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# Indiana School Start Times and Adolescent Sleep Health – Policy Brief

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Adolescence is a key developmental period with clear connections to later life health and behavioral outcomes. The **impact of sleep on learning, health, and behavior in adolescence is robust**; therefore, promoting sleep health is a logical step in encouraging healthy development. The importance of adolescent development on future outcomes and the risks associated with insufficient sleep in highlight the crucial need to promote teen sleep health. The *American Academy of Sleep Medicine (AASM)*, *American Academy of Pediatrics (AAP)*, *American Medical Association (AMA)*, *Center for Disease Control (CDC)*, *National Sleep Foundation (NSF)* and *the Sleep Research Society (SRS)* **recommend high/middle school start times of 8:30AM or later to promote teen sleep health**.<sup>1-4</sup> The *National Parent Teacher Association (NPTA)* and U.S. Surgeon General also endorse pushing back school start times to promote sleep health in adolescents.<sup>5</sup> This brief aims to review the most salient literature behind these recommendations and to consider how Indiana school start times align with recommendations and national trends. The crafting of this brief was done in tandem with discussions and interviews from several Indiana stakeholders including state representatives, teachers, superintendents, school administrators, and students.

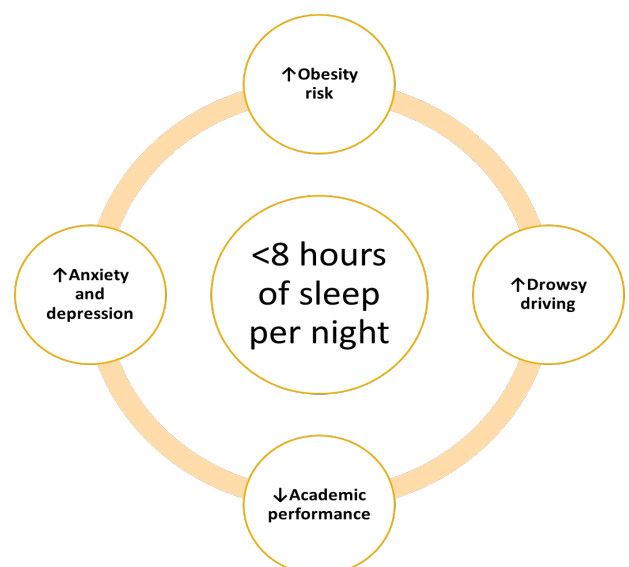
## The Importance of Sleep

Adequate sleep is an essential component of healthy development for everyone, especially teens, who are at higher risk for insufficient sleep. Not meeting sleep recommendations can increase adolescent risk for several adverse health and behavioral outcomes. To help organize the diverse impacts the following sections will consider mental and physical health, risky behaviors, and cognitive performance.

**Mental and Physical Health:** Sleep deprived and drowsy teens experience more depression<sup>1,6,7</sup>, anxiety<sup>8</sup>, and suicide attempts<sup>8,9</sup>. Schools with early start times have up to 10% higher odds of students attempting suicide<sup>9</sup>. Physical health risks associated with poor sleep include higher rates of obesity<sup>1,10</sup>, lower activity levels, and more sport-related injuries<sup>11</sup>. Specifically, a 2014 study reported high school athletes who slept less than 8 hours a night were 1.7 times more likely to have had a sport related injury than those who slept 8 hours.<sup>11</sup>

**Risky Behaviors:** Increased rates of substance abuse<sup>8,12</sup> and drowsy driving<sup>8</sup> are also associated with insufficient sleep and earlier school start times. Drowsy driving increases risk of teen car accidents and of fatal car accidents<sup>13</sup>.

**Cognitive Performance:** Inadequate sleep is linked with increased school absences<sup>14</sup>, attention and memory impairment<sup>15-17</sup>, and lowered academic performance<sup>18</sup>.



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Cumulatively, this literature review included data from over 145,000 adolescents with each study documenting significant negative impacts from insufficient sleep.

### Changes in Sleep Rhythm

*One hallmark of adolescence is a propensity to fall asleep later*, which reflects a normative shift in circadian patterns.<sup>19</sup> This natural shift in sleep rhythms means the bodies of teens are ‘primed’ to be up later, in turn creating a need to sleep later into the morning to receive adequate sleep. This sleep phase delay is present in cultures/communities all over the world. Studies consistently document school start times are a contributing factor to chronic sleep deficiency in adolescents - early rise times are in odds with natural sleep rhythms<sup>20</sup>. In the U.S. (and Indiana) current school start times set teens up for chronic insufficient sleep.



### Role of School Start Times

Pushing back school start times increases teen sleep.<sup>1,12-21</sup> According to Neuroth et al., every ~15 minute delay in high school start times is associated with an additional ~5 minutes in sleep duration. Additionally, schools beginning after 8:30AM have higher percentages of students obtaining 8 hours of sleep and more total sleep when compared to schools with earlier start times.<sup>9</sup> Eleven studies in the past ten years have highlighted similar associations with delayed start times improving total sleep duration in adolescence. The links between school start times and sleep have also implicated other risk factors including pathways from early school start times to less sleep and ultimately elevated obesity risk<sup>21</sup>, substance abuse<sup>8,22</sup>, and motor vehicle accidents<sup>13</sup>. Studies documenting a delay in school start times document increases in sleep duration and improved outcomes in all three domains such as: lower daytime sleepiness, decrease rates of depressed mood and anxiety<sup>22</sup>, lower rates of suicide attempts<sup>8</sup>, better overall academic outcomes<sup>8,23</sup>, less school absences<sup>1,24</sup>, and less risky behavior such as substance abuse<sup>22</sup> and drowsy driving<sup>1</sup>.

