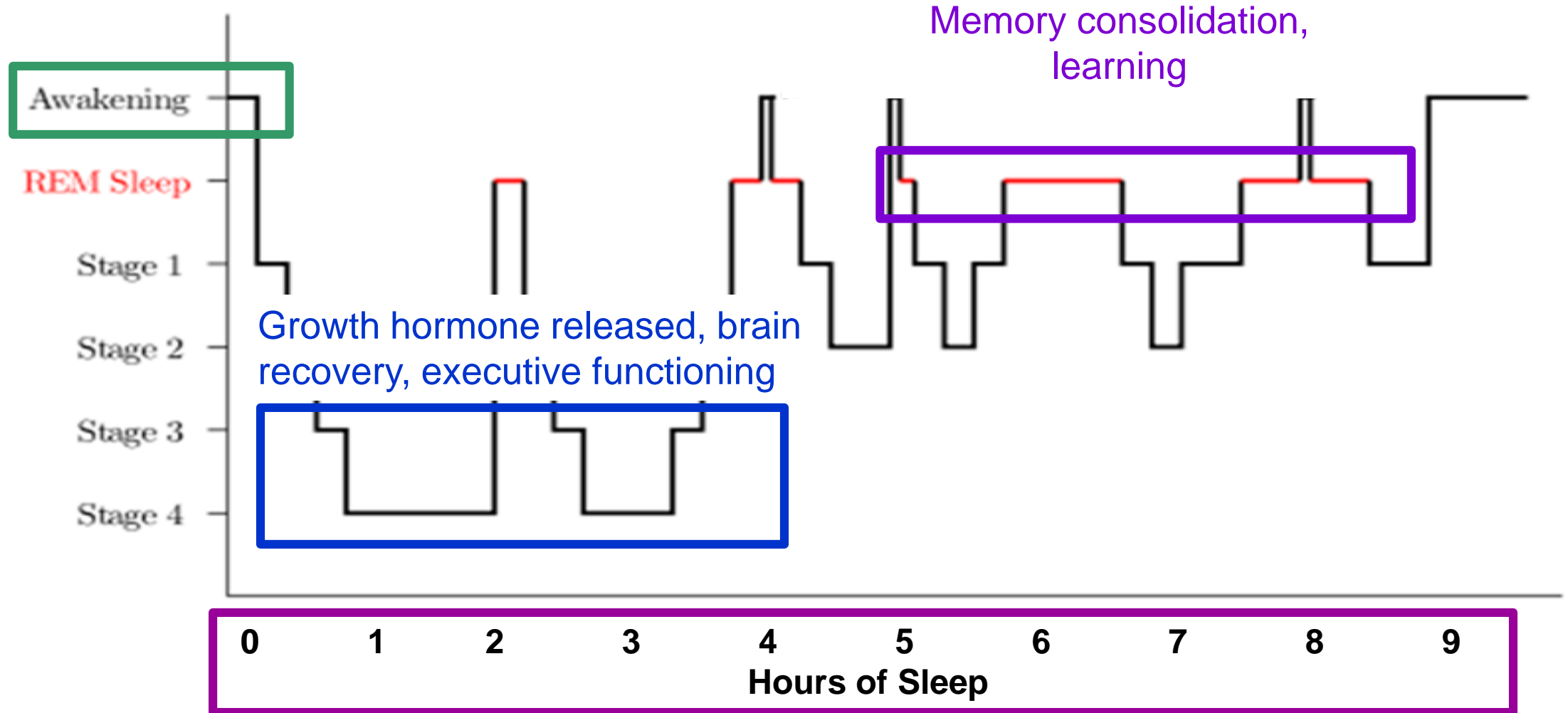
You have to breathe

You have to eat

You have to sleep!

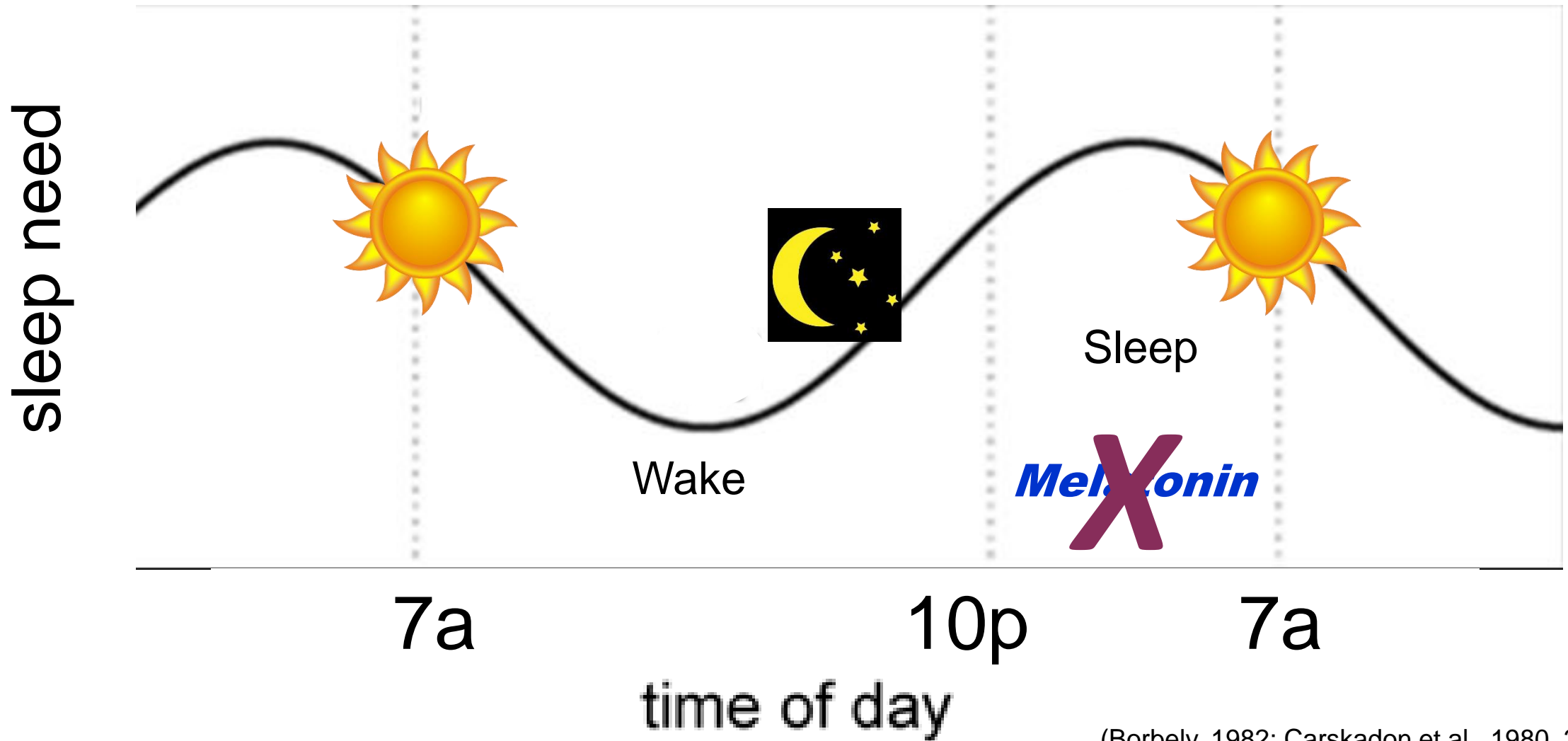
Sleep is not an optional luxury, but is essential for health, daytime functioning, and well-being

Stages of Sleep



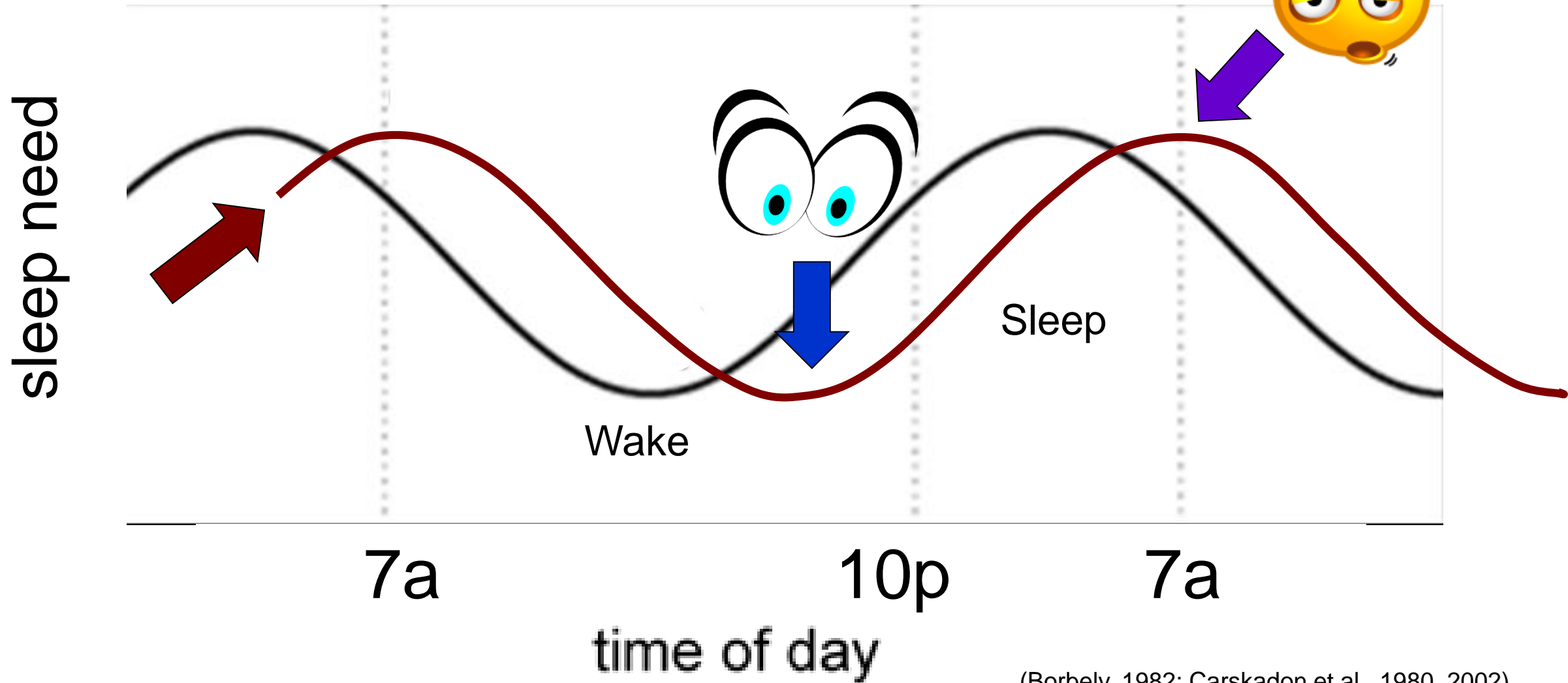
*Well if my teen just turned off
his phone and went to bed
earlier, then he wouldn't have
any problems waking up*

Process C - Circadian Rhythm



(Borbely, 1982; Carskadon et al., 1980, 2002)

Circadian Misalignment



(Borbely, 1982; Carskadon et al., 1980, 2002)

Faces of Deficient Sleep



Deficient Sleep in Children/Adolescents

- Mood and affect changes
- Behavior problems
 - Non-compliance
 - Aggression
 - Hyperactivity
 - Poor impulse control
- Risk taking behaviors and increased accidents



Deficient Sleep in Children/Adolescents

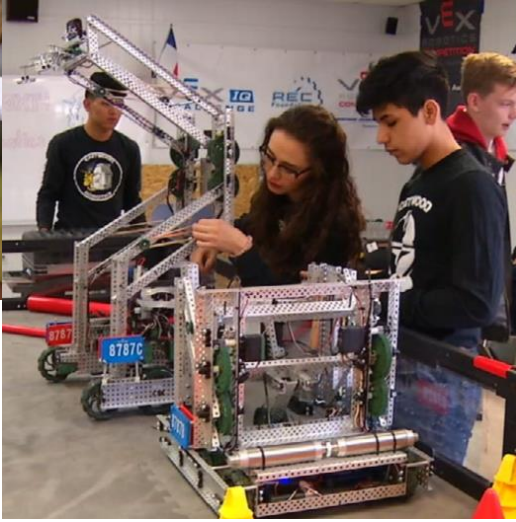
- Neurocognitive deficits
 - Attention
 - Memory
 - Executive functioning
- Weight gain
 - Increased caloric intake
 - Increased consumption fats and carbs



Signs of Deficient Sleep



- Needs to be awakened in morning
- Sleeps 2+ hours on weekends or vacations than weekdays
- Falls asleep in school or other inappropriate times
- Behavior/mood differ following nights of increased sleep



Extrinsic Sleep Disruptors

Later School Start Time Outcomes

- Multiple studies have demonstrated the benefit of changing to a later school start time...
- Students getting > 8 hours sleep/night
- Better academic outcomes
- Better attendance rates
- Higher graduation rates
- Reduced tardiness
- Less depression
- Less caffeine use
- Fewer car crashes

Recommendation to start middle/high schools no earlier than 8:30 a.m.

American Academy of Pediatrics

Centers for Disease Control and Prevention

American Medical Association

American Thoracic Society

American Academy of Child and Adolescents Psychiatrists

American Psychological Association

American Academy of Sleep Medicine

American Association of Sleep Technologists

National Educational Association

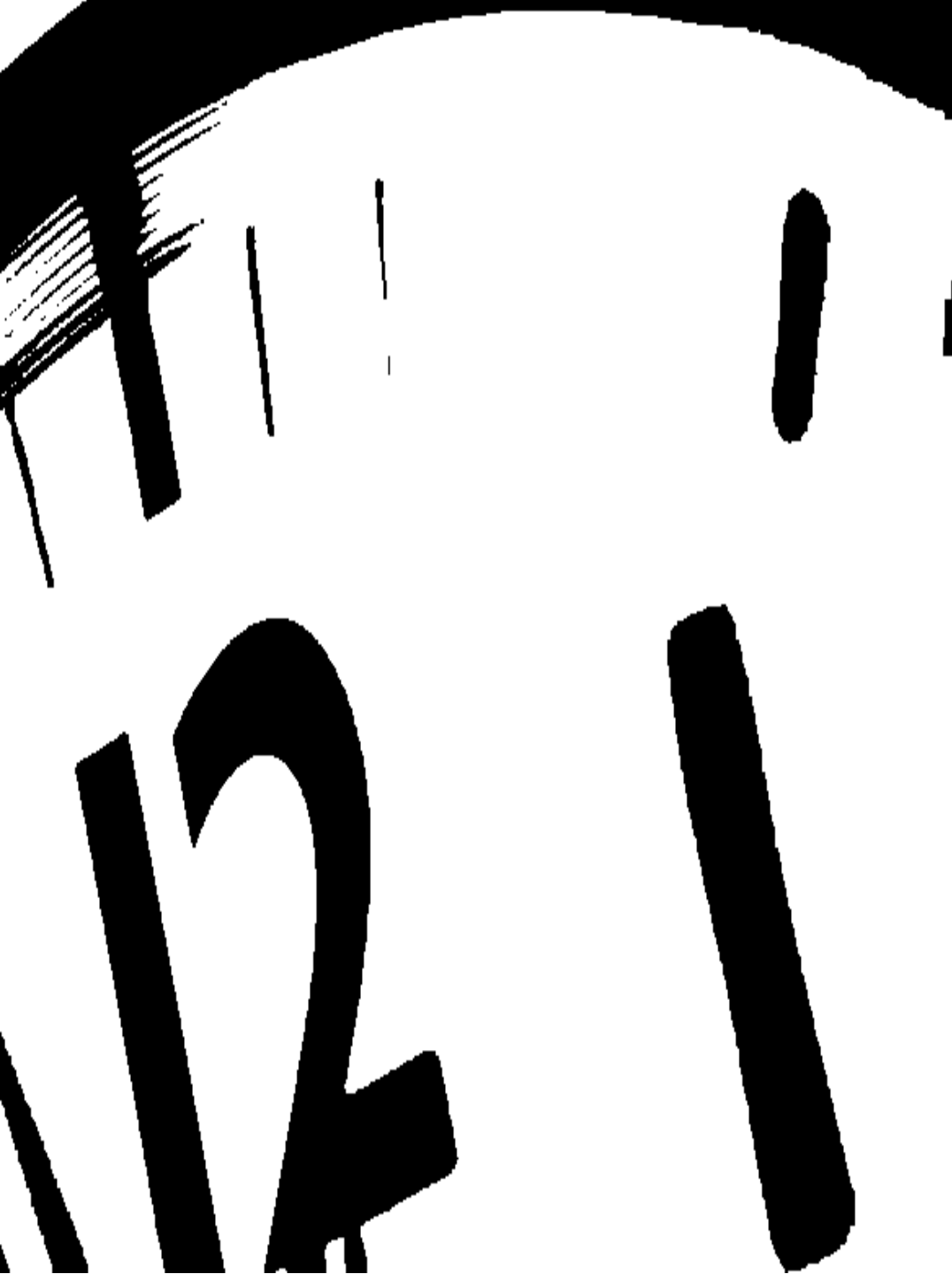
National Parent Teacher Association

National Association of School Nurses

Less than 20% of
high schools in the
United States start
at or after 8:30 a.m.

