



Vision and Hearing

CHAPTER 28

Lead Agency

National Institutes of Health

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GOAL:

Improve the visual and hearing health of the Nation through prevention, early detection, treatment, and rehabilitation.



This chapter includes objectives that monitor progress in two major Healthy People areas:

- › **Vision.** The objectives in this area track visual impairments, occupational eye injuries, eye examinations, visual rehabilitation services, and the use of protective equipment.
- › **Hearing.** This area includes objectives that monitor hearing loss, newborn screening for hearing problems, the use of hearing aids, and hearing examinations.

All Healthy People tracking data quoted in this chapter, along with technical information and Operational Definitions for each objective, can be found in the Healthy People 2010 database, DATA2010, available from <http://wonder.cdc.gov/data2010/>.

More information about this Focus Area can be found in the following publications:

- › *Healthy People 2010: Understanding and Improving Health*, available from <http://www.healthypeople.gov/2010/Document/tableofcontents.htm#under>.
- › *Healthy People 2010 Midcourse Review*, available from <http://www.healthypeople.gov/2010/data/midcourse/html/default.htm#FocusAreas>.

Highlights

- › Substantial progress was made in the Vision and Hearing Focus Area objectives during the past decade (Figure 28-1) [1]. Two thirds of the Vision objectives and over one half of the Hearing objectives with data available to measure progress moved toward or achieved their Healthy People 2010 targets. Health disparities were observed for some objectives among select population groups (Figure 28-2), as highlighted below [2].

- › Several Vision objectives exceeded their Healthy People 2010 targets:

- Visual impairment due to diabetic retinopathy among adults aged 18 and over with diabetes (objective 28-5) declined, decreasing 40.0% between 2002 and 2008, from 45.8 to 27.5 per 1,000 population (age adjusted), exceeding the 2010 target of 40.9.
- Occupational eye injuries declined. A decrease of 39.6% was observed for injuries resulting in lost work days (objective 28-8a) between 2002 and 2008, from 4.8 to 2.9 per 10,000 full time workers in private industry, exceeding the 2010 target of 3.4. The rate of eye injuries treated in emergency departments (objective 28-8b) also decreased 38.6% between 1999 and 2008, from 21.0 to 12.9 per 10,000 full-time workers, exceeding the target of 14.7.
- Females had a lower (better) rate of occupational eye injuries resulting in lost work days, 1.3 per 10,000 full time workers in private industry in 2008. The rate for males, 4.0 per 10,000 full-time workers in private industry, was more than three times the rate for females [2].
- Adult use of protective eyewear at home (objective 28-9b) increased 21.2% between 2002 and 2008, from 33% to 40% (age adjusted), exceeding the Healthy People 2010 target of 37%.
- The use of vision rehabilitation services by visually impaired persons (objective 28-10a) more than doubled during the same period, increasing from 14.0 to 30.1 per 1,000 visually impaired adults aged 18 and over (age adjusted), exceeding the 2010 target of 15.5.

- › A statistically significant disparity was observed in blindness and visual impairment among children and adolescents (objective 28-4). Persons without disabilities had lower (better) rates of blindness and visual impairment in both 1997 and 2008, 19 and

24 per 1,000 population aged 17 years and under, respectively. The rates for persons with disabilities, were 92 per 1,000 population in 1997 and 68 in 2008. In 2008, the rate for children and adolescents with disabilities was almost three times the rate for those without disabilities. The disparity between children and adolescents without disabilities and those with disabilities declined by more than 100 percentage points between 1997 and 2008 [2,3].

- › Several Hearing objectives, including the following, exceeded the 2010 targets:
 - *Otitis media* in children and adolescents (objective 28-12) declined by almost 30% between 1997 and 2007, from 344.7 to 246.6 per 1,000 population aged under 18 years, exceeding the target of 294.
 - The use of cochlear implants by deaf or very hard of hearing persons (objective 28-13b) increased between 2001 and 2006, from 57 to 92 per 10,000 population, exceeding the target of 63.
 - The use of hearing aids by adults with hearing loss (objectives 28-13c) also increased between 2001 and 2007, from 255.2 to 289.1 per 1,000 population aged 70 and over, exceeding the target of 280.7.

- › Four objectives (28-13d, 28-14c, 28-15, and 28-16b) had no follow-up data available to measure progress.
- › Figure 28-2 displays health disparities in Vision and Hearing from the best group rate for each characteristic at the most recent data point [2]. It also displays changes in disparities from baseline to the most recent data point [3].

