

## CHAPTER 38

# Sleep Health (SH)

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### Lead Agency

National Institutes of Health

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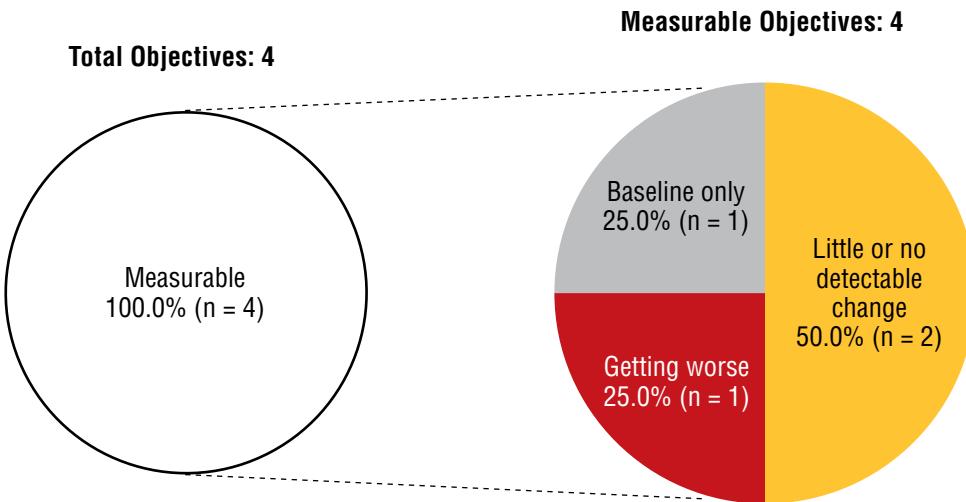
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## Goal: Increase public knowledge of how adequate sleep and treatment of sleep disorders improve health, productivity, wellness, quality of life, and safety on roads and in the workplace.

This chapter includes objectives that monitor medical evaluation of obstructive sleep apnea, vehicular crashes due to drowsy driving, and the proportion of the population getting sufficient sleep. The *Reader's Guide* provides a step-by-step explanation of the content of this chapter, including criteria for highlighting objectives in the Selected Findings.<sup>1</sup>

### Status of Objectives

**Figure 38–1. Midcourse Status of the Sleep Health Objectives**



All four of the objectives in the Sleep Health Topic Area were measurable<sup>2</sup> (Figure 38–1, Table 38–1). The midcourse status of these objectives was as follows (Table 38–2):

- 2 objectives had demonstrated little or no detectable change,<sup>3</sup>
- 1 objective was getting worse,<sup>4</sup> and
- 1 objective had baseline data only.<sup>5</sup>

### Selected Findings

- In 2005–2008, the age-adjusted proportion of **adults aged 20 and over with symptoms of obstructive sleep apnea who sought medical evaluation** (SH-1) was 25.5% (Table 38–2). Data beyond the baseline were not available, so progress toward the 2020 target could not be assessed.
- » In 2005–2008, disparities by sex, race and ethnicity, and disability status in the age-adjusted proportion

of adults aged 20 and over with symptoms of obstructive sleep apnea who sought medical evaluation were statistically significant (Table 38–3, SH-1). Disparities by education and family income were not statistically significant.

- There was little or no detectable change in the proportion of **students in grades 9–12 who got sufficient sleep** (SH-3) (8 or more hours of sleep on an average school night) between 2009 and 2013 (30.9% and 31.7%, respectively) (Table 38–2).
  - » In 2013, the disparity by sex in the proportion of students in grades 9–12 who got sufficient sleep was statistically significant (Table 38–3, SH-3). The disparity by race and ethnicity was not statistically significant.
- The proportion of **adults aged 18 and over who got sufficient sleep** (SH-4) (8 or more hours for those aged 18–21 and 7 or more hours for those aged 22 and over, on average, during a 24-hour period) decreased from 69.6% in 2008 to 67.6% in 2014, moving away from the baseline and 2020 target (Table 38–2).

- » In 2013, the proportion of adults aged 18 and over who got sufficient sleep (SH-4) varied by state. No states met the national target (Map 38–1).
- » In 2014, disparities in the proportion of adults aged 18 and over who got sufficient sleep by education, family income, and disability status were statistically significant (Table 38–3, SH-4). The disparities by sex, race and ethnicity, and geographic location were not statistically significant.