Take Home Message: Science of Start Times

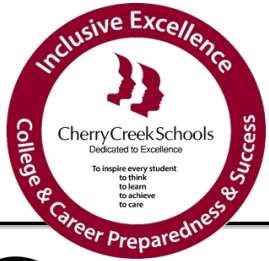
- Sleep essential for learning and health
- Adolescents significantly sleep deprived, with school start times as one of the strongest contributing factors
- Changing start times is not coddling students, but setting them up for success in life



Process

Cherry Creek School District (CCSD)

- 4th largest district in Colorado (~55,000 students)
- 53% White, 20% Hispanic
- 29% Free/reduced lunch (range 4% - 80%)
- Southeast Denver metro area with a geographic footprint 108 square miles



2021

Adopted Recommendations

CHERRY CREEK

District Goals

College and Career

Preparedness and Success

Inclusive Excellence

Credit Requirements

Credits to Graduate

Online Opportunities

Competency Demonstration

College and Career Ready

Demonstrations

College & Career Readiness

Innovation

Career & Innovation Center

Social & Emotional

Wellness, Mental Health

Life Skills, PBIS/SOS

Achievement

Continuous Improvement/PLC

Articulation & Rigor

System of Interventions

Early Literacy Focus

Aligned Math Programming

School Structure

Mobility & Student

Achievement

Later High School Start Times

Progress Toward Future Goals

Naviance 6-12

Feeder College & Career

Planning Guide

- 12 month strategic planning process
- Public meetings in all communities
- New graduation requirements
- Served as the basis for the successful 2016 bond and budget election
- Informal survey of participants on their “tolerance” for changing start times
- If we are “Dedicated to Excellence we must address start times”

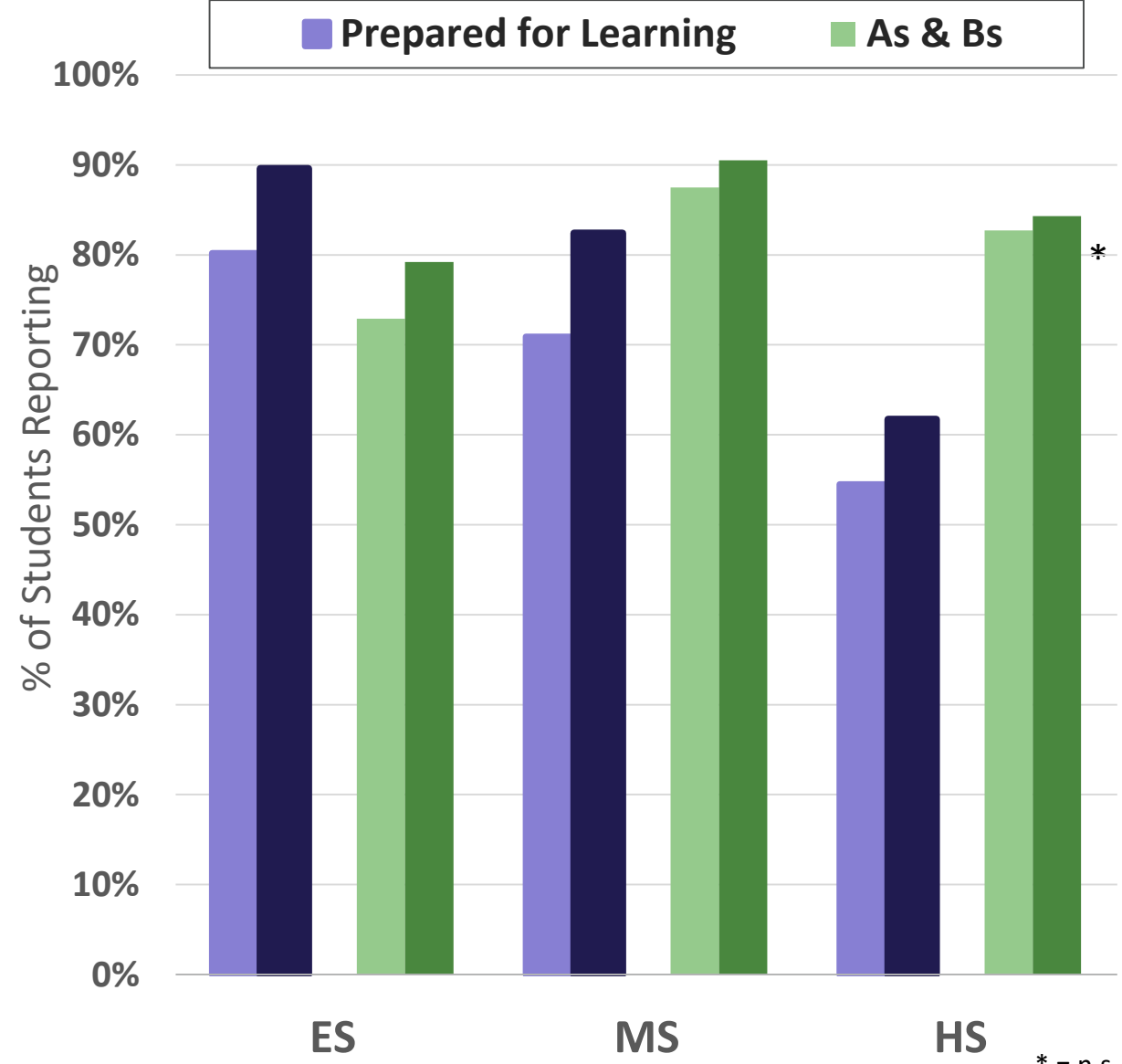
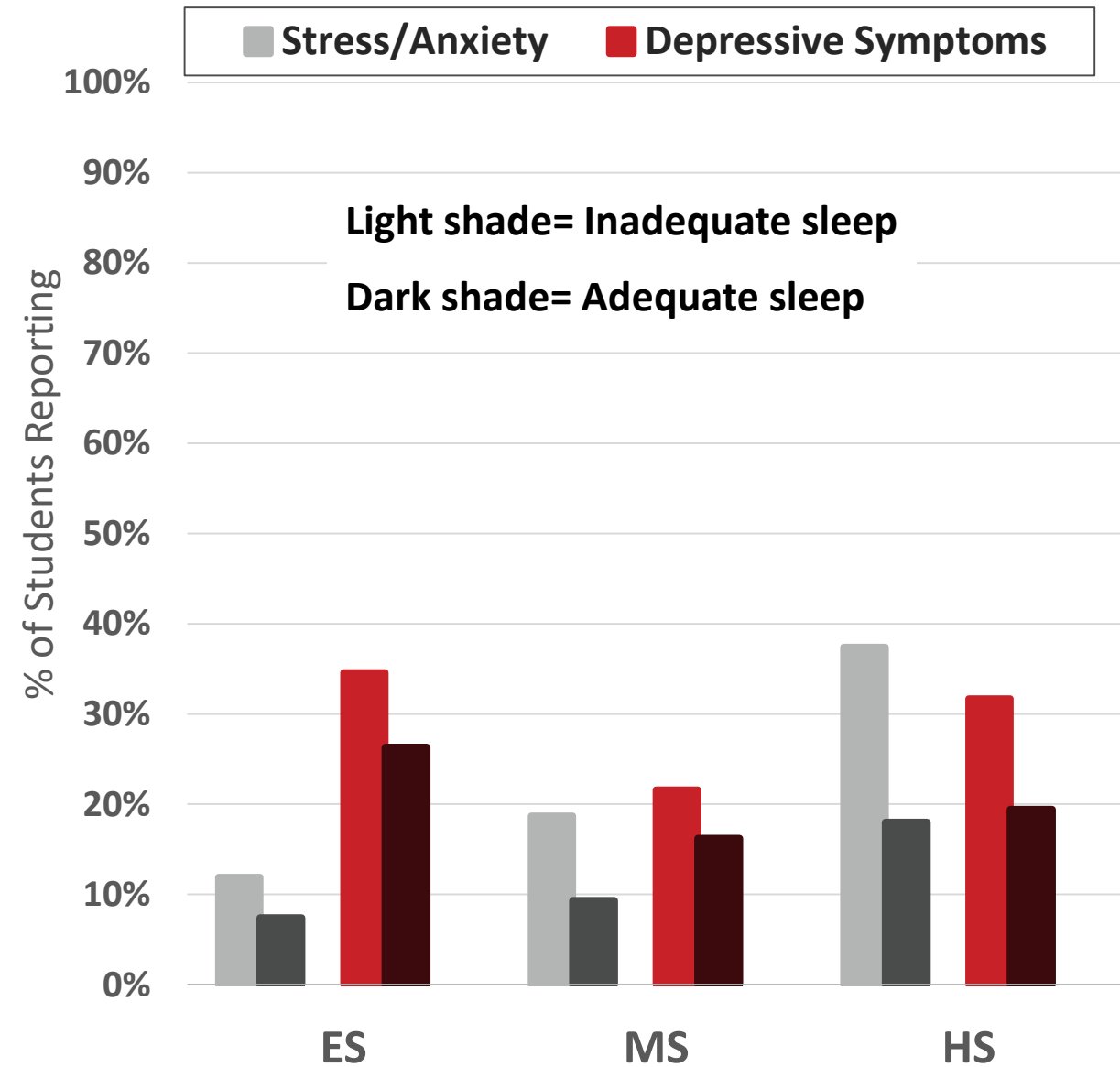




Whole School **Whole Community** Whole Child



Mental Health Concerns and Academic Outcomes for Students with and without Adequate Sleep



* = n.s. difference

Process

2015 – Nov 2016: Study, Research, Best Practices, Community Involvement, Survey



Start Times Task Force

**MET FOR 18+ MONTHS TO STUDY, REVIEW AND
IDENTIFY RATIONALE AND CONSTRAINTS REGARDING
AN ADJUSTMENT TO START TIMES**

Dr. Scott Siegfried	Associate Superintendent
Brooke Gregory	Assistant Superintendent, EdOp
Todd Fukai	Assistant Superintendent, Human Resources
Sarah Grobbel	Executive Director – High School
Dr. John Kennedy	Executive Director – Middle School
Chris Smith	Executive Director, Elementary Education
Dr. Tera Helmon	Executive Director, Elementary Education
Jennifer Perry	Executive Director, Elementary Education
Gwen Hansen-Vigil	Principal, Eaglecrest High School
Kim Rauh	Principal, Cherokee Trail High School
Ryan Silva	Principal, Cherry Creek High School
Dr. Lisa Sprague	Principal, Grandview High School
Allison Witkin	Principal, Adaptive Programs
Nickie Bell	Principal, Horizon Middle School
David Gonzales	Principal, Prairie Middle School
Roberta Ballard	Principal, Arrowhead Elementary School
Chris Hardy	Principal, Sunrise Elementary School
Scott May	Principal, Peakview Elementary School
Kyle Sorg	Principal, Homestead Elementary School

Michael Giles	Executive Director, Inclusive Excellence
Dr. Floyd Cobb	Executive Director, Curriculum & Instruction
Dr. Norm Alerta	Director, Assessment & Evaluation
Sheryl Cunningham	CCEA Association President
Holly Drake	Teacher, Overland High School
Scot Kaye	Teacher, Liberty Middle School
Kristin Chaney	Teacher, Rolling Hills Elementary School
John Eyolfson	District Coordinator, Science
Janise McNally	District Coordinator, Health & Wellness
Dr. Amy Plog	Research & Data Coordinator
Gincey Mansfield	Executive Assistant
Mike Hush	Director of Transportation
Erika Edwards	Director of Food and Nutrition Services
Chardonnay Adams	Route Planning Manager - Trans
Jim Parker	QA / Personnel Resources Manager - Trans

In addition to the task force...

Best Practices – Task force + visits to other districts who made the change

Administrative – Legal/HR review, discussions at administrator meetings

Staff Engagement – Discussions at staff meetings, letter to all staff, staff survey

Parent/Community Engagement – Discussions at parent/community meetings, parent/community survey and opportunity to provide feedback

Student Feedback – Discussions with high school student groups, student survey, and opportunity to provide feedback

Community Survey

Online Survey Overview

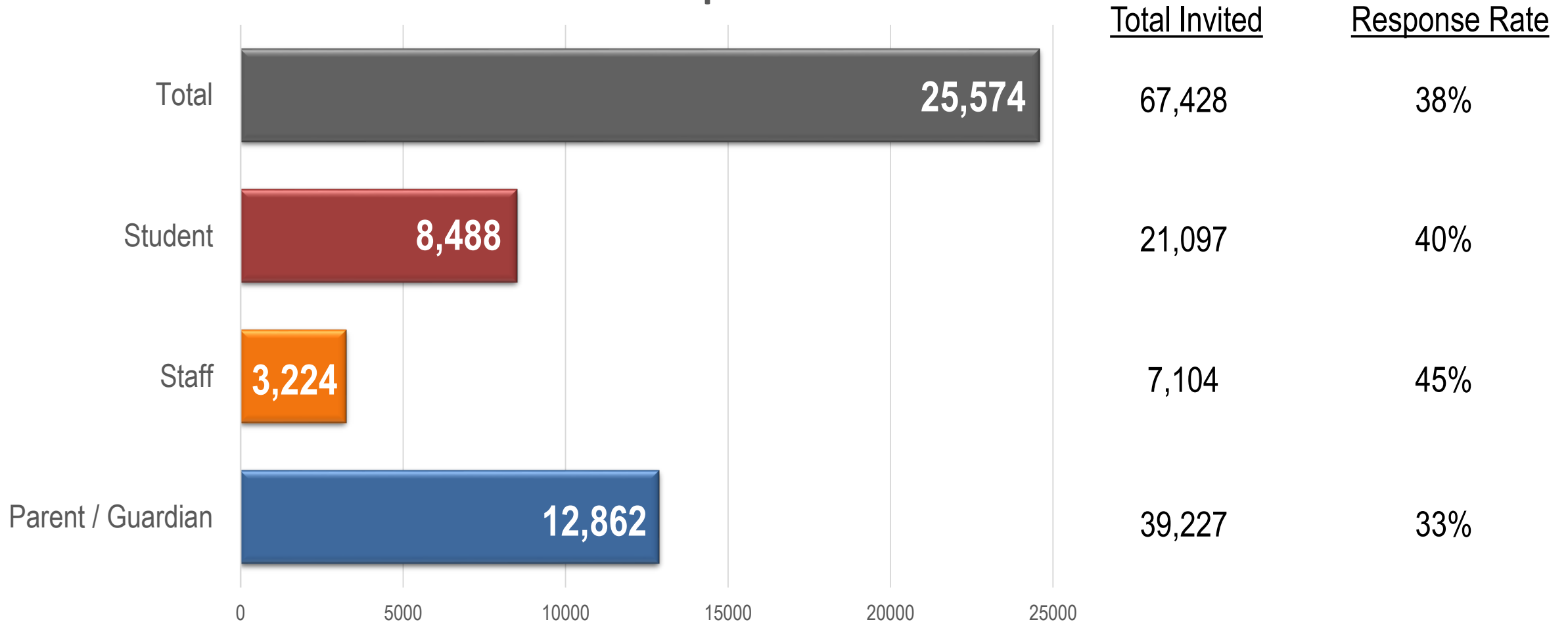
- Developed by the School Start Times task Force
- Reviewed by the District Accountability Committee
- 12 questions designed to elicit “tolerance” and “preference” for change

Process

- Notifications to all parents via phone and email messages
- Survey open for 10 days
- Results analyzed and posted online for review