- Of the 10 objectives with statistically significant racial and ethnic health disparities of 10% or more, the non-Hispanic white population had the best rate for 5 objectives (28-3, 28-9b, 28-13c, 28-15, and 28-16b); the non-Hispanic black population had the best rate for 2 objectives (28-14a and b), as did the population of persons of two or more races (28-1 and 28-2); and the Hispanic or Latino population had the best rate for 1 objective (28-16a).
- For seven objectives, statistically significant health disparities of 10% or more were observed between females and males (objectives 28-1, 28-7, 28-9b, 28-13c, 28-14a, and 28-16a and b). In addition, one objective exhibited a health disparity of 100% or more (see Highlights, above), but lacked data to assess statistical significance (objective 28-8a). Males had better rates than females for six of these eight objectives (28-7, 28-9b, 28-13c, 28-14a, and 28-16a and b). Females had better rates for two objectives (28-1 and 28-8a).
- Persons with at least some college education had the best group rate for three of the four objectives with statistically significant health disparities of 10% or more by education level (28-1, and 28-13a and c). High school graduates had the best group rate for one objective (28-7).
- Persons with middle/high incomes had the best group rate for three of the four objectives with statistically significant health disparities of 10% or more by income (objectives 28-3, 28-13-d, and 28-16a). Near-poor persons had the best group rate for the fourth objective (28-9a).
- Persons with disabilities had better rates than persons without disabilities for two of the three objectives with statistically significant health disparities of 10% or more by disability status (objectives 28-14b and 28-15). Persons without disabilities had the better rate for one objective (28-4).
- Health disparities of 100% or more were observed for two objectives: blindness and visual impairment in children and adolescents (objective 28-4), and occupational eye injuries resulting in lost work days (objective 28-8a). A statistically significant decline in disparity also was observed for blindness and visual impairment in children and adolescents; see Highlights, above.

Summary of Progress

- › Figure 28-1 presents a quantitative assessment of progress in achieving the Healthy People 2010 objectives for Vision and Hearing. Data to measure progress toward target attainment were available for 25 objectives [1]. Of these:
 - Nine objectives (28-5, 28-8a and b, 28-9b, 28-10a, 28-12, 28-13b and c, and 28-14b) met or exceeded their Healthy People 2010 targets.
 - Six objectives moved toward their targets. A statistically significant difference between the baseline and the final data points was observed for one of these objectives (28-2). No significant differences were observed for three objectives (28-7, 28-9b, and 28-17); and data to test the significance of the difference were unavailable for two objectives (28-11a and b).
 - One objective (28-1) showed no change.
 - Nine objectives moved away from their targets. A statistically significant difference between the baseline and the final data points was observed for two of these objectives (28-3 and 28-10b). No significant differences were observed for six objectives (28-4, 28-6, 28-13a, 28-14a, 28-16a, and 28-18); and data to test the significance of the difference were unavailable for one objective (28-11c).

Transition to Healthy People 2020

To emphasize the individual importance of Vision and Hearing, the Healthy People 2010 Vision and Hearing Focus Area was divided into two separate Topic Areas for Healthy People 2020: 1) Vision, and 2) Hearing and Other Sensory or Communication Disorders. Other sensory or communication disorders include disorders of the ear, nose, throat, and conditions associated with voice, speech, and language (ENT-VSL). See [HealthyPeople.gov](https://www.hhs.gov/healthypeople) for a complete list of Healthy People 2020 topics and objectives.

The Healthy People 2020 Vision Topic Area covers:

- › Eye examinations among adults and vision screening among children
- › Visual impairment due to selected eye diseases
- › Occupational eye injuries
- › Use of protective eyewear at home and during recreational activities
- › Use of vision rehabilitation services and visual adaptive devices
- › Comprehensive vision health service provided in Federally Qualified Health Centers (FQHCs).

The Healthy People 2020 Hearing and Other Sensory or Communication Disorders Topic Area includes new objectives in addition to the Healthy People 2010 hearing objectives. The Topic Area objectives can be grouped into several sections:

- › Newborn hearing screening
- › Ear infections (*otitis media*)
- › Hearing
- › Tinnitus
- › Balance and dizziness
- › Smell and taste (chemosenses)
- › Voice, speech, and language
- › Internet health care resources for ENT-VSL.

The differences between the objectives for Healthy People 2010 and Healthy People 2020 are summarized below:

- › The Healthy People 2010 Vision and Hearing Focus Area had a total of 29 objectives, including 13 vision and 16 hearing objectives. For Healthy People 2020,

the Vision Topic Area has 15 objectives and the Hearing and Other Sensory or Communication Disorders Topic Area has 36 objectives.