## More Information

Readers interested in more detailed information about the objectives in this topic area are invited to visit the [HealthyPeople.gov](http://www.healthypeople.gov) website, where extensive substantive and technical information is available:

- For the background and importance of the topic area, see: <http://www.healthypeople.gov/2020/topics-objectives/topic/sleep-health>
- For data details for each objective, including definitions, numerators, denominators, calculations, and data limitations, see:  
<http://www.healthypeople.gov/2020/topics-objectives/topic/sleep-health/objectives>  
*Select an objective, then click on the “Data Details” icon.*
- For objective data by population group (e.g., sex, race and ethnicity, or family income), including rates, percentages, or counts for multiple years, see:  
<http://www.healthypeople.gov/2020/topics-objectives/topic/sleep-health/objectives>  
*Select an objective, then click on the “Data2020” icon.*

Data for the measurable objectives in this chapter were from the following data sources:

- Behavioral Risk Factor Surveillance System:  
<http://www.cdc.gov/brfss/>
- National Automotive Sampling System General Estimates System: [http://www.nhtsa.gov/Data/National-Automotive-Sampling-System-\(NASS\)/NASS-General-Estimates-System](http://www.nhtsa.gov/Data/National-Automotive-Sampling-System-(NASS)/NASS-General-Estimates-System)
- National Health and Nutrition Examination Survey:  
<http://www.cdc.gov/nchs/nhanes.htm>
- National Health Interview Survey:  
<http://www.cdc.gov/nchs/nhis.htm>
- Youth Risk Behavior Surveillance System:  
<http://www.cdc.gov/healthyyouth/data/yrbs/index.htm>

## Footnotes

<sup>1</sup>The **Technical Notes** provide more information on Healthy People 2020 statistical methods and issues.

<sup>2</sup>**Measurable** objectives had a national baseline value.

<sup>3</sup>**Little or no detectable change**—One of the following, as specified in the Midcourse Progress Table:

- » Movement was toward the target, standard errors were available, and the percentage of targeted change achieved was not statistically significant.
- » Movement was toward the target, standard errors were not available, and the objective had achieved less than 10% of the targeted change.
- » Movement was away from the baseline and target, standard errors were available, and the percentage change relative to the baseline was not statistically significant.
- » Movement was away from the baseline and target, standard errors were not available, and the objective had moved less than 10% relative to the baseline.
- » There was no change between the baseline and the midcourse data point.

<sup>4</sup>**Getting worse**—One of the following, as specified in the Midcourse Progress Table:

- » Movement was away from the baseline and target, standard errors were available, and the percentage change relative to the baseline was statistically significant.
- » Movement was away from the baseline and target, standard errors were not available, and the objective had moved 10% or more relative to the baseline.

<sup>5</sup>**Baseline only**—The objective only had one data point, so progress toward target attainment could not be assessed.

## Suggested Citation

National Center for Health Statistics. Chapter 38: Sleep Health. Healthy People 2020 Midcourse Review. Hyattsville, MD. 2016.

## Table 38–1. Sleep Health Objectives

### LEGEND

	Data for this objective are available in this chapter's Midcourse Progress Table.		Disparities data for this objective are available, and this chapter includes a Midcourse Health Disparities Table.		A state or county level map for this objective is available at the end of the chapter.
Not Applicable	Midcourse data availability is not applicable for developmental and archived objectives. <b>Developmental</b> objectives did not have a national baseline value. <b>Archived</b> objectives are no longer being monitored due to lack of data source, changes in science, or replacement with other objectives.				

Objective Number	Objective Statement	Data Sources	Midcourse Data Availability
SH-1	Increase the proportion of persons with symptoms of obstructive sleep apnea who seek medical evaluation	National Health and Nutrition Examination Survey (NHANES), CDC/NCHS	
SH-2	Reduce the rate of vehicular crashes per 100 million miles traveled that are due to drowsy driving	General Estimates System (GES), DOT/NHTSA	
SH-3	Increase the proportion of students in grades 9 through 12 who get sufficient sleep	Youth Risk Behavior Surveillance System (YRBSS), CDC/NCHHSTP	
SH-4	Increase the proportion of adults who get sufficient sleep	National Health Interview Survey (NHIS), CDC/NCHS	