Q1 - RESPONDENTS

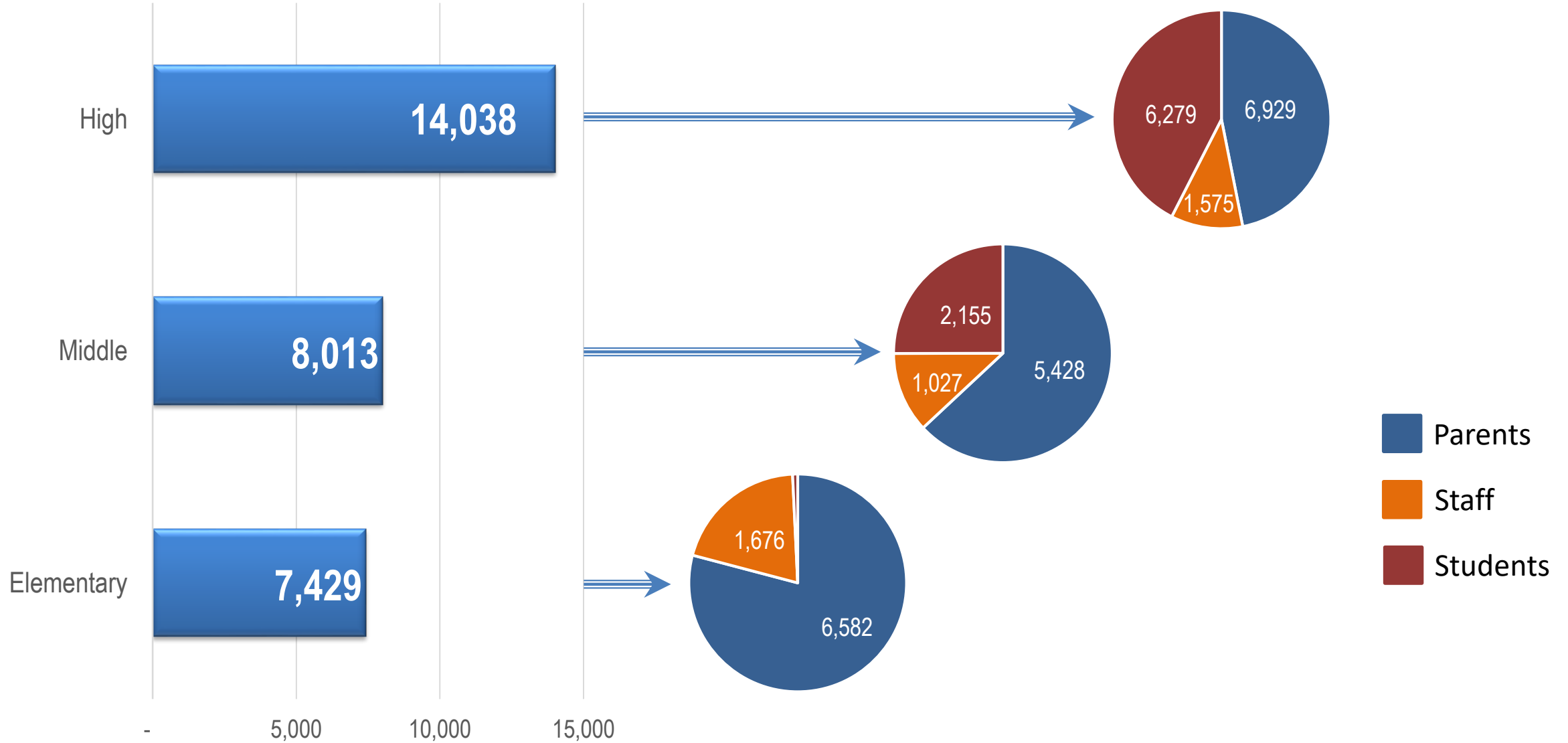
Number of Responses



Significant and unprecedented response rate

Q2 – RESPONDENTS – Level of School They Represent

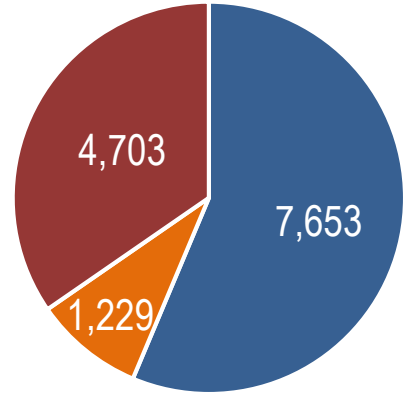
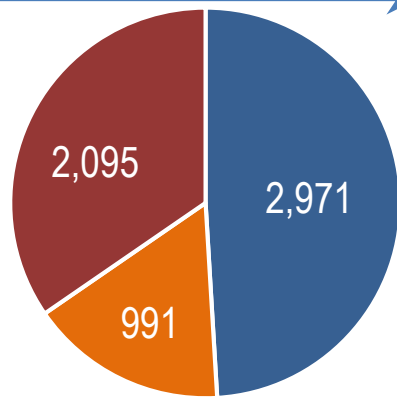
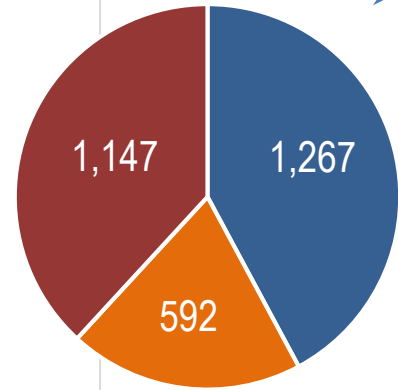
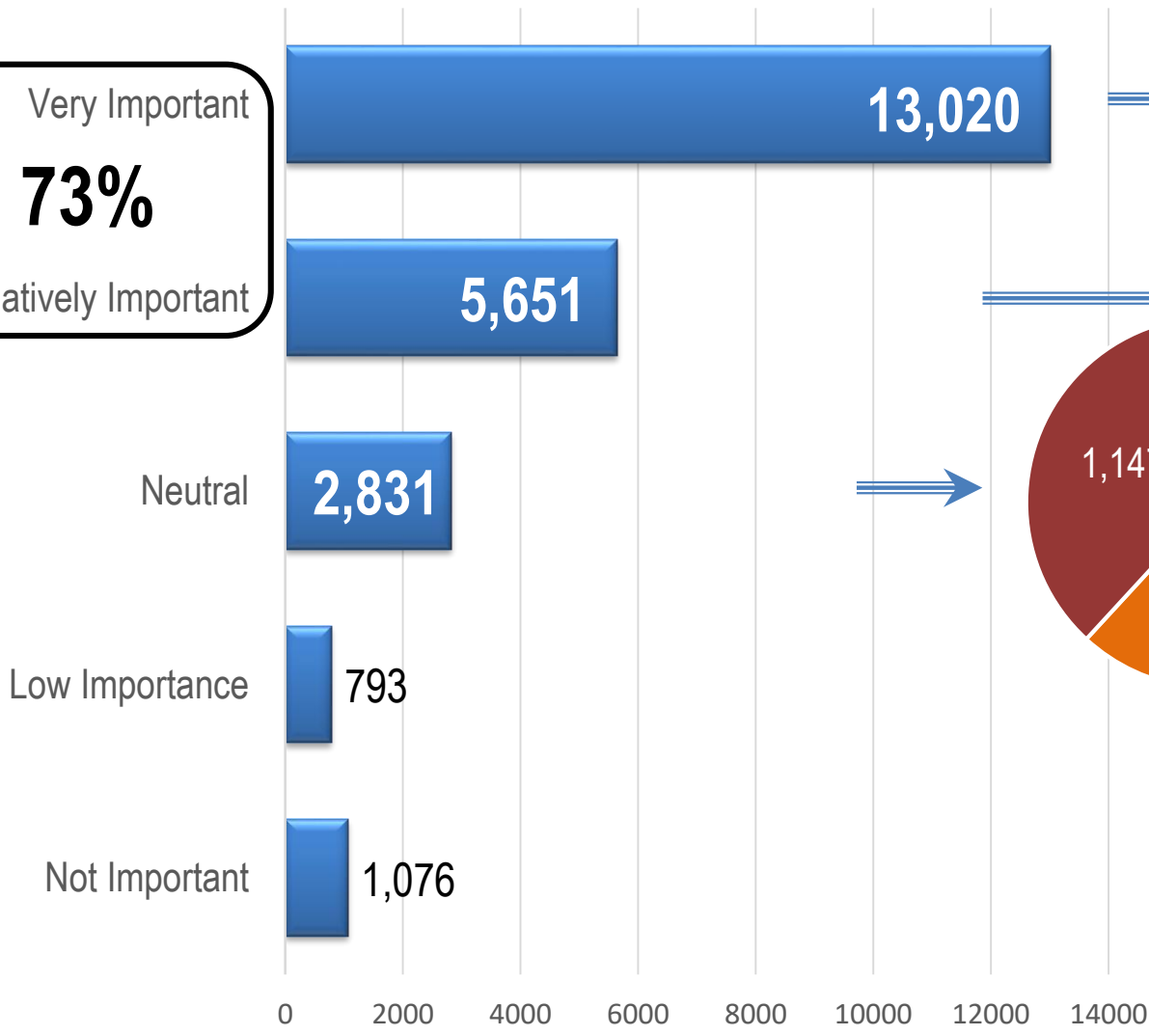
All Responses



Q4 – How Important is This Issue?

All Responses

Very Important
73%
Relatively Important

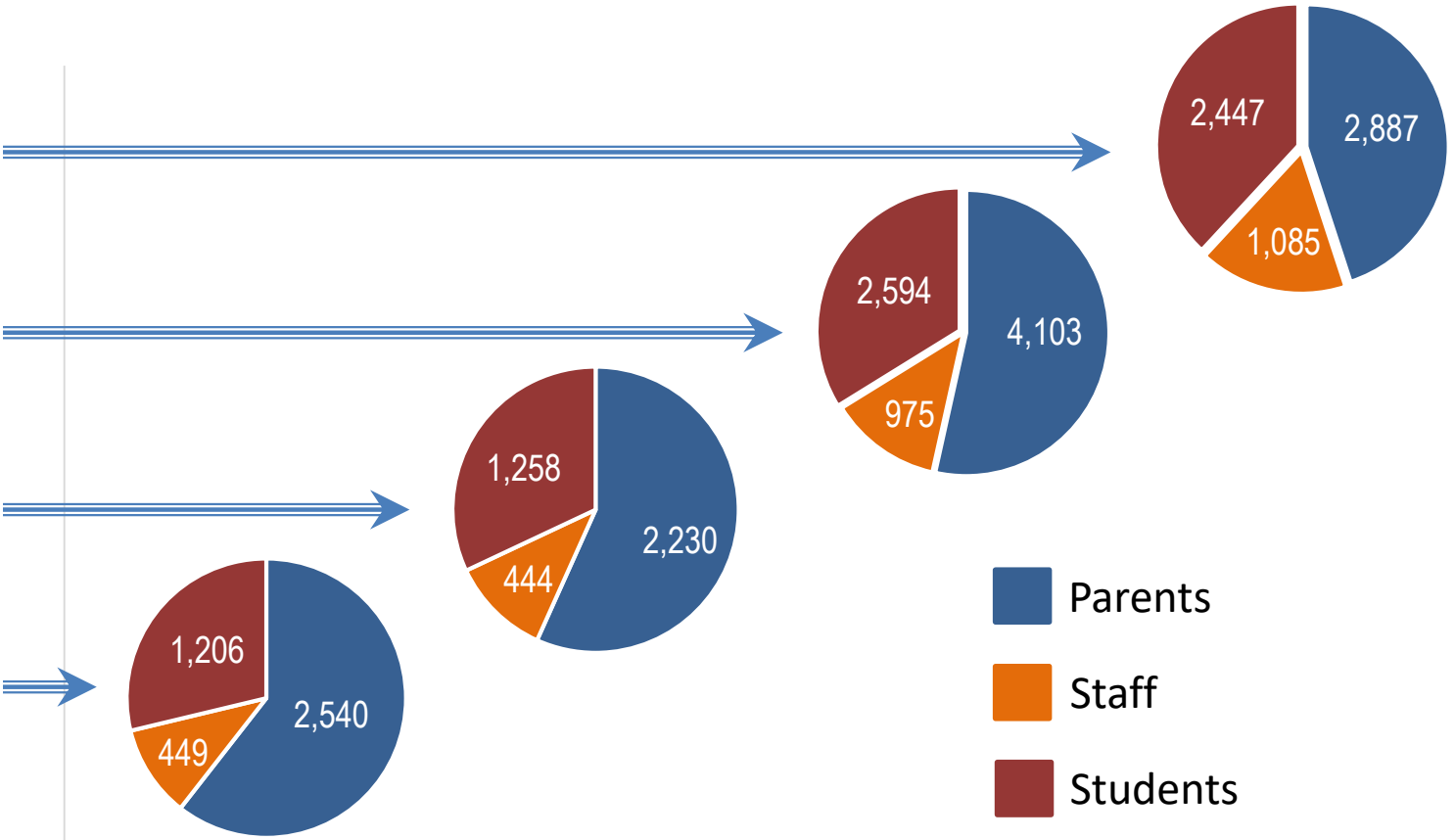
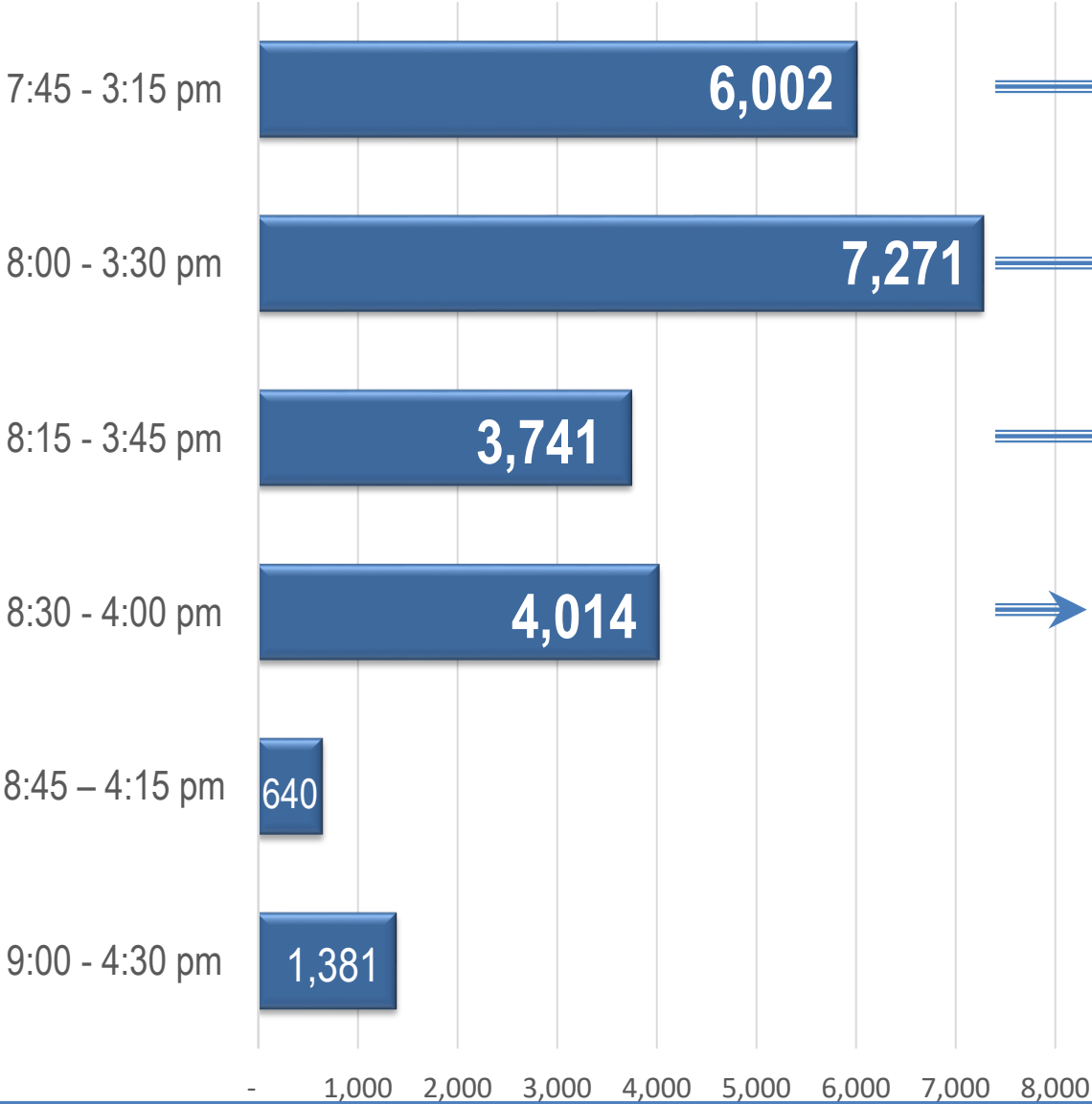


Parents
Staff
Students

It is evident this is an important concern in our community across all groups of respondents.