Vision

- › Ten Healthy People 2010 Vision objectives (28-1 through 28-4, 28-8a and b, 28-9a and b, and 28-10a and b) were retained “as is” [4].
- › Three Vision objectives (28-5, 28-6, and 28-7) on reduction of visual impairment caused by age-related eye diseases were modified because of changes in survey methodology [5].
- › Two new Vision objectives were added to the Healthy People 2020 Topic Area:
 - The first addresses visual impairment due to age-related macular degeneration.
 - The second measures the proportion of FQHCs that provide comprehensive vision health services.

Hearing and Other Sensory or Communication Disorders

- › All sixteen Healthy People 2010 Hearing objectives (28-11a through 28-18) were retained “as is” [4].
- › Twenty new objectives were added to this Healthy People 2020 Topic Area:
 - Three tinnitus objectives focus on adults bothered by tinnitus who have seen a health provider, audiologist or otolaryngologist, and tried appropriate treatment.
 - Twelve new objectives on balance, dizziness, and smell or taste disorders will track use of health care services, referrals to health care specialists, treatment, negative or adverse outcomes, falls and injuries caused by balance and dizziness conditions, and impact of these conditions on general health status and quality of life.
 - Four voice, speech, and language objectives were introduced to Healthy People 2020 to highlight the importance of timely evaluation, treatment, and use of rehabilitation services in improving the quality of life of patients with VSL conditions.
 - One new objective on the use of Internet health care resources for ENT-VSL disorders was added to measure the number of people who used the Internet for health care information, guidance, or advice.

[Appendix D](#), “A Crosswalk Between Objectives From Healthy People 2010 to Healthy People 2020,” summarizes the changes between the two decades of objectives, reflecting new knowledge and direction for this area.

Data Considerations

Education and income are the primary measures of socioeconomic status in Healthy People 2010. Most data systems used in Healthy People 2010 define income as a family's income before taxes. To facilitate comparisons among groups and over time, while adjusting for family size and for inflation, Healthy People 2010 categorizes income using the poverty thresholds developed by the Census Bureau. Thus, the three categories of family income that are primarily used are:

- › Poor—below the Federal poverty level
- › Near poor—100% to 199% of the Federal poverty level
- › Middle/high income—200% or more of the Federal poverty level.

These categories may be overridden by considerations specific to the data system, in which case they are modified as appropriate. See *Healthy People 2010: General Data Issues*, referenced below.

In general, data on educational attainment are presented for persons aged 25 and over, consistent with guidance given by the Census Bureau. However, because of the requirements of the different data systems, the age groups used to calculate educational attainment for any specific objective may differ from the age groups used to report the data for other Healthy People 2010 objectives, as well as from select populations within the same objective. Therefore, the reader is urged to exercise caution in interpreting the data by educational attainment shown in the Health Disparities Table. See *Healthy People 2010: General Data Issues*, referenced below.

Additional information on data issues is available from the following sources:

- › All Healthy People 2010 tracking data can be found in the Healthy People 2010 database, DATA2010, available from <http://wonder.cdc.gov/data2010/>.
- › Detailed information about the data and data sources used to support these objectives can be found in the Operational Definitions on the DATA 2010 website, available from <http://wonder.cdc.gov/data2010/focusod.htm>.
- › More information on statistical issues related to Healthy People tracking and measurement can be found in the [Technical Appendix](#) and in *Healthy People 2010: General Data Issues*, which is available in the General Data Issues section of the NCHS Healthy People website under Healthy People 2010; see http://www.cdc.gov/nchs/healthy_people/hp2010/hp2010_data_issues.htm.

Notes

1. Displayed in the Progress Chart (Figure 28-1), the percent of targeted change achieved expresses the difference between the baseline and the final value relative to the initial difference between the baseline and the Healthy People 2010 target. As such, it is a relative measure of progress toward attaining the Healthy People 2010 target. See the [Reader's Guide](#) for more information. When standard errors were available, the difference between the baseline and the final value was tested at the 0.05 level of significance. See the Figure 28-1 footnotes, as well as the [Technical Appendix](#), for more detail.
2. Information about disparities among select populations is shown in the Health Disparities Table (Figure 28-2). Disparity from the best group rate is defined as the percent difference between the best group rate and each of the other group rates for a characteristic. For example, racial and ethnic health disparities are measured as the percent difference between the best racial and ethnic group rate and each of the other racial and ethnic group rates. Similarly, disparities by sex are measured as the percent difference between the better group rate (e.g., female) and the rate for the other group (e.g., male). Some objectives are expressed in terms of favorable events or conditions that are to be increased, while others are expressed in terms of adverse events or conditions that are to be reduced. To facilitate comparison of health disparities across different objectives, disparity is measured only in terms of adverse events or conditions. For comparability across objectives, objectives that are expressed in terms of favorable events or conditions are re-expressed using the adverse event or condition for the purpose of computing disparity, but they are not otherwise restated or changed. For example, objective 1-1, to increase the proportion of persons with health insurance (e.g., 72% of the American Indian or Alaska Native population under age 65 had some form of health insurance in 2008), is expressed in terms of the percentage of persons without health insurance (e.g., $100\% - 72\% = 28\%$ of the American Indian or Alaska Native population under age 65 did not have any form of health insurance in 2008) when the disparity from the best group rate is calculated. See the [Reader's Guide](#) for more information. When standard errors were available, the difference between the best group rate and each of the other group rates was tested at the 0.05 level of significance. See the Figure 28-2 footnotes, as well as the [Technical Appendix](#), for more detail.
3. The change in disparity is estimated by subtracting the disparity at baseline from the disparity at the