**Table 38–2. Midcourse Progress for Measurable<sup>1</sup> Sleep Health Objectives**

## LEGEND

	Target met or exceeded <sup>2,3</sup>		Improving <sup>4,5</sup>		Little or no detectable change <sup>6–10</sup>		Getting worse <sup>11,12</sup>		Baseline only <sup>13</sup>		Informational <sup>14</sup>
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Objective Description	Baseline Value (Year)	Midcourse Value (Year)	Target	Movement Toward Target <sup>15</sup>	Movement Away From Baseline <sup>16</sup>	Movement Statistically Significant <sup>17</sup>
<sup>13</sup> SH-1 Adults with symptoms of obstructive sleep apnea who seek medical evaluation (age-adjusted, percent, 20+ years)	25.5% (2005–2008)		28.0%			
<sup>6</sup> SH-2 Motor vehicle crashes involving drowsy driving (per 100 million vehicle miles)	2.7 (2008)	2.4 (2013)	2.1	50.0%		No
<sup>6</sup> SH-3 Students getting sufficient sleep on school nights (percent, grades 9–12)	30.9% (2009)	31.7% (2013)	33.1%	36.4%		No
<sup>11</sup> SH-4 Adults getting sufficient sleep (percent, 18+ years)	69.6% (2008)	67.6% (2014)	70.8%		2.9%	Yes

## NOTES

See [HealthyPeople.gov](#) for all Healthy People 2020 data. The [Technical Notes](#) provide more information on the measures of progress.

## FOOTNOTES

<sup>1</sup>Measurable objectives had a national baseline value.

**Target met or exceeded:**

<sup>2</sup>At baseline the target was not met or exceeded and the midcourse value was equal to or exceeded the target. (The percentage of targeted change achieved was equal to or greater than 100%.)

<sup>3</sup>The baseline and midcourse values were equal to or exceeded the target. (The percentage of targeted change achieved was not assessed.)

**Improving:**

<sup>4</sup>Movement was toward the target, standard errors were available, and the percentage of targeted change achieved was statistically significant.

<sup>5</sup>Movement was toward the target, standard errors were not available, and the objective had achieved 10% or more of the targeted change.

**Little or no detectable change:**

<sup>6</sup>Movement was toward the target, standard errors were available, and the percentage of targeted change achieved was not statistically significant.

<sup>7</sup>Movement was toward the target, standard errors were not available, and the objective had achieved less than 10% of the targeted change.

<sup>8</sup>Movement was away from the baseline and target, standard errors were available, and the percentage change relative to the baseline was not statistically significant.

<sup>9</sup>Movement was away from the baseline and target, standard errors were not available, and the objective had moved less than 10% relative to the baseline.

<sup>10</sup>There was no change between the baseline and the midcourse data point.

**Getting worse:**

<sup>11</sup>Movement was away from the baseline and target, standard errors were available, and the percentage change relative to the baseline was statistically significant.

## FOOTNOTES—Continued

<sup>12</sup>Movement was away from the baseline and target, standard errors were not available, and the objective had moved 10% or more relative to the baseline.

<sup>13</sup>**Baseline only:** The objective only had one data point, so progress toward target attainment could not be assessed.

<sup>14</sup>**Informational:** A target was not set for this objective, so progress toward target attainment could not be assessed.

<sup>15</sup>For objectives that **moved toward** their targets, movement toward the target was measured as the percentage of targeted change achieved (unless the target was already met or exceeded at baseline):

$$\text{Percentage of targeted change achieved} = \frac{\text{Midcourse value} - \text{Baseline value}}{\text{HP2020 target} - \text{Baseline value}} \times 100$$

<sup>16</sup>For objectives that **moved away** from their baselines and targets, movement away from the baseline was measured as the magnitude of the percentage change from baseline:

$$\text{Magnitude of percentage change from baseline} = \frac{|\text{Midcourse value} - \text{Baseline value}|}{\text{Baseline value}} \times 100$$

<sup>17</sup>Statistical significance was tested when the objective had a target and at least two data points, standard errors of the data were available, and a normal distribution could be assumed. Statistical significance of the percentage of targeted change achieved or the magnitude of the percentage change from baseline was assessed at the 0.05 level using a normal one-sided test.

## DATA SOURCES

SH-1 National Health and Nutrition Examination Survey (NHANES), CDC/NCHS

SH-2 General Estimates System (GES), DOT/NHTSA

SH-3 Youth Risk Behavior Surveillance System (YRBSS), CDC/NCHHSTP

SH-4 National Health Interview Survey (NHIS), CDC/NCHS

**Table 38–3. Midcourse Health Disparities<sup>1</sup> for Population-based Sleep Health Objectives**

Most favorable (least adverse) and least favorable (most adverse) group rates and summary disparity ratios<sup>2,3</sup> for selected characteristics at the midcourse data point

## LEGEND

At the midcourse data point

Group with the most favorable (least adverse) rate

Group with the least favorable (most adverse) rate

Data are available, but this group did not have the highest or lowest rate.