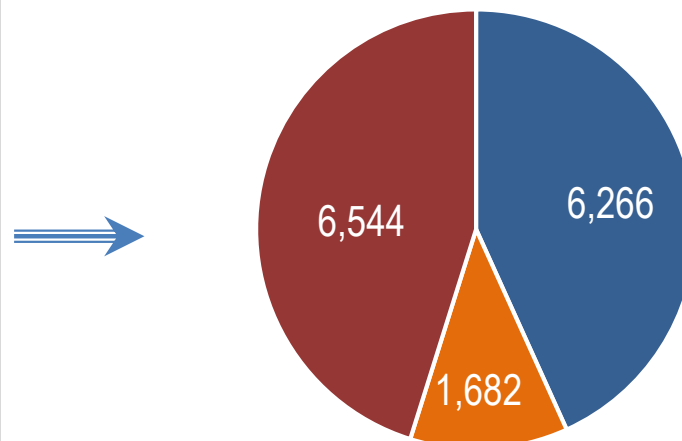
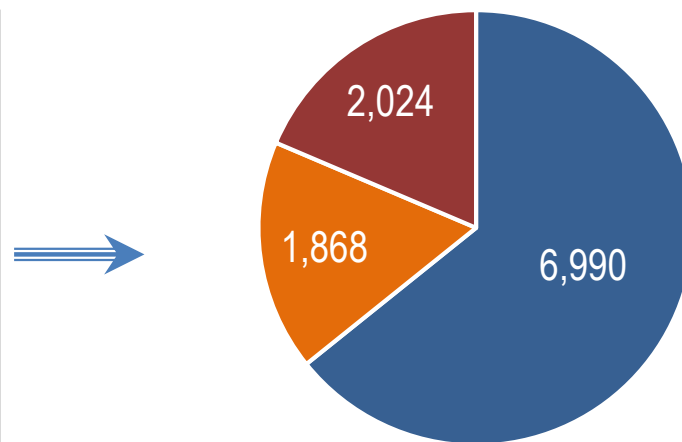
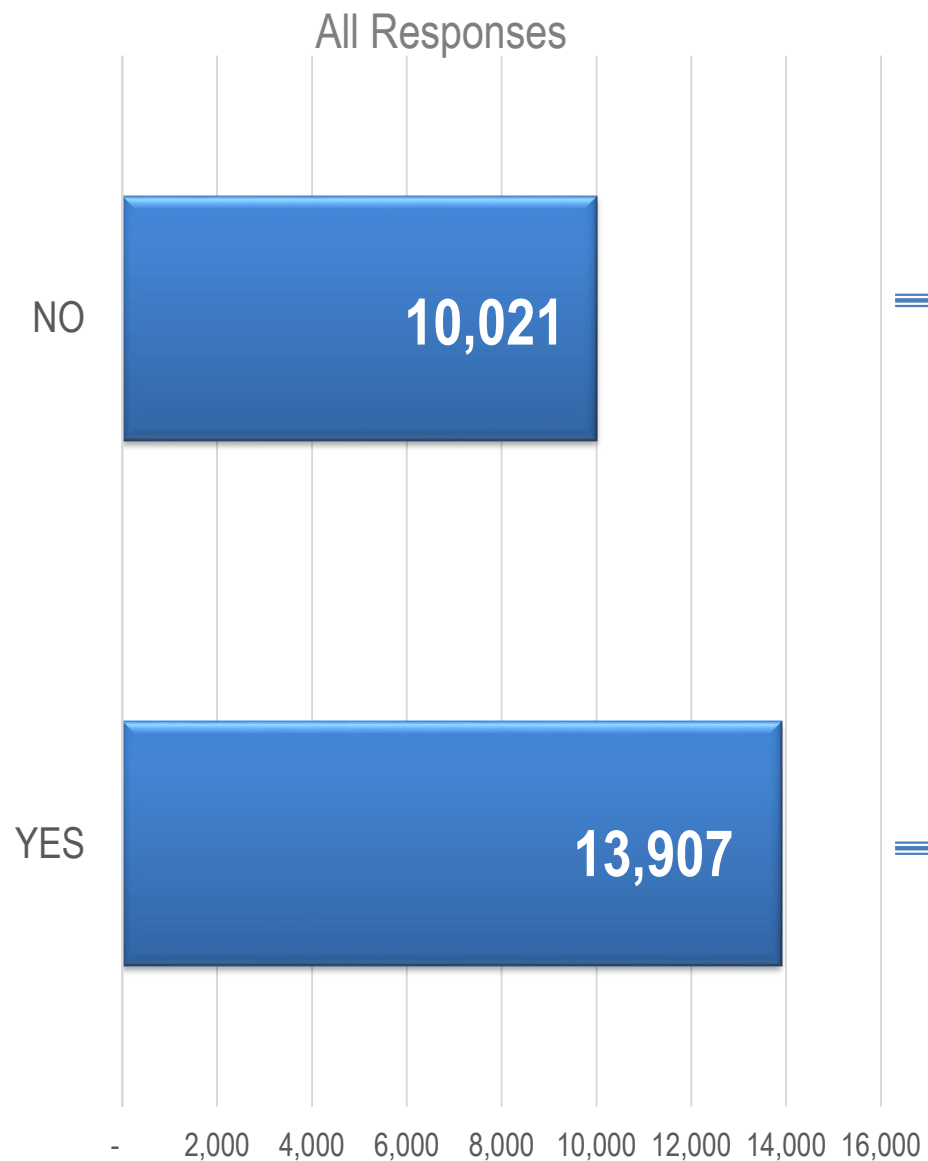
Q5 – Ideal High School Start and End Times?

All Responses



- Parents
- Staff
- Students

Q9 – Is it Important that Secondary Students Dismiss First to Provide Supervision to Younger Siblings?



- Parents
- Staff
- Students

More parents and staff don't find it necessary to dismiss secondary first – students trended the opposite way making it appear more families require older sibling support for daycare.

Process

2015 – Nov 2016: Study, Research, Best Practices, Community Involvement, Survey

Dec 2016 – Feb 2017: Model Development, Publication, Feedback

Initial Recommendation



	<u>Start</u>		<u>Dismiss</u>
Elementary School	7:55 am	—	2:40 pm
High School	8:15 am	—	3:30 pm
Middle School	8:50 am	—	3:45 pm

Process

2015 – Nov 2016: Study, Research, Best Practices, Community Involvement, Survey

Dec 2016 – Feb 2017: Model Development, Publication, Feedback

Feb 2017: Further Refinement, Final Recommendation, Feedback



Start Time Model

Final Recommendation

Based on

- ...research*
- ...best practices*
- ...community survey*
- ...community feedback*
- ...budget neutral*

CCSD Change in Start Times

	2016 – 2017	2017 - 2018
Elementary	9:00 a.m. to 3:30 p.m.	8:00 a.m. to 2:45 p.m.
Middle	7:50-8:10 a.m. to 2:50-3:10 p.m.	8:50 a.m. to 3:45 p.m.
High	7:10 a.m. to 2:30-2:51 p.m.	8:20 a.m. to 3:30 p.m.

Process

2015 – Nov 2016: Study, Research, Best Practices, Community Involvement, Survey

Dec 2016 – Feb 2017: Model Development, Publication, Feedback

Feb 2017: Further Refinement, Final Recommendation, Feedback

March 2017: Board of Education Decision

Process

2015 – Nov 2016: Study, Research, Best Practices, Community Involvement, Survey

Dec 2016 – Feb 2017: Model Development, Publication, Feedback

Feb 2017: Further Refinement, Final Recommendation, Feedback

March 2017: Board of Education Decision

August 2017: Implementation

Weekly task force meetings

- Included 40 staff representing all departments and levels, including the CCEA president
- Focused on issues at individual levels
 - High School: no new activities allowed before school
 - Middle School: supervised breakfast and study hall to allow students to be dropped off early
 - Elementary School: extra time in day allows for additional recess
- Transportation
 - Allows for most vulnerable students to be picked up on time

Promoting Healthy Sleep Behaviors

- Important to maximize the positive impact
- Provide information to students and parents about healthy sleep habits: sleep needs, consistent bedtime routines, and limits to technology and caffeine

HEALTHY SLEEP HABITS

The following recommendations help to provide the best quality sleep every night.

- Have a consistent sleep schedule.**
Wake up and go to bed at about the same time on weeknights and weekend nights. Bedtime and wake time should not differ from day to day by more than an hour.
- Do not consume caffeine after lunchtime.**
Caffeine will still be helping you stay awake 4 to 6 hours after you take it, which makes it hard to fall asleep! Be aware of all the things that have caffeine. Many sodas, coffee, iced tea, and dark chocolate have caffeine, but you can also find caffeine in products like certain waters, juice drinks, gum, and candy bars.
- Create an environment that is only for sleeping.**
This means the bedroom should be comfortable, quiet, and dark. It is very important to get all technology (TV, cell phones, computers, tablets, etc.) out of the bedroom.

Sleep Needs

Age Group	Hours per Day
PRESCHOOLERS (3-5 years)	10-13 hours per day
SCHOOL-AGED (6-13 years old)	9-11 hours per day
ADOLESCENTS (14-17 years)	8-10 hours per day

Healthy sleep habits will help you fall asleep faster, stay asleep, and wake more refreshed in the morning. Consistency in following these rules is essential to achieve quality sleep.

COMPREHENSIVE WELLNESS STRATEGY
Cherry Creek Schools

Dedicated to Excellence
Cherry Creek Schools

Recommendations adapted from Meltzer & Crabtree, 2015

HEALTHY SLEEP CHALLENGE

March 2018

- FEEL GREAT**
Healthy sleep recharges your mood, enabling you to feel your best and have a more optimistic attitude toward life.
- EXCEL IN SCHOOL**
Sleep recharges your brain, helping you excel in the classroom by maximizing your attention, memory and learning ability.
- PERFORM YOUR BEST**
Sleep recharges your energy for peak performance in sports, making you faster, stronger and more accurate.
- LOOK BETTER**
Sufficient sleep recharges your health, helping you to look your best and maintain a healthy weight.

Open to Cherry Creek Schools students, staff and families.
Challenge starts March 5! Register now at: challenge.ccsdfit.org

CCSDFIT
Cherry Creek Schools
Feel Your Best. Be Your Best.

Dedicated to Excellence
Cherry Creek Schools

Students, win valuable prizes for successfully completing the challenge!

Take Home Message:

Process of Changing Start Times

- Stakeholder engagement critical at all levels
- Need buy in from administration
- Change is hard, need to consider the ripple effect and help the grown ups solve the grown up problems to help students succeed
- Sleep health is more than just changing start times

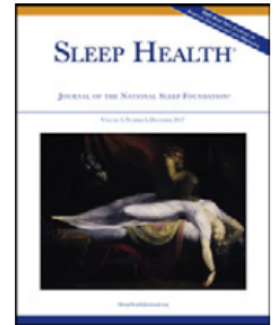


Contents lists available at ScienceDirect

Sleep Health

Journal of the National Sleep Foundation

journal homepage: sleephealthjournal.org



Engaging the community in the process of changing school start times: experience of the Cherry Creek School District



Lisa J. Meltzer, PhD ^{a,*}, Janise McNally, EdS ^b, Amy E. Plog, PhD ^b, Scott A. Siegfried, PhD ^b

^a National Jewish Health, Denver, CO

^b Cherry Creek School District, Greenwood Village, CO



Evaluating Outcomes



Robert Wood Johnson Foundation

Evidence for Action



Comprehensive Outcomes Evaluation

- **Quantitative surveys of students (grades 6-11),** parents (grades K-11), teachers/staff/transportation employees
- District level-data (i.e., attendance, tardy, test scores)
- **Cohort with parent consent to link survey data** year-over-year, and link surveys to district-level data
- Qualitative data collection with key stakeholders
- **Biennial anonymous surveys** of health and risk behavior
- School nurse visits (time of day, presenting problems)
- Community data from CDOT and law enforcement

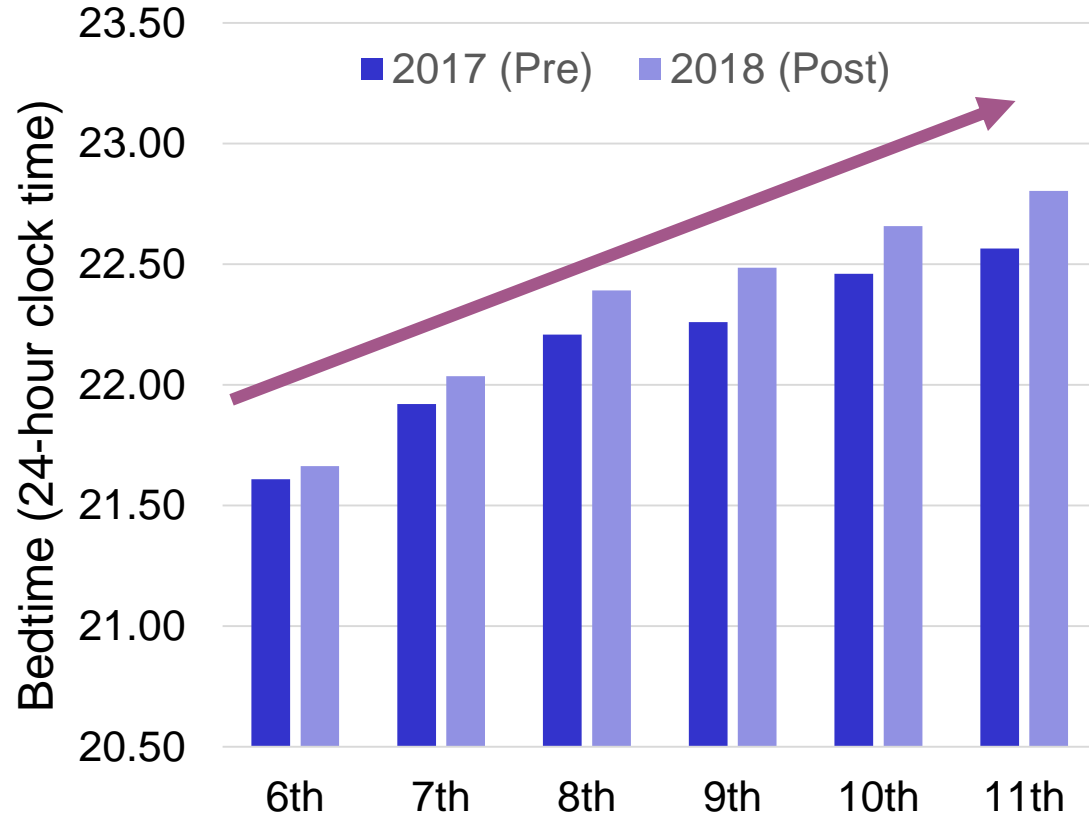
Student Surveys

- Online surveys completed by CCSD MS/HS students
 - **Spring 2017 n = 15,700**
 - **Spring 2018 n = 18,607**
- Cohort: link data across years and to district level data
 - **Middle School n = 1,224**
 - **High School n = 934**
- Questions focused on sleep and well-being
 - **Sleep timing:** Reported weekday bedtime and wake time
 - **Sleep duration:** Calculated from reported BT to WT
 - **Extracurricular:** Past 7 days participation in sports/activities
 - **Academic:** Homework completion, first period engagement
 - **Daytime mood:** PROMIS items, past 7 days