most recent data point and, therefore, is expressed in percentage points. See the [Reader's Guide](#) for more information. When standard errors were available, the change in disparity was tested at the 0.05 level of significance. See the Figure 28-2 footnotes, as well as the [Technical Appendix](#), for more detail.

4. As of the Healthy People 2020 launch, Healthy People 2020 objectives that were retained “as is” from Healthy People 2010 had no change in the numerator or denominator definitions, the data source(s), or the data collection methodology. These include

objectives that were developmental in Healthy People 2010 and are developmental in Healthy People 2020, and for which no numerator information is available.

5. As of the Healthy People 2020 launch, objectives that were modified from Healthy People 2010 had some change in the numerator or denominator definitions, the data source(s), or the data collection methodology. These include objectives that went from developmental in Healthy People 2010 to measurable in Healthy People 2020, or vice versa.

Comprehensive Summary of Objectives: Vision and Hearing

Objective	Description	Data Source
28-1	Dilated eye examination within the past 2 years (age adjusted, 18+ years)	National Health Interview Survey (NHIS), CDC, NCHS.
28-2	Vision screening for children (<6 years)	National Health Interview Survey (NHIS), CDC, NCHS.
28-3	Uncorrected visual impairment due to refractive errors (age adjusted, per 1,000 population, 12+ years)	National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
28-4	Blindness and visual impairment in children and adolescents (per 1,000 population, ≤17 years)	National Health Interview Survey (NHIS), CDC, NCHS.
28-5	Visual impairment due to diabetic retinopathy (age adjusted, per 1,000 population, 18+ years with diabetes)	National Health Interview Survey (NHIS), CDC, NCHS.
28-6	Visual impairment due to glaucoma (age adjusted, per 1,000 population, 45+ years)	National Health Interview Survey (NHIS), CDC, NCHS.
28-7	Visual impairment due to cataract (age adjusted, per 1,000 population, 65+ years)	National Health Interview Survey (NHIS), CDC, NCHS.
28-8a	Occupational eye injuries resulting in lost work days (per 10,000 full-time workers in private industry)	Survey of Occupational Injuries and Illnesses (SOII), Department of Labor (DOL), Bureau of Labor Statistics (BLS).
28-8b	Occupational eye injuries treated in emergency departments (per 10,000 full-time workers)	National Electronic Injury Surveillance System (NEISS), Consumer Product Safety Commission (CPSC) and CDC, NIOSH.
28-9a	Use of protective eyewear at home—Children and adolescents 6–17 years	National Health Interview Survey (NHIS), CDC, NCHS.
28-9b	Use of protective eyewear at home—Adults 18+ years (age adjusted)	National Health Interview Survey (NHIS), CDC, NCHS.
28-10a	Use of vision rehabilitation services by visually impaired persons (age adjusted, per 1,000 population, 18+ years)	National Health Interview Survey (NHIS), CDC, NCHS.
28-10b	Use of visual adaptive devices by visually impaired persons (age adjusted, 18+ years)	National Health Interview Survey (NHIS), CDC, NCHS.
28-11a	Newborns receiving hearing screening before age 1 month	Baseline data: Directors of Speech and Hearing Programs in State Health and Welfare Agencies. Final data: Early Hearing Detection and Intervention (EHDI) Program, CDC, NCBDD; and/or specific State data.

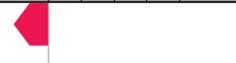
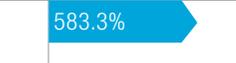
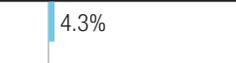
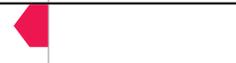
Comprehensive Summary of Objectives: Vision and Hearing (continued)