Data are not available for this group because the data were statistically unreliable, not collected, or not analyzed.

Population-based Objectives	Sex		Race and Ethnicity		Education <sup>4</sup>		Family Income <sup>5</sup>		Disability		Location																			
	Male	Female	Summary Disparity Ratio <sup>2</sup>	American Indian or Alaska Native	Asian	Native Hawaiian or other Pacific Islander	Two or more races	Hispanic or Latino	Black, not Hispanic	White, not Hispanic	Summary Disparity Ratio <sup>3</sup>	Less than high school	High school graduate	At least some college	Associate's degree	4-year college degree	Advanced degree	Summary Disparity Ratio <sup>3</sup>	Poor	Near-poor	Middle	Near-high	High	Summary Disparity Ratio <sup>3</sup>	Persons with disabilities	Persons without disabilities	Summary Disparity Ratio <sup>2</sup>	Metropolitan	Nonmetropolitan	Summary Disparity Ratio <sup>2</sup>
<b>SH-1</b> Adults with symptoms of obstructive sleep apnea who seek medical evaluation (age-adjusted, percent, 20+ years) (2005–2008)	■	■	1.534*	■	■	■	■	■	■	■	1.422*	■	■	■	■	■	■	1.105	■	■	■	■	■	■	■	■	■	■	■	
<b>SH-3</b> Students getting sufficient sleep on school nights (percent, grades 9–12) (2013)	■	■	1.195*	■	■	■	■	■	■	■	1.089	■	■	■	■	■	■	1.127*	■	■	■	■	■	■	■	■	■	■	■	
<b>SH-4</b> Adults getting sufficient sleep (percent, 18+ years) (2014)	■	■	1.005	■	■	■	■	■	■	■	1.120	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

## NOTES

See [HealthyPeople.gov](#) for all Healthy People 2020 data. The [Technical Notes](#) provide more information on the measures of disparities.

## FOOTNOTES

<sup>1</sup>Health disparities were assessed among population groups within specified demographic characteristics (sex, race and ethnicity, educational attainment, etc.). This assessment did not include objectives that were not population-based, such as those based on states, worksites, or those monitoring the number of events.

<sup>2</sup>When there were only two groups (e.g., male and female), the **summary disparity ratio** was the ratio of the higher to the lower rate.

<sup>3</sup>When there were three or more groups (e.g., white non-Hispanic, black non-Hispanic, Hispanic) and the most favorable rate ( $R_b$ ) was the highest rate, the **summary disparity ratio** was calculated as  $R_b/R_a$ , where  $R_a$  = the average of the rates for all other groups. When there were three or more groups and the most favorable rate was the lowest rate, the summary disparity ratio was calculated as  $R_a/R_b$ .

<sup>4</sup>Unless otherwise footnoted, data do not include persons under age 25 years.

<sup>5</sup>Unless otherwise footnoted, the poor, near-poor, middle, near-high, and high income groups are for persons whose family incomes were less than 100%, 100%–199%, 200%–399%, 400%–599%, and at or above 600% of the poverty threshold, respectively.

## FOOTNOTES—Continued

\*The summary disparity ratio was significantly greater than 1.000. Statistical significance was assessed at the 0.05 level using a normal one-sided test on the natural logarithm scale.

<sup>a</sup>Data are for Mexican-American persons.

<sup>b</sup>Data are for persons who completed some college or received an associate's degree.

<sup>c</sup>Data are for persons who graduated from college or above.

<sup>d</sup>Data are for persons whose family income was 400% to 499% of the poverty threshold.

<sup>e</sup>Data are for persons whose family income was 500% or more of the poverty threshold.

<sup>f</sup>Data are for persons with activity limitations.

<sup>g</sup>Data are for persons without activity limitations.