Student Reported Bedtimes and Wake Times

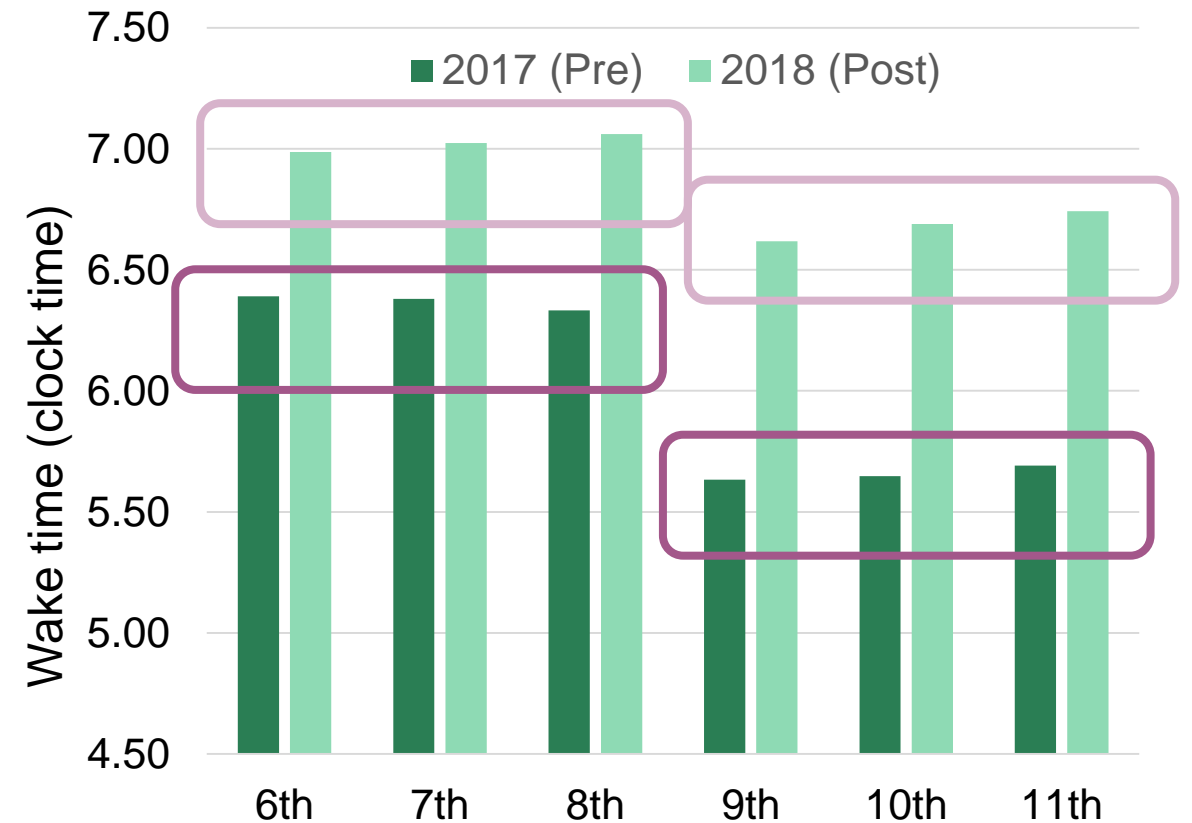
Bedtime slightly later

MS: +8 m HS: +13 m



Wake time significantly later

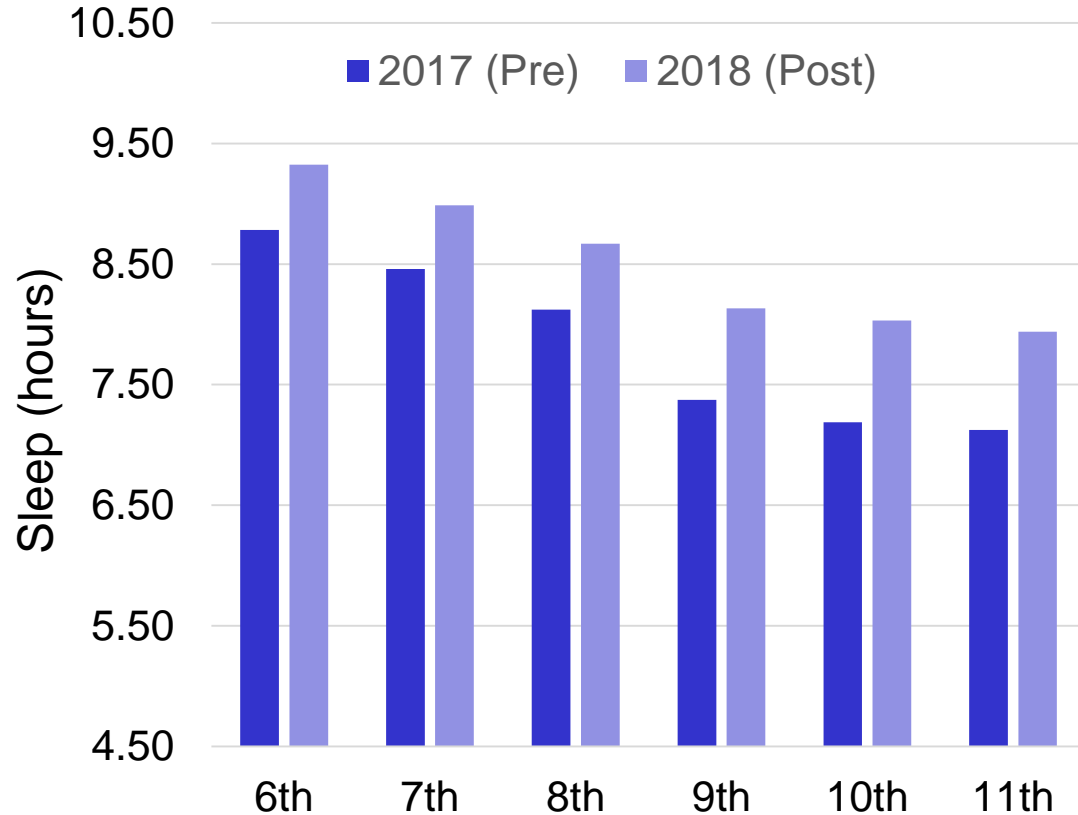
MS: +39 m HS: +61 m



Student Reported Sleep & Sleep Deficit

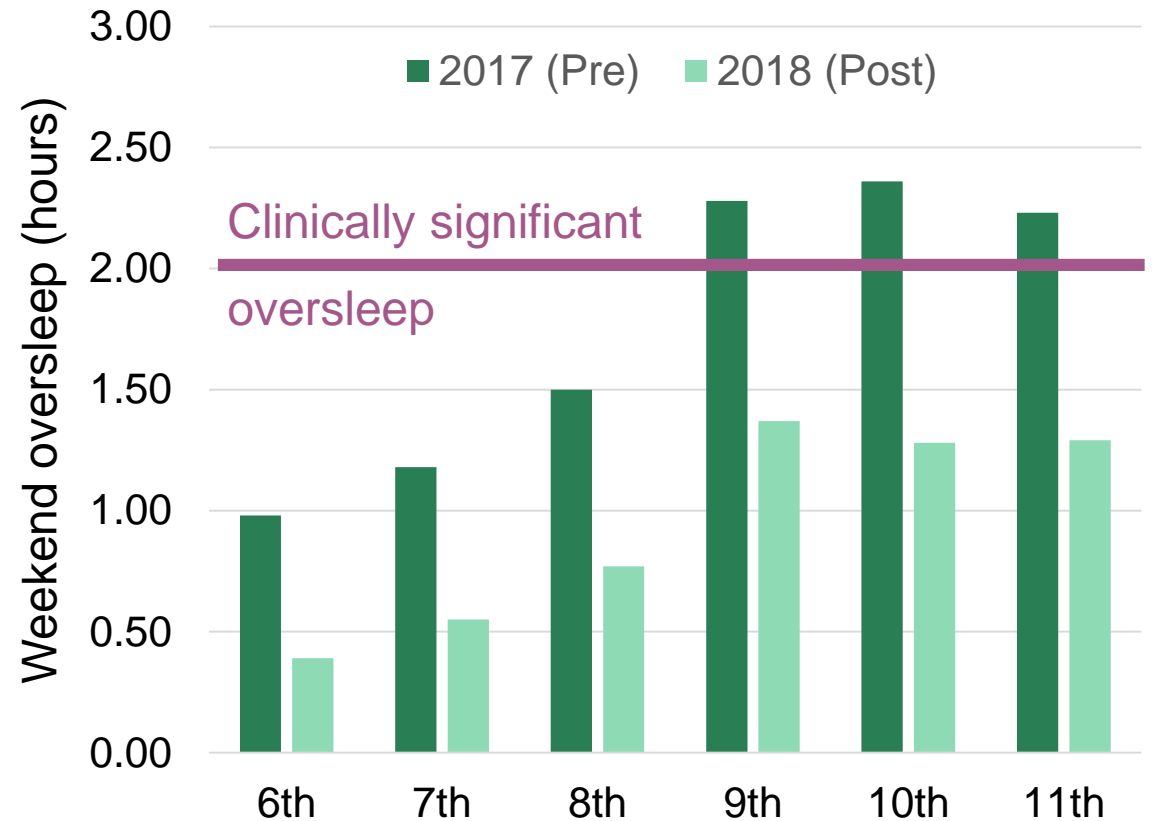
Changes in sleep driven by wake time

MS: +31 m HS: +48 m



Significant decrease in weekend oversleep

MS: -38 m HS: -59 m



Cohort Changes in Weekday Sleep

Significantly greater increase in sleep for MS-FRL students

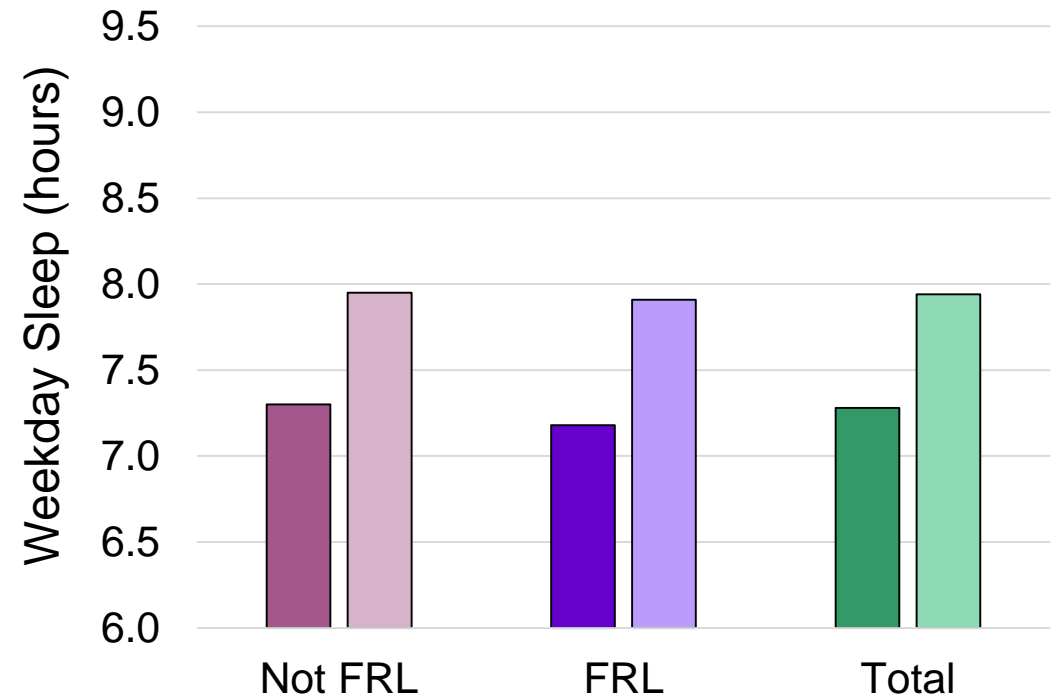
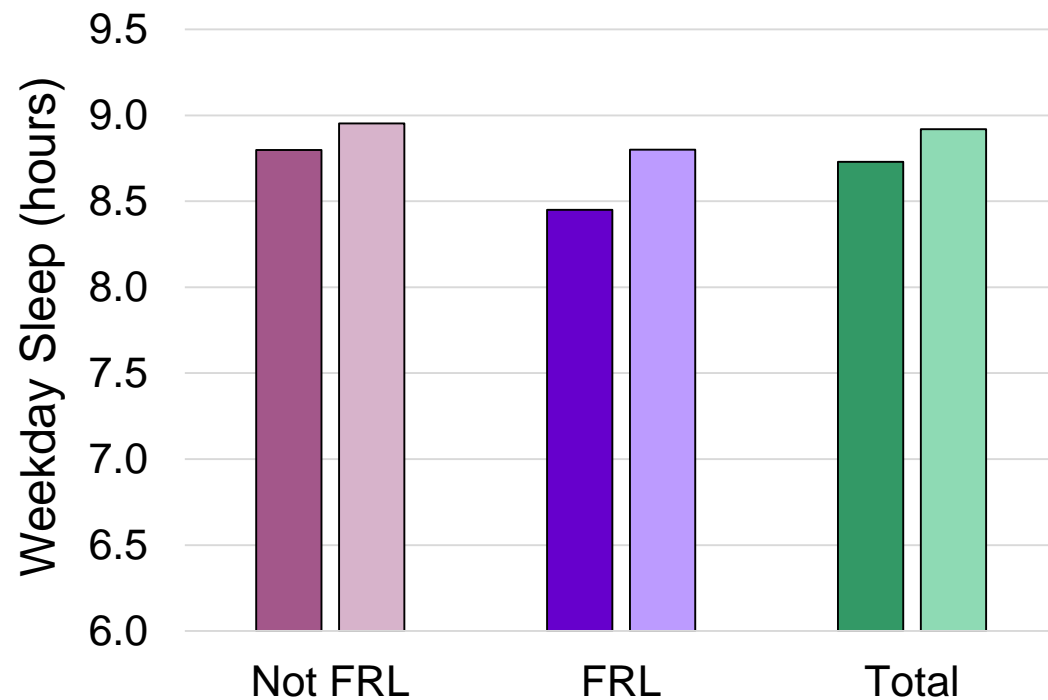
No difference in increase for HS students by FRL status

Middle School (6th/7th pre-change)

High School (9th-11th pre-change)

Not: 9 m FRL: 21 m Total: 11 m

Not: 39 m FRL: 44 m Total: 40 m



Dark bars are pre-change (2017) and light bars are post-change (2018)



Goal SH-3: Increase the proportion of students in grades 9 through 12 who get sufficient sleep (8 or more hours of sleep on an average school night)

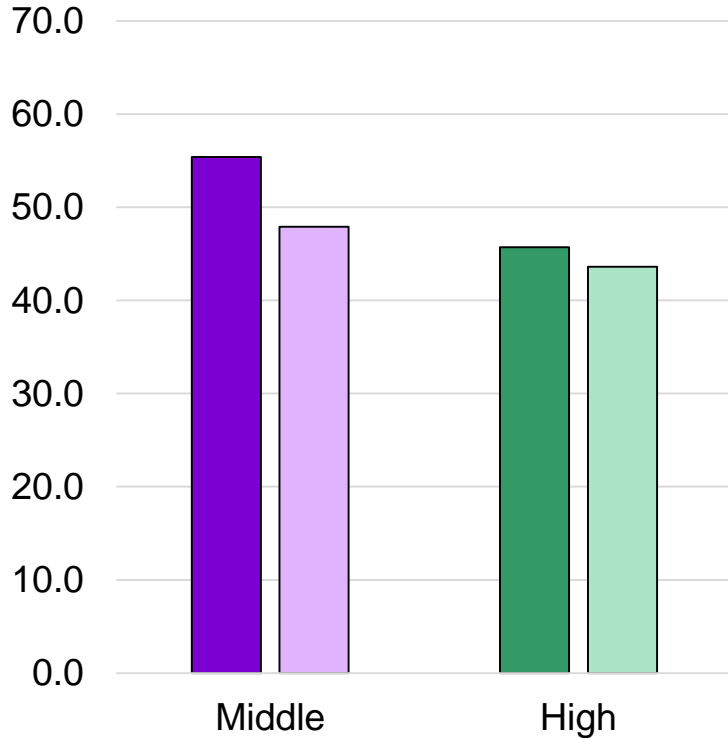
Sample	Baseline/2017	Goal/2018	Change
Healthy People 2020	30.9%	33.1%	+2.2%
CCSD (HS)	26.8%	60.9%	+34.1%
CCSD (MS \geq 9 hours)	37.7%	58.5%	+20.8%
YRBS June 2018	30.9%	25.4%	-5.5%