Objective	Description	Data Source
28-11b	Infants with possible hearing loss receiving hearing evaluation before age 3 months	Baseline data: Directors of Speech and Hearing Programs in State Health and Welfare Agencies. Final data: Early Hearing Detection and Intervention (EHDI) Program, CDC, NCBDD; and/or specific State data.
28-11c	Infants with hearing loss receiving intervention services before age 6 months	Baseline data: Directors of Speech and Hearing Programs in State Health and Welfare Agencies. Final data: Early Hearing Detection and Intervention (EHDI) Program, CDC, NCBDD; and/or specific State data.
28-12	<i>Otitis media</i> in children and adolescents (per 1,000 population, <18 years)	National Ambulatory Medical Care Survey (NAMCS), CDC, NCHS; National Hospital Ambulatory Medical Care Survey (NHAMCS), CDC, NCHS.
28-13a	Use of hearing aids by adults with hearing loss (per 1,000 population, 20–69 years)	National Health Interview Survey (NHIS), CDC, NCHS; National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
28-13b	New cochlear implants by deaf or very hard of hearing persons (per 10,000 population)	Healthcare Cost and Utilization Project (HCUP), AHRQ; National Health Interview Survey (NHIS), CDC, NCHS.
28-13c	Use of hearing aids by older adults with hearing loss (per 1,000 population, 70+ years)	National Health Interview Survey (NHIS), CDC, NCHS; National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
28-13d	Use of assistive listening devices by older adults with hearing loss (per 1,000 population, 70+ years)	National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
28-14a	Hearing examination in past 5 years—Adults 20–69 years (age adjusted)	National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
28-14b	Hearing examination in past 5 years—Older adults 70+ years	National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
28-14c	Hearing examination in past 5 years—Adolescents 12–19 years	National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
28-15	Primary care provider referrals for hearing evaluation and treatment	National Health Interview Survey (NHIS), CDC, NCHS.
28-16a	Use of ear protection devices when exposed to loud noises (age adjusted, per 1,000 population, 20–69 years)	National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
28-16b	Use of ear protection devices among adolescents when exposed to loud noises (per 1,000 population, 12–19 years)	National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
28-17	Audiometric notches (both ears) signifying noise-induced hearing loss among adolescents (per 1,000 population, 12–19 years)	National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
28-18	Audiometric notches (both ears) signifying noise-induced hearing loss (age adjusted, per 1,000 population, 20–69 years)	National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

Figure 28-1. Progress Toward Target Attainment for Focus Area 28: Vision and Hearing

LEGEND		 Moved away from target ¹	 Moved toward target	 Met or exceeded target					
Objective	Percent of targeted change achieved ²	2010 Target	Baseline (Year)	Final (Year)	Baseline vs. Final				
					Difference ³	Statistically Significant ⁴	Percent Change ⁵		
28-1. Dilated eye examination within the past 2 years (age adjusted, 18+ years)	0.0%	58%	55% (2002)	55% (2008)	0	No	0.0%		
28-2. Vision screening for children (<6 years)	25.0%	52%	36% (2002)	40% (2008)	4	Yes	11.1%		
28-3. Uncorrected visual impairment due to refractive errors (age adjusted, per 1,000 population, 12+ years)		101.1	118.0 (1999–2002)	136.1 (2005–08)	18.1	Yes	15.3%		
28-4. Blindness and visual impairment in children and adolescents (per 1,000 population, ≤17 years)		18	24 (1997)	28 (2008)	4	No	16.7%		
28-5. Visual impairment due to diabetic retinopathy (age adjusted, per 1,000 population, 18+ years with diabetes)	373.5%	40.9	45.8 (2002)	27.5 (2008)	-18.3	Yes	-40.0%		
28-6. Visual impairment due to glaucoma (age adjusted, per 1,000 population, 45+ years)		10.7	13.5 (2002)	14.3 (2008)	0.8	No	5.9%		
28-7. Visual impairment due to cataract (age adjusted, per 1,000 population, 65+ years)	1.8%	91.4	119.3 (2002)	118.8 (2008)	-0.5	No	-0.4%		
28-8a. Occupational eye injuries resulting in lost work days (per 10,000 full-time workers in private industry)	135.7%	3.4	4.8 (2002)	2.9 (2008)	-1.9	Not tested	-39.6%		
28-8b. Occupational eye injuries treated in emergency departments (per 10,000 full-time workers)	128.6%	14.7	21.0 (1999)	12.9 (2008)	-8.1	Yes	-38.6%		
28-9. Use of protective eyewear at home									
a. Children and adolescents 6–17 years	40.0%	20%	15% (2002)	17% (2008)	2	No	13.3%		
b. Adults 18+ years (age adjusted)	175.0%	37%	33% (2002)	40% (2008)	7	Yes	21.2%		
28-10a. Use of vision rehabilitation services by visually impaired persons (age adjusted, per 1,000 population, 18+ years)	1,073.3%	15.5	14.0 (2002)	30.1 (2008)	16.1	Yes	115.0%		
28-10b. Use of visual adaptive devices by visually impaired persons (age adjusted, 18+ years)		26%	22% (2002)	11% (2008)	-11	Yes	-50.0%		
28-11a. Newborns receiving hearing screening before age 1 month	66.7%	90%	66% (2001)	82% (2007)	16	Not tested	24.2%		
28-11b. Infants with possible hearing loss receiving hearing evaluation before age 3 months	71.4%	70%	56% (2001)	66% (2007)	10	Not tested	17.9%		
28-11c. Infants with hearing loss receiving intervention services before age 6 months		85%	57% (2001)	50% (2007)	-7	Not tested	-12.3%		
28-12. <i>Otitis media</i> in children and adolescents (per 1,000 population, <18 years)	193.5%	294.0	344.7 (1997)	246.6 (2007)	-98.1	Yes	-28.5%		