### National Estimates

Later bedtimes, combined with early school start times, means it is less likely teens will achieve the sleep they need. Nationally, the CDC reported that 57.8% of middle school and 72% of high school students obtain fewer than 8 hours of sleep<sup>25</sup>. This is in contrast with widely agreed upon recommendations that adolescents (between 13 and 18 years of age) should sleep 8-10 hours a night (CDC, AASM, NSF).<sup>26</sup> In 2018, the national average start time for public schools was 8:10AM, which is a contributing factor in our national trends in insufficient teen sleep.

## How Do Indiana Schools Compare?

With over 601,000 students between the grades of 6-12 enrolled in Indiana, there is a considerable portion of the state's population at elevated risk for insufficient sleep. Data on academic performance and attendance by school, as well as school enrollment and grades serviced, were obtained through the Indiana Department of Education for the academic year of 2020-2021.

**Indiana School Start Time Data:** From a list of 1,139 public schools serving grades 6-12 with publicly available enrollment and attendance data, our team stratified school data collection by county, selecting the largest populous school from each county and grade division (e.g., 6 - 8 grade, 9 - 12 grade). For the full list of included schools see Appendix A. A total of 162,472 students are represented in this study from a total of 200 schools in Indiana, with schools separated by those that exclusively serve grades 9 – 12 ( $n = 82$  schools; 100,784 students), and schools that serve grades 6 - 8 ( $n = 118$  schools; 61,685 students).

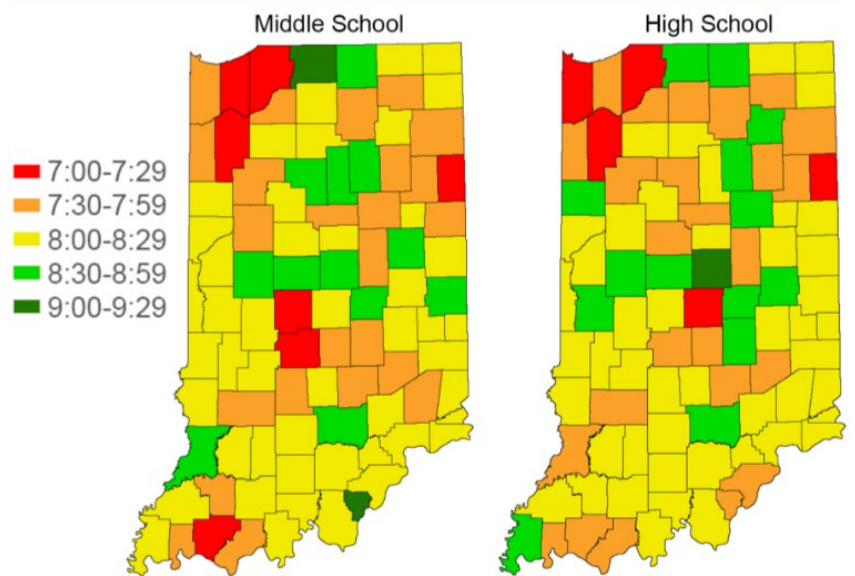
From this sampling, 83% of the high school students started before 8:30AM and 40% started before 8:00AM. The average start times for high schools was 8:04AM. Middle schools had an average start time of 8:05AM, with 77% of students starting school prior to 8:30AM, and 37% beginning prior to 8:00AM.

Compared to the long list of recommendations noted above, both Indiana and national averages of school start times do not meet the recommended 8:30AM start time. Early start times in Indiana and the United States put youth at risk for negative outcomes both physically and mentally.

## Potential Barriers

Shifting school start times in a universal manner comes with several logistical and social challenges. These barriers could include potential monetary costs from shifting bus schedules<sup>27</sup> or changing sports practice to be later. However, some school corporations in Indiana, such as Fort Wayne, have made a shift in their school start times to cut bus expenses by over two million dollars.<sup>28</sup> Discussions with teachers, school administrators, and parents have highlighted other potential barriers including issues with scheduling after school activities with teams that end earlier/later in the day, the potential of young children waiting for the school bus in the dark, and the possibility of students arriving back from activities later in the night. All barriers considered, the benefits of later school start times greatly outweigh the costs with reductions in negative physical and mental health outcomes, greater academic performance and attendance, and decreases in risky behavior such as drowsy driving and substance abuse.

Indiana school start times by county



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## Recommendations

The information highlighted above demonstrates that: 1) early school start times (before 8:30AM) negatively impact teen sleep; 2) inadequate sleep is associated with elevated risks across health, risky behavior, and academic domains; 3) the average Indiana middle/high school starts before the recommended time of 8:30AM. To promote optimal sleep during adolescence, Indiana schools should start middle and high school start times no earlier than 8:30AM, to better ensure the health, safety, and academic success of Indiana teens.

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