## DATA SOURCES

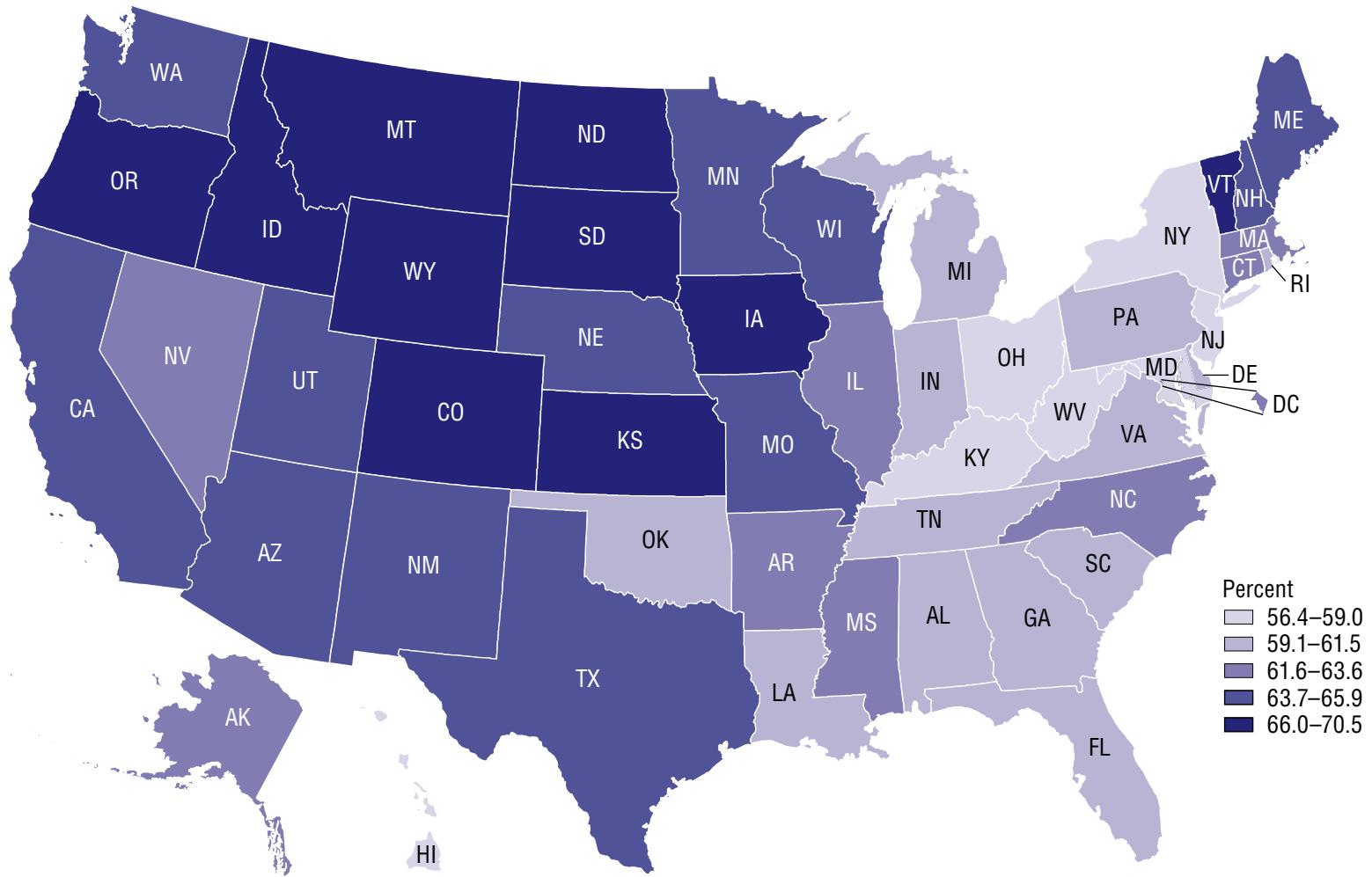
SH-1 National Health and Nutrition Examination Survey (NHANES), CDC/NCHS

SH-3 Youth Risk Behavior Surveillance System (YRBSS), CDC/NCHHSTP

SH-4 National Health Interview Survey (NHIS), CDC/NCHS

## Map 38–1. Adults (18+ years) Who Got Sufficient Sleep, by State: 2013

Healthy People 2020 Objective SH-4 • Related State Data



NOTES: Data are for adults who get an average of at least the following number of hours of sleep in a 24-hour period for their age group: 8 or more hours for those aged 18–21 years and 7 or more hours for those aged 22 years and over. National data for the objective are from the National Health Interview Survey (NHIS) and are the basis for setting the national target of 70.8%. State data are from the Behavioral Risk Factor Surveillance System (BRFSS). Data from the NHIS (67.6% in 2013) may not be directly comparable to the all-states combined data from the BRFSS (62.4% in 2013), and therefore the national target may not be applicable to individual states. Data are displayed by a Jenks classification for U.S. states which creates categories that minimize within-group variation and maximize between-group variation. The [Technical Notes](#) provide more information on the data and methods.

DATA SOURCE: Behavioral Risk Factor Surveillance System (BRFSS), CDC/NCCDPHP