Figure 28-1. Progress Toward Target Attainment for Focus Area 28: Vision and Hearing (continued)

Objective	Percent of targeted change achieved ²	2010 Target	Baseline (Year)	Final (Year)	Baseline vs. Final		
					Difference ³	Statistically Significant ⁴	Percent Change ⁵
28-13a. Use of hearing aids by adults with hearing loss (per 1,000 population, 20–69 years)		182.5	165.9 (2001)	162.7 (2006)	-3.2	No	-1.9%
28-13b. New cochlear implants by deaf or very hard of hearing persons (per 10,000 population)		63	57 (2001)	92 (2006)	35	Yes	61.4%
28-13c. Use of hearing aids by older adults with hearing loss (per 1,000 population, 70+ years)		280.7	255.2 (2001)	289.1 (2007)	33.9	No	13.3%
28-14. Hearing examination in past 5 years							
a. Adults 20–69 years (age adjusted)		35% (1999–2002)	30% (2003–04)	29% (2003–04)	-1	No	-3.3%
b. Older adults 70+ years		41% (1999–2002)	38% (2003–06)	41% (2003–06)	3	No	7.9%
28-16a. Use of ear protection devices when exposed to loud noises (age adjusted, per 1,000 population, 20–69 years)		514.5	489.8 (1999–2002)	483.0 (2003–04)	-6.8	No	-1.4%
28-17. Audiometric notches (both ears) signifying noise-induced hearing loss among adolescents (per 1,000 population, 12–19 years)		34.7	46.4 (1988–94)	45.9 (2005–06)	-0.5	No	-1.1%
28-18. Audiometric notches (both ears) signifying noise-induced hearing loss (age adjusted, per 1,000 population, 20–69 years)		88.1	119.0 (1999–2002)	121.4 (2003–04)	2.4	No	2.0%

NOTES

See the [Reader's Guide](#) for more information on how to read this figure. See DATA2010 at <http://wonder.cdc.gov/data2010> for all HealthyPeople 2010 tracking data. Tracking data are not available for objectives 28-13d, 28-14c, 28-15, and 28-16b.

FOOTNOTES

¹ Movement away from target is not quantified using the percent of targeted change achieved. See [Technical Appendix](#) for more information.

² Percent of targeted change achieved = $\frac{\text{Final value} - \text{Baseline value}}{\text{Healthy People 2010 target} - \text{Baseline value}} \times 100$.

³ Difference = Final value – Baseline value. Differences between percents (%) are measured in percentage points.

⁴ When estimates of variability are available, the statistical significance of the difference between the final value and the baseline value is assessed at the 0.05 level. See [Technical Appendix](#) for more information.

⁵ Percent change = $\frac{\text{Final value} - \text{Baseline value}}{\text{Baseline value}} \times 100$.

DATA SOURCES

- 28-1–28-2. National Health Interview Survey (NHIS), CDC, NCHS.
- 28-3. National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
- 28-4–28-7. National Health Interview Survey, (NHIS), CDC, NCHS.
- 28-8a. Survey of Occupational Injuries and Illnesses (SOII), Department of Labor (DOL), Bureau of Labor Statistics (BLS).
- 28-8b. National Electronic Injury Surveillance System (NEISS), Consumer Product Safety Commission (CPSC) and CDC, NIOSH.
- 28-9a–b. National Health Interview Survey (NHIS), CDC, NCHS.
- 28-10a–b. National Health Interview Survey (NHIS), CDC, NCHS.
- 28-11a–c. Baseline data: Directors of Speech and Hearing Programs in State Health and Welfare Agencies. Final data: Early Hearing Detection and Intervention (EHDI) Program, CDC, NCBDD; and/or specific State data.
- 28-12. National Ambulatory Medical Care Survey (NAMCS), CDC, NCHS; National Hospital Ambulatory Medical Care Survey (NHAMCS), CDC, NCHS.
- 28-13a. National Health Interview Survey (NHIS), CDC, NCHS; National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
- 28-13b. Healthcare Cost and Utilization Project (HCUP), AHRQ; National Health Interview Survey (NHIS), CDC, NCHS.
- 28-13c. National Health Interview Survey (NHIS), CDC, NCHS; National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
- 28-14a–b. National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
- 28-16a. National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
- 28-17–28-18. National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

Figure 28-2. Health Disparities Table for Focus Area 28: Vision and Hearing

Disparities from the best group rate for each characteristic at the most recent data point and changes in disparity from the baseline to the most recent data point.