Activities and Homework

**In the Past 7 Days,
% of Students Who Participated in:**

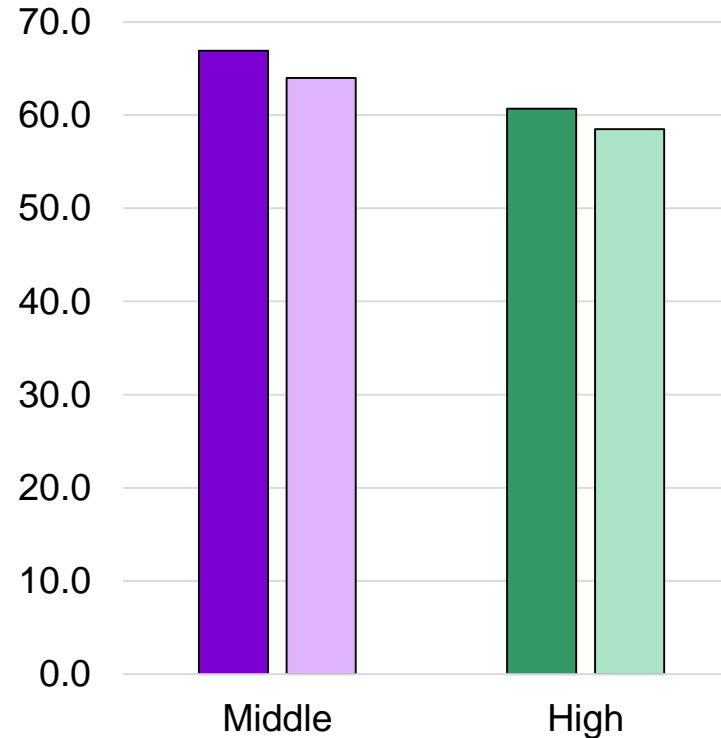
Sports

MS: -7.5% **HS: -2.1%**



Activities

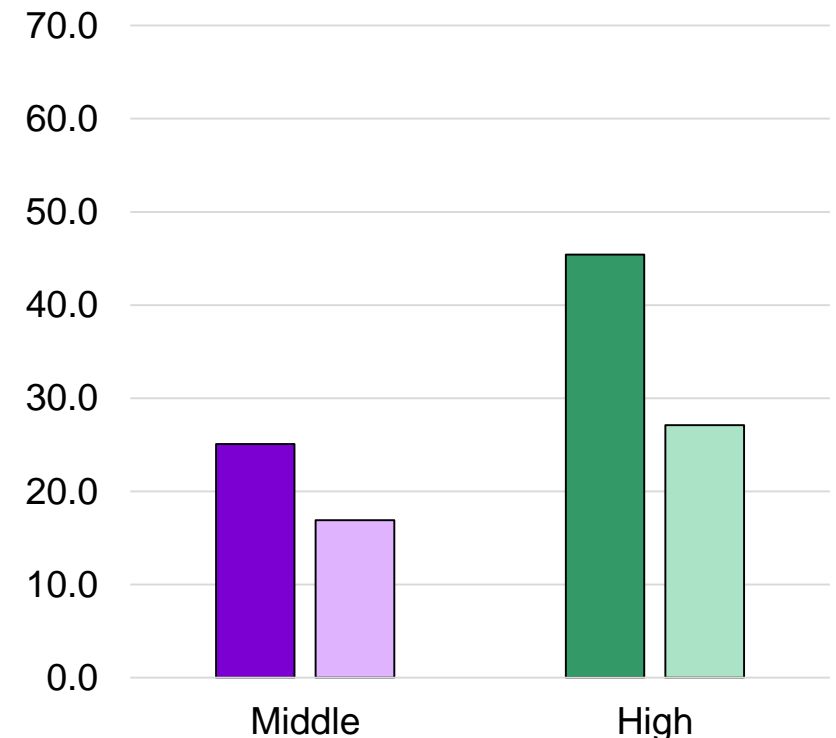
MS: -2.9% **HS: -2.2%**



**Past 7 days, % Students
Always/ Almost Always**

Too Tired for Homework

MS: -8.2% **HS: -18.3%**



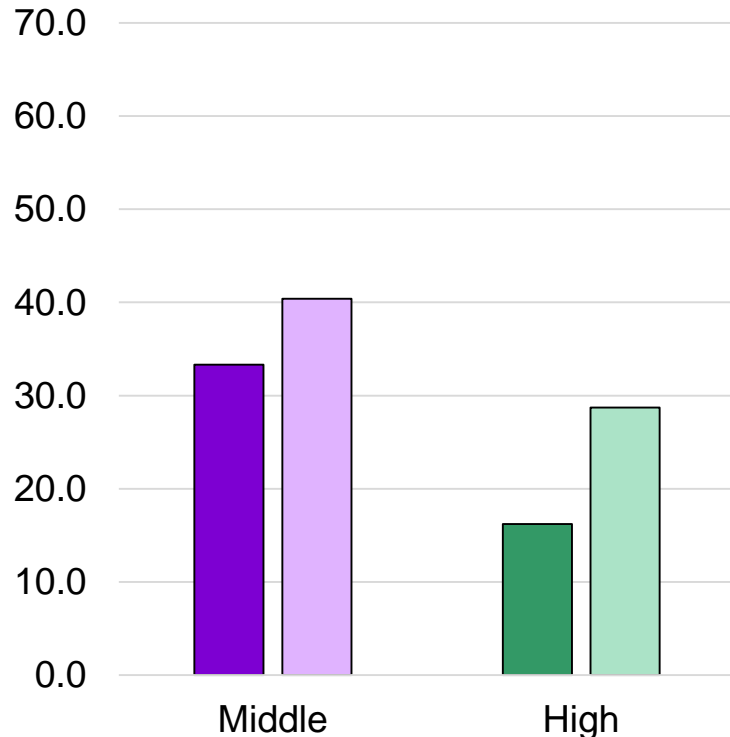
Dark bars are pre-change (2017) and light bars are post-change (2018)

Academic Engagement

In the Past 7 Days, % of Students At Least Half the Time

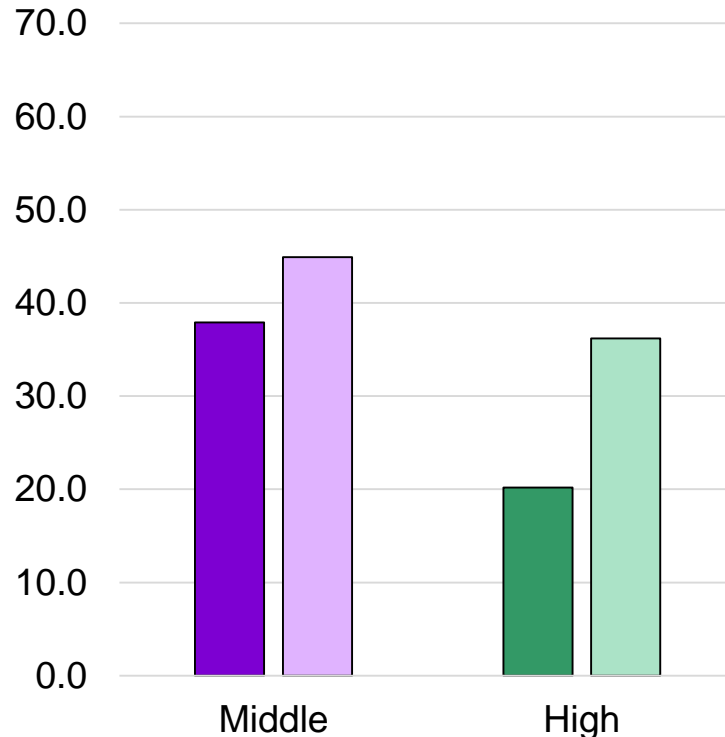
Ready for First Period

MS: 7.1% HS: 12.5%



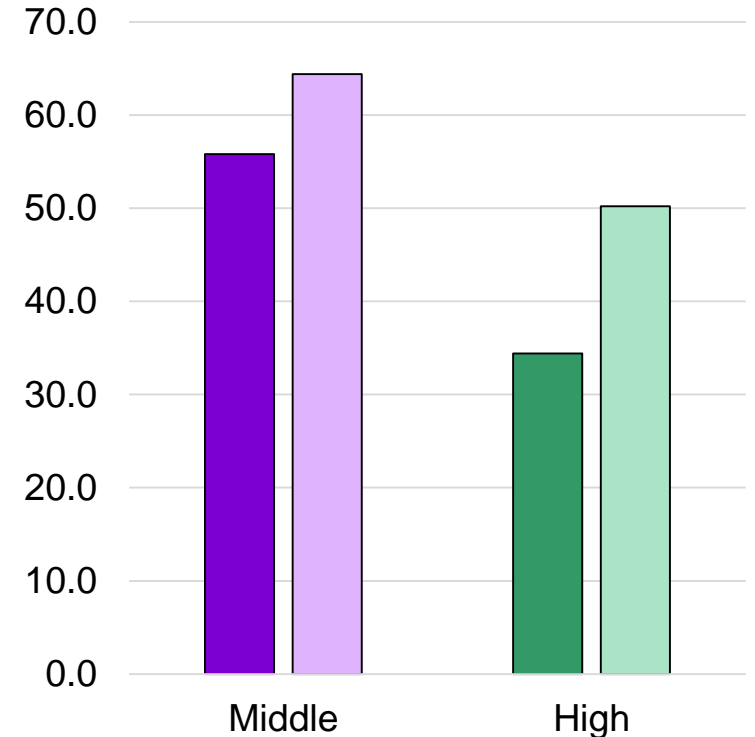
Alert First Period

MS: 7.0% HS: 16.0%



Prepared for First Period

MS: 8.6% HS: 15.8%

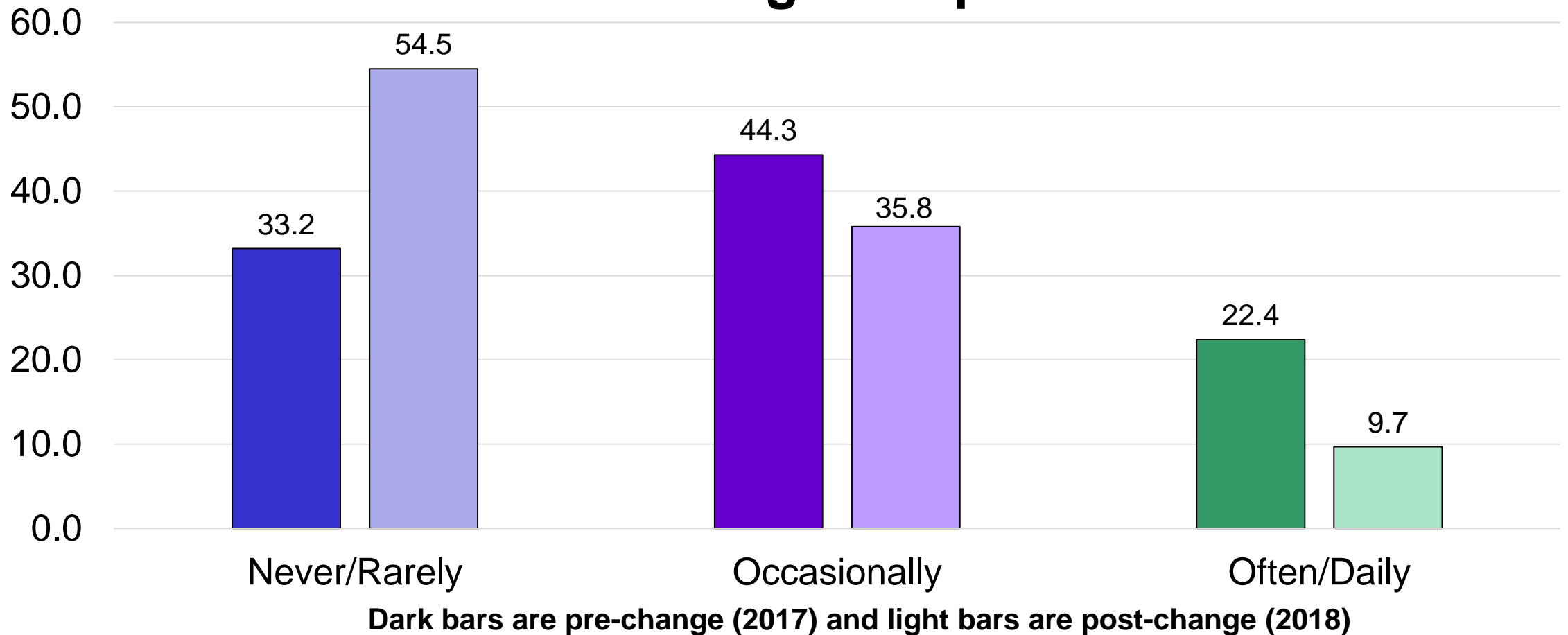


Dark bars are pre-change (2017) and light bars are post-change (2018)

HS Teachers Notice Differences In Class

(2017 n=485, 2018 n=567)

In the past 7 days, have you noticed students falling asleep in class?

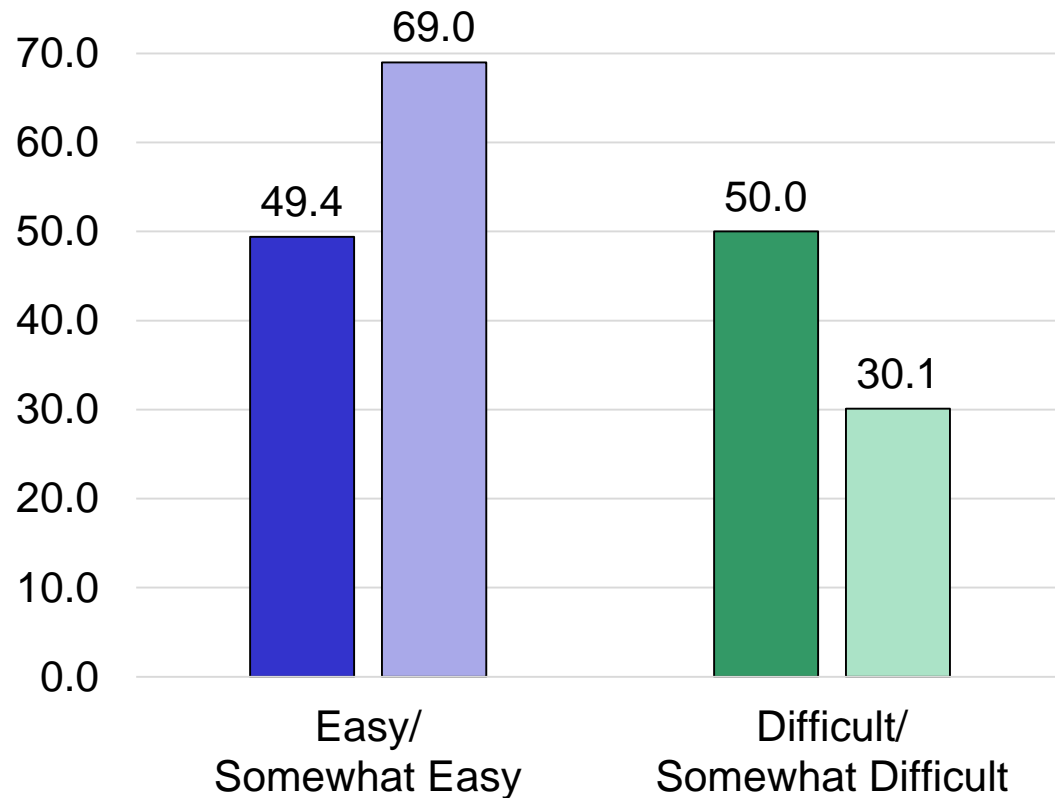


Dark bars are pre-change (2017) and light bars are post-change (2018)

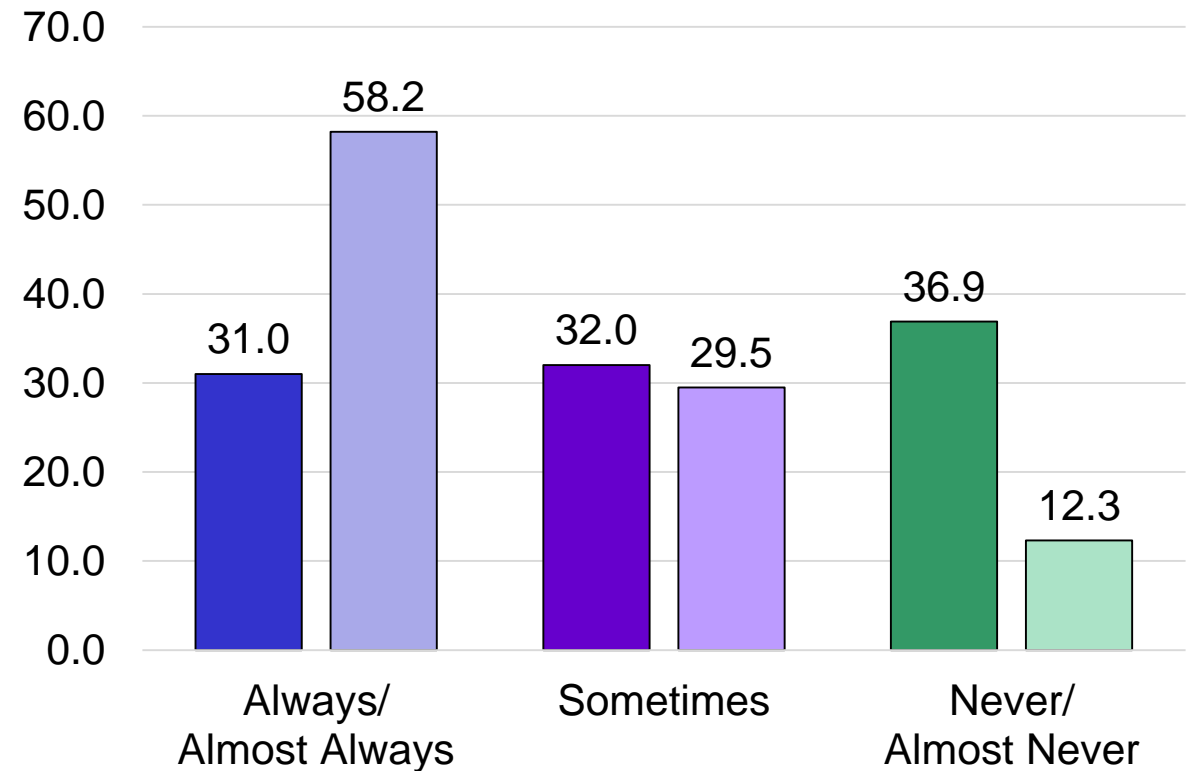
HS Parents Notice Differences In the Morning

(2017 n=4258, 2018 n=3455)

On most school mornings how easy it is for your child to wake up?