Population-based objective	Race and Ethnicity							Sex		Education				Income				Disability			
	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 index	Female	Male	Less than high school	High school graduate	At least some college	Summary index	Poor	Near poor	Middle/high income	Summary index	Persons with disabilities	Persons without disabilities	
28-1. Dilated eye examination within the past 2 years (age adjusted, 18+ years) (2002, 2008)*				B ⁱ			↓		B				B								
28-2. Vision screening for children (<6 years) (2002, 2008)*				B					B ⁱ	B						B ⁱ					
28-3. Uncorrected visual impairment due to refractive errors (age adjusted, per 1,000 population, 12+ years) (1999–2002, 2005–08)*					ii		B			B					↓		B				
28-4. Blindness and visual impairment in children and adolescents (per 1,000 population, ≤17 years) (1997, 2008) ^{1*}																			↓	↓	B
28-5. Visual impairment due to diabetic retinopathy (age adjusted, per 1,000 population, 18+ years with diabetes) (2002, 2008)*																					
28-6. Visual impairment due to glaucoma (age adjusted, per 1,000 population, 45+ years) (2002, 2008)*																					
28-7. Visual impairment due to cataract (age adjusted, per 1,000 population, 65+ years) (2002, 2008)*					b	b	B			B		B									
28-8a. Occupational eye injuries resulting in lost work days (per 10,000 full-time workers in private industry) (2002, 2008) ^{2†}									B	↑											
28-8b. Occupational eye injuries treated in emergency departments (per 10,000 full-time workers) (1999, 2008)*																					
28-9a. Use of protective eyewear at home— Children and adolescents 6–17 years (2002, 2008)*						B ⁱ		iii		B						B ⁱ					
b. Use of protective eyewear at home— Adults 18+ years (age adjusted) (2002, 2008)*						B ⁱ				B		B									
28-10a. Use of vision rehabilitation services by visually impaired persons (age adjusted, per 1,000 population, 18+ years) (2002, 2008)*							B		iv			B ⁱ									
28-10b. Use of visual adaptive devices by visually impaired persons (age adjusted, 18+ years) (2002, 2008)*						B	B ⁱ	iii		B ⁱ		B									
28-12. <i>Otitis media</i> in children and adolescents (per 1,000 population, <18 years) (1997, 2007)*										i											
28-13a. Use of hearing aids by adults with hearing loss (per 1,000 population, 20–69 years) (2001, 2006)*							i					B ⁱ							v	B ^v	
28-13b. New cochlear implants by deaf or very hard of hearing persons (per 10,000 population) (2001, 2006)*									B												

Figure 28-2. Health Disparities Table for Focus Area 28: Vision and Hearing (continued)

Population-based objective	Race and Ethnicity							Summary index	Sex		Education			Income			Disability			
	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		Female	Male	Less than high school	High school graduate	At least some college	Summary index	Poor	Near poor	Middle/high income	Summary index	Persons with disabilities	Persons without disabilities
28-13c. Use of hearing aids by older adults with hearing loss (per 1,000 population, 70+ years) (2001, 2007)*							B			B			B ⁱ						B ^v	v
28-13d. Use of assistive listening devices by older adults with hearing loss (per 1,000 population, 70+ years) (2005–06)*					ii		B			B			B				B			
28-14a. Hearing examination in past 5 years—Adults 20–69 years (age adjusted) (1999–2002, 2003–04)*					ii		B			B							B			B
b. Hearing examination in past 5 years—Older adults 70+ years (1999–2002, 2003–06)*					ii		B ⁱ		↓	B					↓	↓	B	↓		B
c. Hearing examination in past 5 years—Adolescents 12–19 years (2005–06)*					ii															
28-15. Primary care provider referrals for hearing evaluation and treatment (2007)*							B			B			B				B			B
28-16a. Use of ear protection devices when exposed to loud noises [age adjusted, per 1,000 population (pop.), 20–69 years] (1999–2002, 2003–04)*					B ^{i,ii}					B					↓		B			
28-16b. Use of ear protection devices among adolescents when exposed to loud noises (per 1,000 pop., 12–19 years) (2005–06)*					ii		B			B						B				
28-17. Audiometric notches (both ears) signifying noise-induced hearing loss among adolescents (per 1,000 pop., 12–19 years) (1988–94, 2005–06)*					ii															
28-18. Audiometric notches (both ears) signifying noise-induced hearing loss (age adjusted, per 1,000 pop., 20–69 years) (1999–2002, 2003–04)*					ii															

NOTES

See DATA2010 at <http://wonder.cdc.gov/data2010> for all Healthy People 2010 tracking data. Disparity data are either unavailable or not applicable for objectives 28-11a through c.

Years in parentheses represent the baseline and most recent data years (if available).

Disparity from the best group rate is defined as the percent difference between the best group rate and each of the other group rates for a characteristic (e.g., race and ethnicity). The summary index is the average of these percent differences for a characteristic. Change in disparity is estimated by subtracting the disparity at baseline from the disparity at the most recent data point. Change in the summary index is estimated by subtracting the summary index at baseline from the summary index at the most recent data point. See [Technical Appendix](#) for more information.

Figure 28-2. Health Disparities Table for Focus Area 28: Vision and Hearing (continued)

LEGEND			
The “best” group rate at the most recent data point.		The group with the best rate for specified characteristic.	
		Most favorable group rate for specified characteristic, but reliability criterion not met.	
		Reliability criterion for best group rate not met, or data available for only one group.	
Percent difference from the best group rate			
Disparity from the best group rate at the most recent data point.		Less than 10%, or difference not statistically significant (when estimates of variability are available).	
		10%–49%	
		50%–99%	
		100% or more	
Changes in disparity over time are shown when: (a) disparities data are available at both baseline and most recent time points; (b) data are not for the group(s) indicated by “B” or “b” at either time point; and (c) the change is greater than or equal to 10 percentage points and statistically significant, or when the change is greater than or equal to 10 percentage points and estimates of variability were not available. See Technical Appendix .	Increase in disparity (percentage points)		
		10–49 points	
			
			100 points or more
	Decrease in disparity (percentage points)		
		10–49 points	
			
		100 points or more	
Availability of Data			
		Data not available.	
		Characteristic not selected for this objective.	

FOOTNOTES

* Measures of variability were available. Thus, the variability of best group rates was assessed, and statistical significance was tested. Disparities of 10% or more are displayed when the differences from the best group rate are statistically significant at the 0.05 level. Changes in disparities over time are indicated by arrows when the changes are greater than or equal to 10 percentage points and are statistically significant at the 0.05 level. See [Technical Appendix](#).

† Measures of variability were not available. Thus, the variability of best group rates was not assessed, and statistical significance could not be tested. Nonetheless, disparities and changes in disparities over time are displayed according to their magnitude. See [Technical Appendix](#).

¹ Baseline data by race and ethnicity are for 1999.

² Baseline data by sex are for 2006.

ⁱ The group with the best rate at the most recent data point is different from the group with the best rate at baseline. Both rates met the reliability criterion. See [Technical Appendix](#).

ⁱⁱ Data are for Mexican American.

ⁱⁱⁱ Change in the summary index cannot be assessed. See [Technical Appendix](#).

^{iv} Reliability criterion for best group rate not met, or data available for only one group, at baseline. Change in disparity cannot be assessed. See [Technical Appendix](#).

^v For this objective, only activity limitations are considered as disabilities.

DATA SOURCES

- 28-1–28-2. National Health Interview Survey (NHIS), CDC, NCHS.
- 28-3. National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
- 28-4–28-7. National Health Interview Survey (NHIS), CDC, NCHS.
- 28-8a. Survey of Occupational Injuries and Illnesses (SOII), Department of Labor (DOL), Bureau of Labor Statistics (BLS).
- 28-8b. National Electronic Injury Surveillance System (NEISS), Consumer Product Safety Commission (CPSC) and CDC, NIOSH.
- 28-9a–b. National Health Interview Survey (NHIS), CDC, NCHS.
- 28-10a–b. National Health Interview Survey (NHIS), CDC, NCHS.
- 28-12. National Ambulatory Medical Care Survey (NAMCS), CDC, NCHS; National Hospital Ambulatory Medical Care Survey (NHAMCS), CDC, NCHS.
- 28-13a. National Health Interview Survey (NHIS), CDC, NCHS; National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
- 28-13b. Healthcare Cost and Utilization Project (HCUP), AHRQ; National Health Interview Survey (NHIS), CDC, NCHS.
- 28-13c. National Health Interview Survey (NHIS), CDC, NCHS; National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
- 28-13d. National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
- 28-14a–c. National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
- 28-15. National Health Interview Survey (NHIS), CDC, NCHS.
- 28-16a–b. National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.
- 28-17–28-18. National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