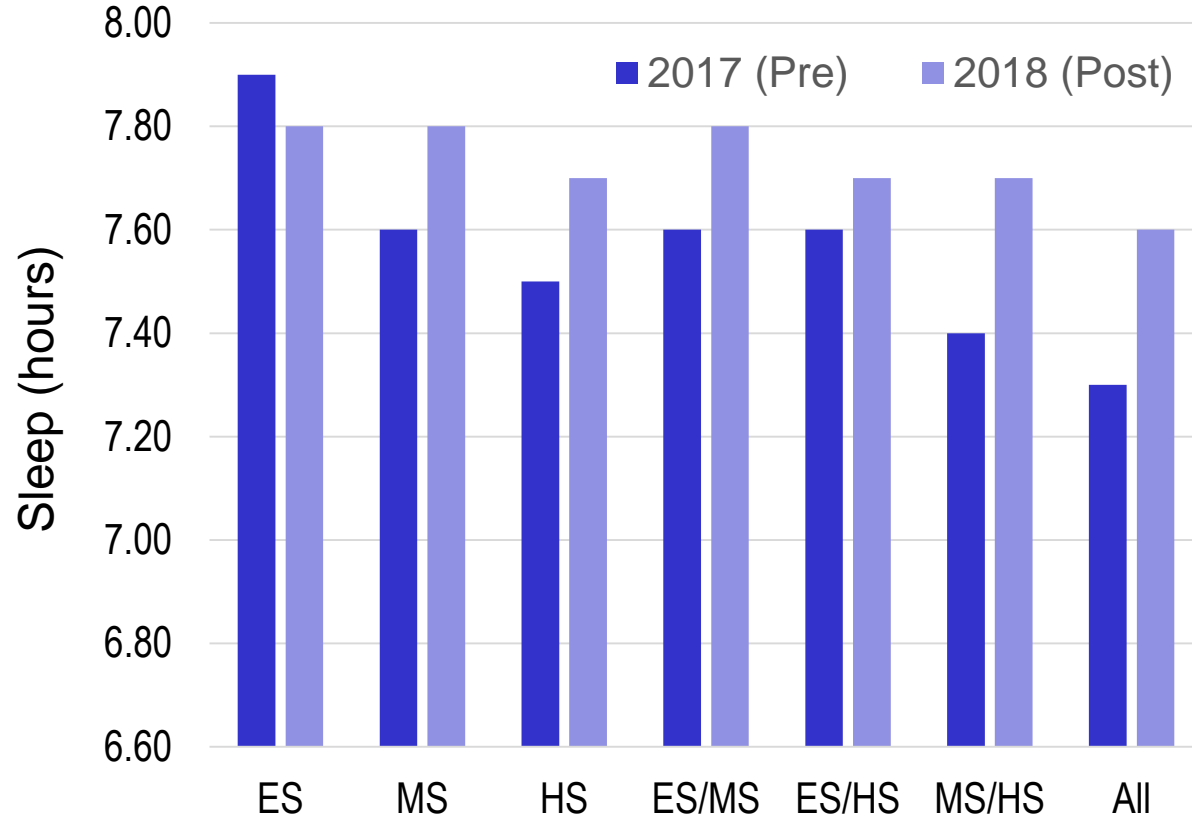
In the past 7 days when my child woke up he/she felt ready to start the day



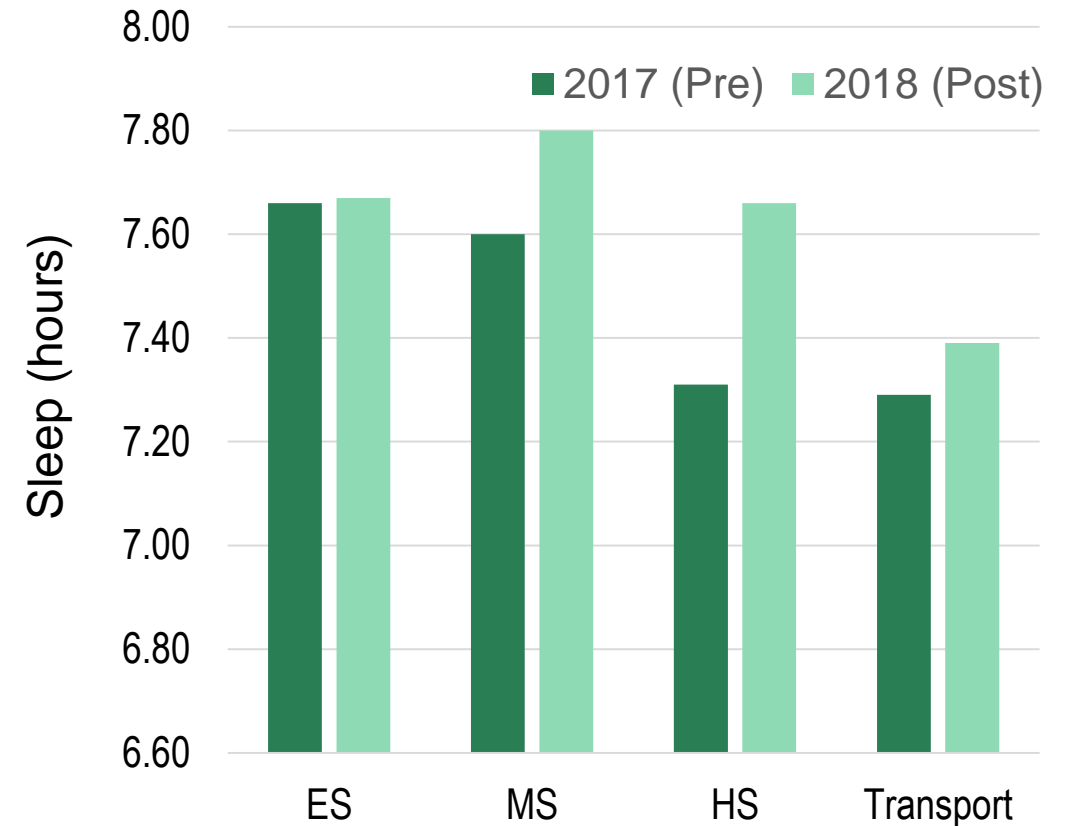
Dark bars are pre-change (2017) and light bars are post-change (2018)

Parent and Staff/Transportation Sleep

Parent sleep decreased 6 min for ES only, increased 12-18 min all other groups



ES no change; MS increase 12 min, HS increase 21 min, Transport increase 6 min

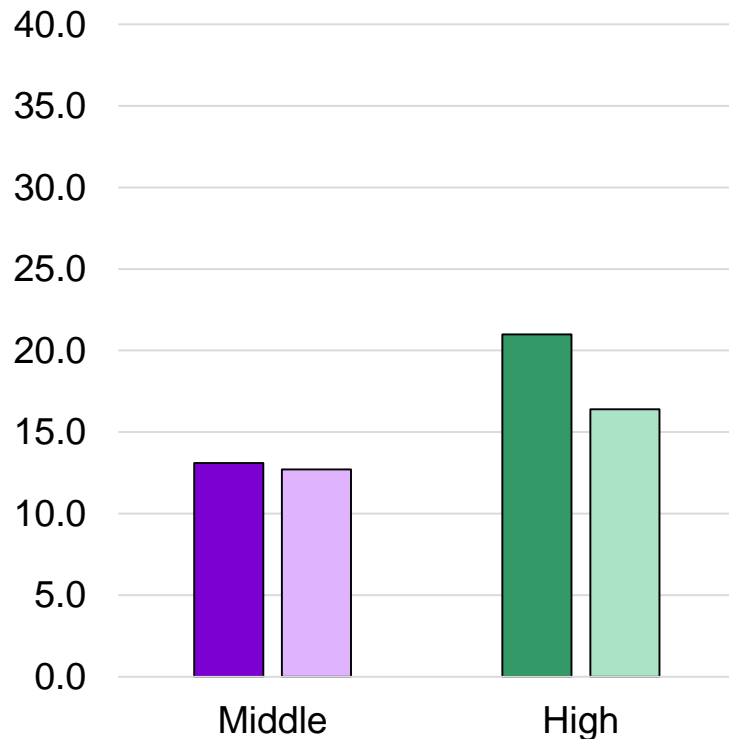


Changes in Daytime Mood

In the Past 7 Days, % of Students Always/Almost Always

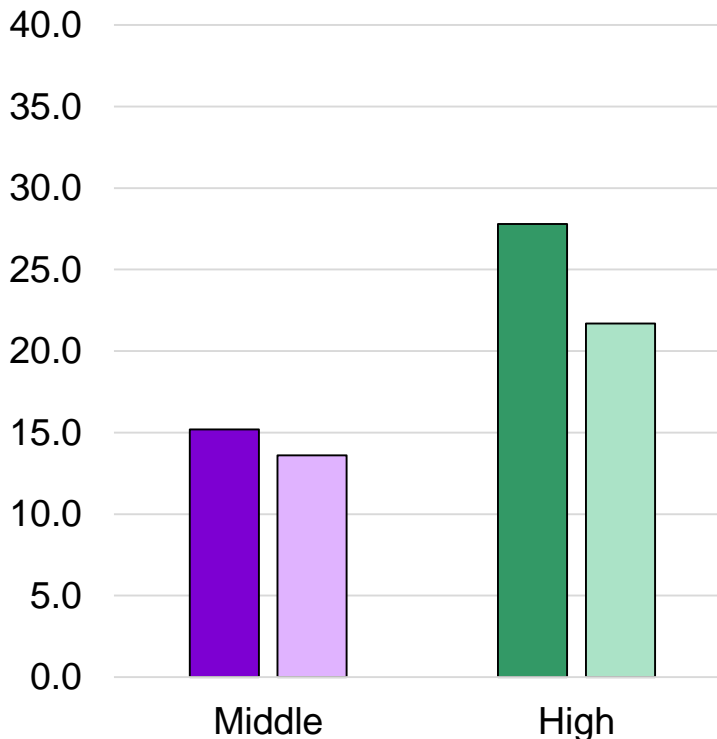
Feeling Sad

MS: -0.4% HS: -4.6%



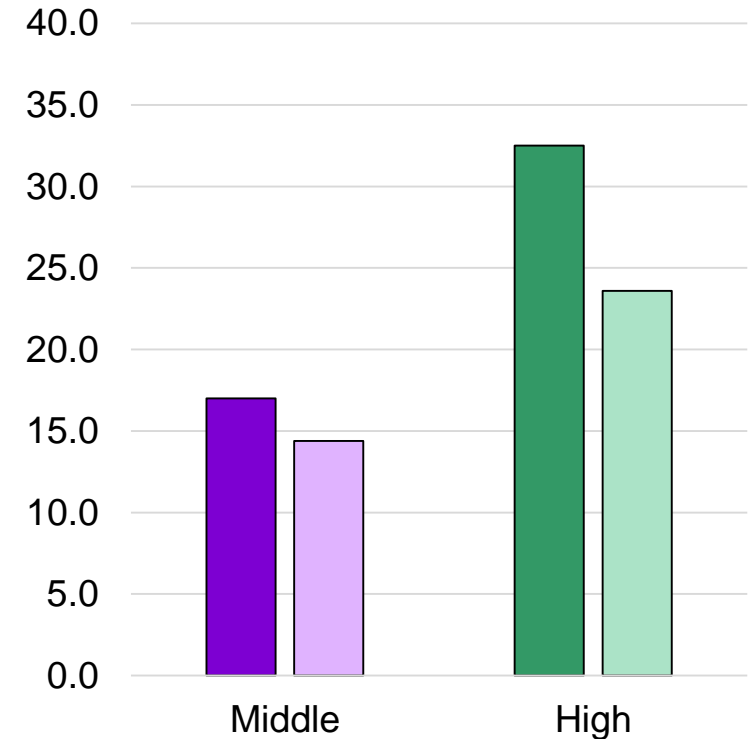
Feeling Nervous

MS: -1.6% HS: -6.1%



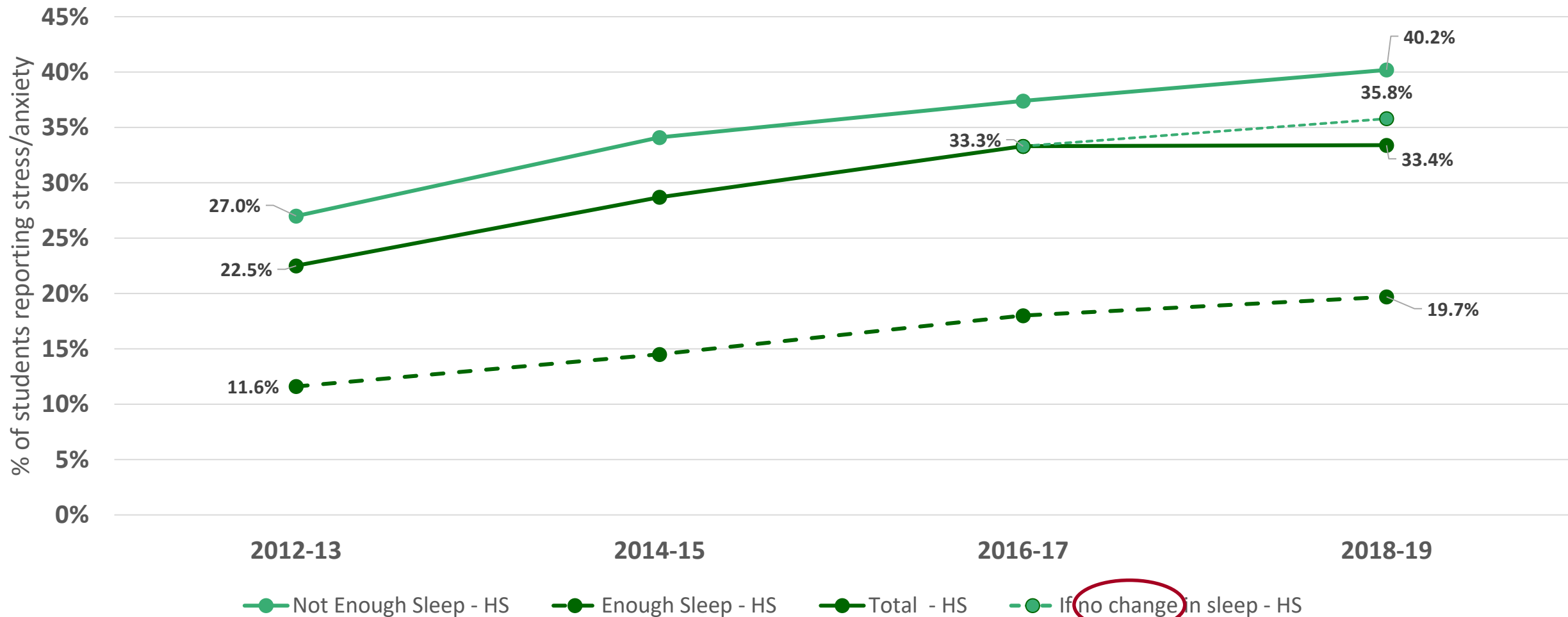
Feeling Worried

MS: -2.6% HS: -8.9%



Dark bars are pre-change (2017) and light bars are post-change (2018)

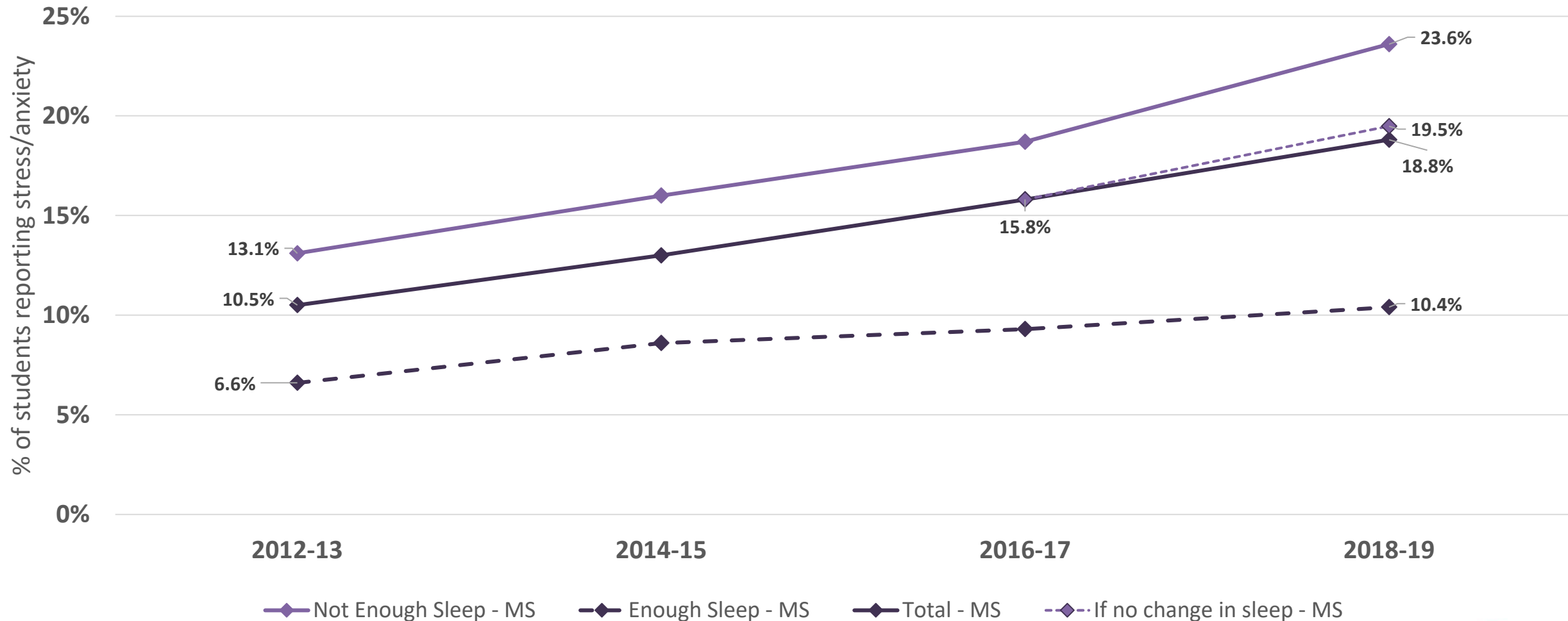
HS Students Who Report Stress/Anxiety Over Time – Reported Separately Based on Sleep



$\chi^2=12.96, p<.001$



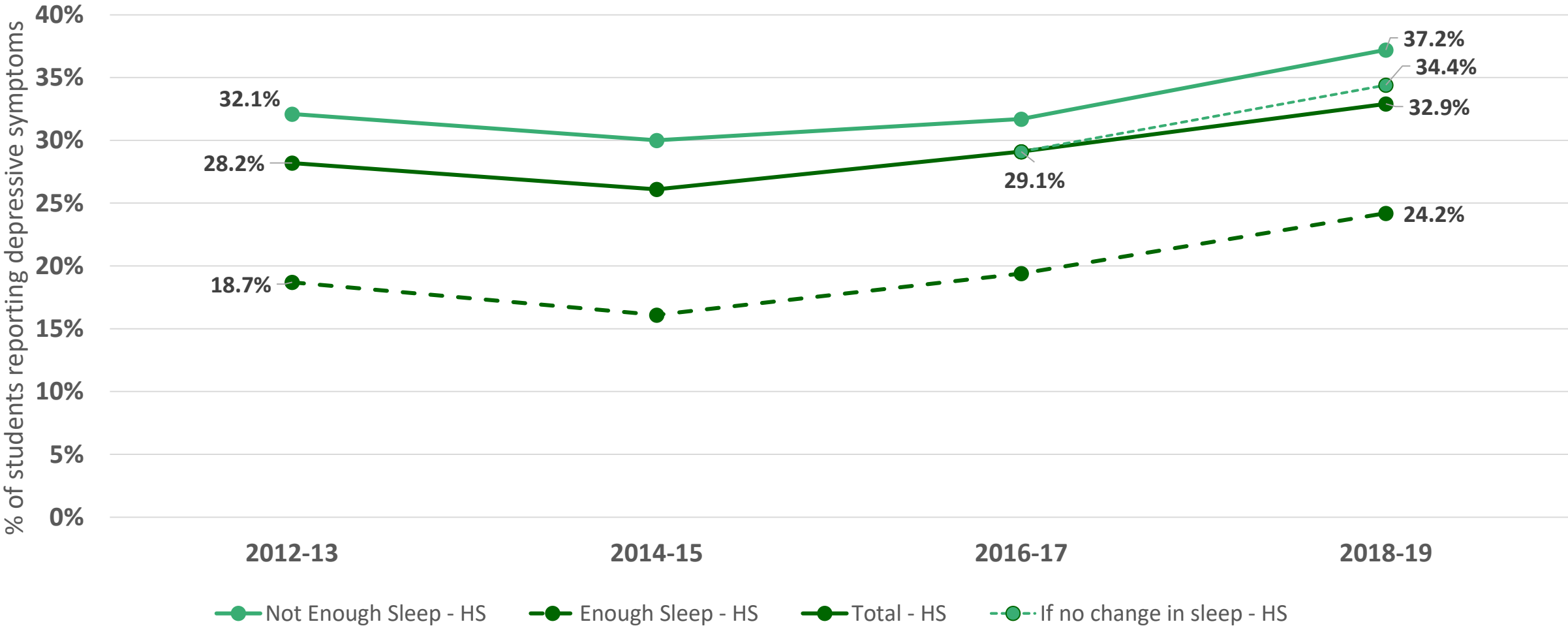
MS Students Who Report Stress/Anxiety Over Time – Reported Separately Based on Sleep



$\chi^2=.88$, n.s.



HS Students Who Report Depressive Symptoms Over Time – Reported Separately Based on Sleep

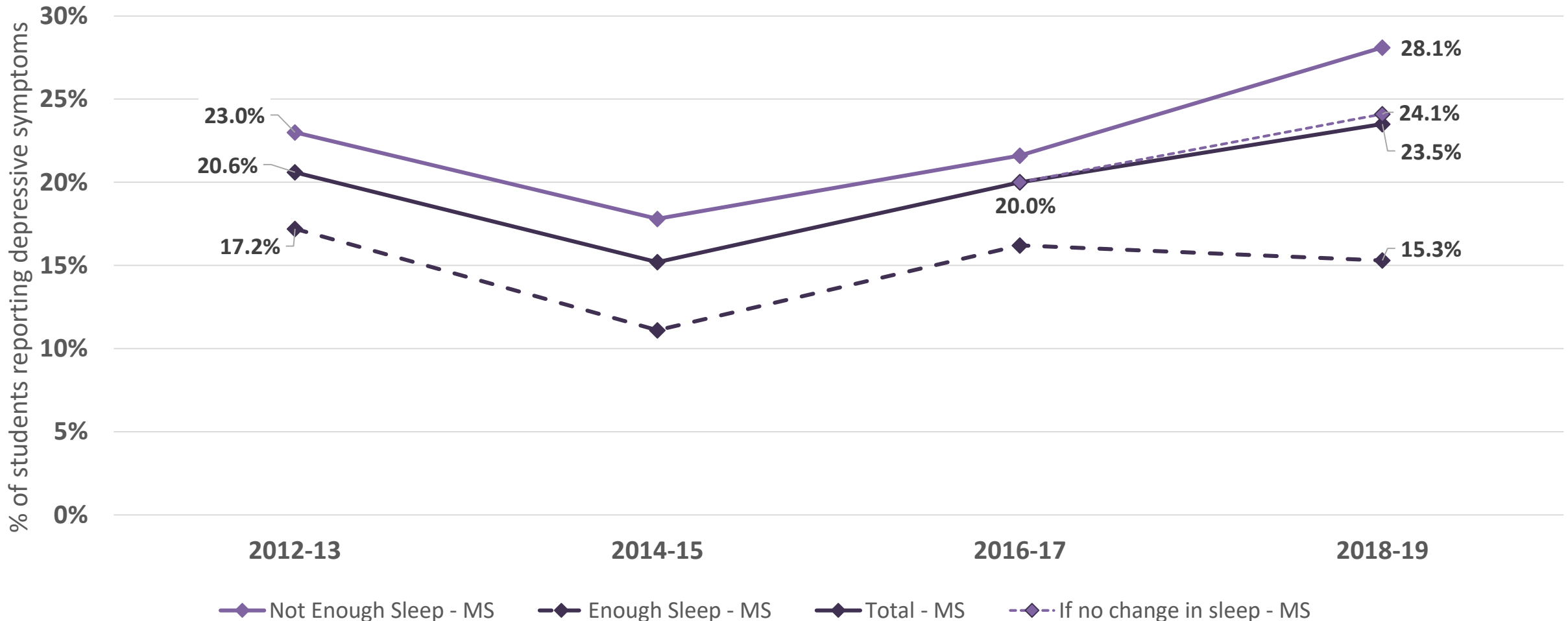


$\chi^2=4.99, p<.05$



Study findings are unpublished and should not be shared on social media or distributed without written consent of the authors.

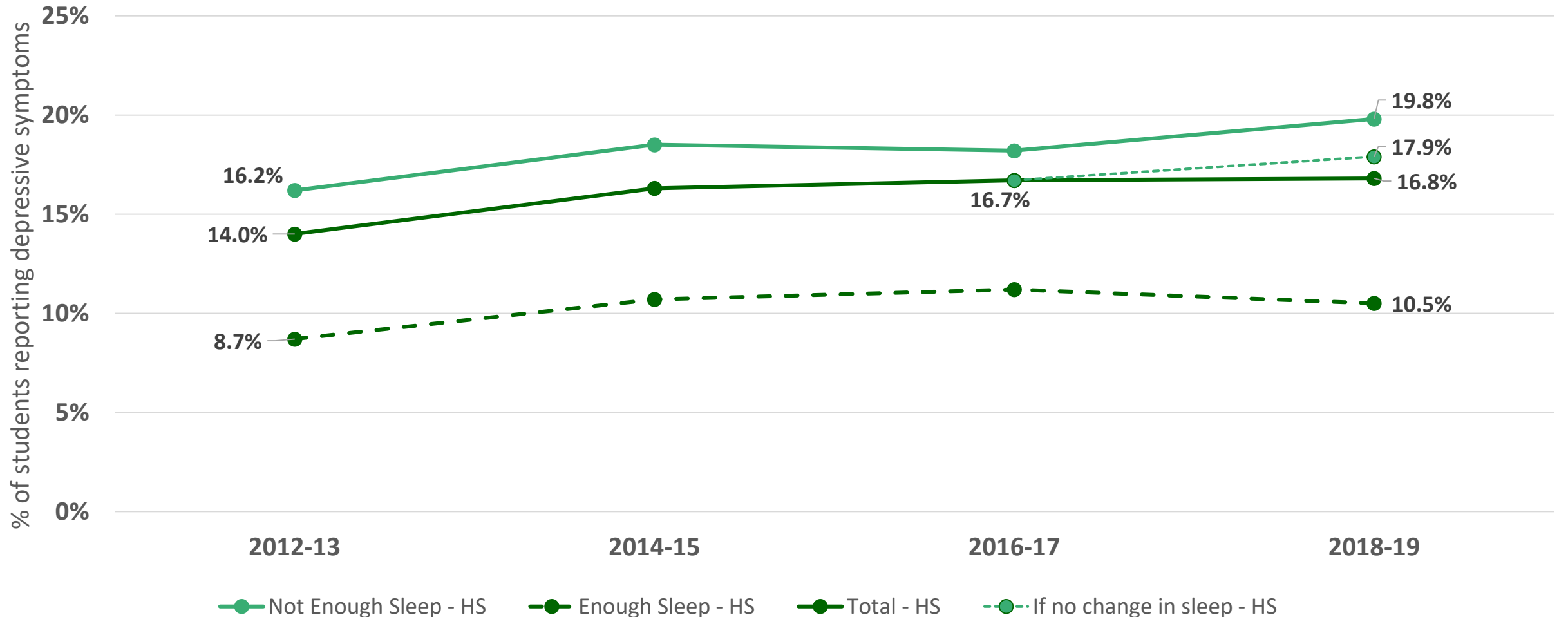
MS Students Who Report Depressive Symptoms Over Time – Reported Separately Based on Sleep



$\chi^2 = .88, n.s.$



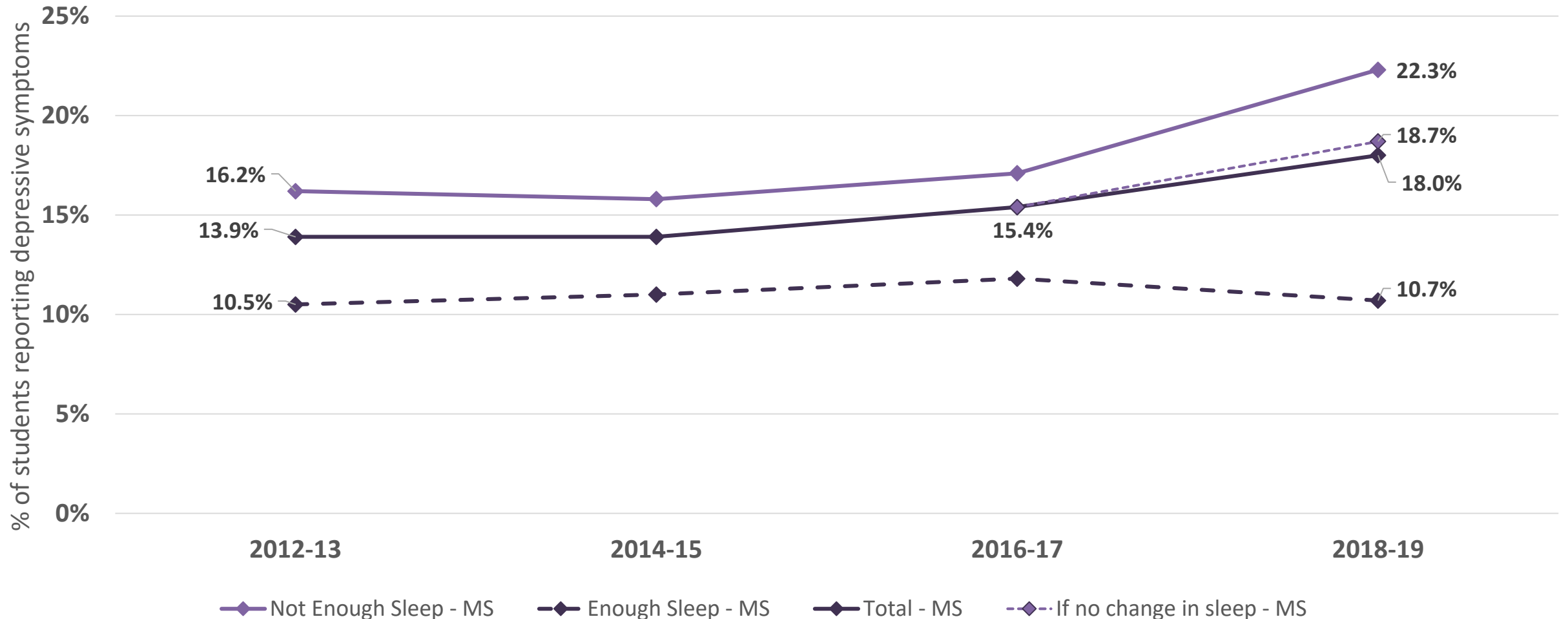
HS Students Who Report Suicidal Thoughts Over Time – Reported Separately Based on Sleep



$\chi^2=3.74, p=.053$



MS Students Who Report Suicidal Thoughts Over Time – Reported Separately Based on Sleep



$\chi^2=.94, n.s.$



Advocating for Change

- Familiarize yourself with the research
- Educate others
- Look for existing data to support need/opportunities for change
- Take a teaming approach
- Involve stakeholders in the process
- Consider collecting data



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