Healthy People 2010 Leading Health Indicators: How Children With Special Health Care Needs Fared

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Objectives. We compared estimates for children with and without special health care needs (SHCN) at 2 time periods for national health objectives related to the Healthy People 2010 leading health indicators (LHIs).

Methods. Data were from the 2003 and 2007 National Surveys of Children's Health. Seven survey items were relevant to the LHIs and available in both survey years: physical activity, obesity, household tobacco use, current insurance, personal health care provider, past-month depressive symptoms, and past-year emergency department visits.

Results. In 2003 and 2007, children with SHCN fared worse than those without SHCN with respect to physical activity, obesity, household tobacco exposure, depressive symptomology, and emergency department visits, but fared better on current insurance and having a personal health care provider. Physical activity and access to a personal health care provider increased for all children, whereas the absolute disparity in personal provider access decreased 4.9%.

Conclusions. Significant disparities exist for key population health indicators between children with and without SHCN. Analyses illustrated how population-based initiatives could be used to frame health challenges among vulnerable populations. (*Am J Public Health.* 2013;103:e99–e106. doi:10.2105/AJPH.2012.301001)

Now in its fourth generation, Healthy People (HP) is a strategic framework for achieving national goals for the health and well-being of all Americans. Each decade, progress toward these goals is monitored using evidence-based objectives that establish targets for the next 10 years.[1–3] The close of the previous decade offered the opportunity to assess progress toward the 467 objective targets[4–6] of HP 2010 and the initiative's 2 overarching goals: (1) to increase quality and years of healthy life, and (2) to eliminate health disparities. With the release of HP 2020, this second goal reflects a 3-decade commitment to addressing health disparities, including those specific to individuals living with disabilities such as children with special health care needs (CSHCN).

The Federal Maternal and Child Health Bureau (MCHB) defines CSHCN as those who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition, and who also require health and related services of a type or amount beyond that required for children generally.[7] Three survey systems, the National Survey of Children's Health (NSCH), the National Survey of Children with Special Health Care Needs (NS-CSHCN), and the Medical Expenditure Panel Survey, use this definition. This definition, operationalized in a 5-item screener, reflects children who experience both a wide range of conditions and related consequences. As such, the definition differs from measures used to track some HP objectives, which focus primarily on functional- and activity-related limitations.[8] This distinction is important because although all children living with a functional limitation would be considered as having a SHCN, not all CSHCN are functionally limited.[9] The broader focus on both needs and consequences of health conditions allows for a more comprehensive analysis of this group within the context of the general pediatric population.

Historically, measuring progress across HP 2010 objectives for CSHCN has been challenging for 3 reasons. First, although disability status was among the characteristics for which population-based objectives could be tracked for the purposes of monitoring progress toward the elimination of health disparities, estimates by disability status were only produced for selected indicators. In some cases, data on disability status were available but not analyzed or were determined by the sponsoring agency as not meeting the criteria for statistical reliability, quality, or confidentiality; HP estimates are published in accordance with the data protocols and analytic practices of the data provider or sponsoring agency of each data system. In others, data on disability status were not collected. Second, for those objectives where disability status was reported, separate estimates for subgroups within this population (e.g., children) were not systematically produced. As such, it was not possible to monitor progress for children with disabilities across all HP 2010 objectives. Third, estimates for individuals with disabilities might vary considerably by the definition of disability utilized. Because HP objectives are tracked using multiple data systems, comparisons across indicators for individuals with disabilities were not always available or comparable for all indicators.

Efforts to track HP objectives for CSHCN and children with disabilities[10] are illustrated in the Appendix (data available as a supplement to the online version of this article at http://www.ajph.org). HP 2010 tracked 2 objectives for CSHCN as defined by MCHB. These objectives included medical home access (objectives 16–22) and receipt of care in family-centered, comprehensive and coordinated systems (objectives 16–23).[11] Six additional objectives were either tracked for children with disabilities using other definitions of disability or estimates for children with disabilities were produced as a subpopulation of interest. Because they were organized across different HP focus areas and relied on different data systems, these indicators provided a limited picture of the health and well-being of children with chronic conditions and related SHCN.

Previous research on health disparities between children with and without SHCN or disabilities has focused predominantly on differences in health care access, utilization, and expenditures,[12–16] and to a lesser extent on selected heath status indicators.[13,17] However, comparisons relative to children without SHCN are ultimately important to monitoring programmatic efforts to improve outcomes and reduce the excess burden of ill health experienced by CSHCN. National efforts, including HP, are commonly used to support social policy development, implementation, and monitoring of efforts to address such public health challenges and disparities. Scholars examining policy processes and implementation through governmental agencies and related organizational structures describe such agenda-setting activities as important tools in the bureaucratic process.[18–20] In the maternal and child health arena, Title V of the Social Security Act explicitly links the purpose of the national maternal and child health program to national health objectives, including HP. The dearth of comparable data for tracking CSHCN health status within the HP framework places stewards of public health programs for this population at a disadvantage. Furthermore, research indicating that CSHCN includes both a sizable[21] and growing[22] segment of the US pediatric population underscores the importance of efforts to address the health of this population within the larger framework of population-based public health initiatives like HP.

The goal of this study was to provide a systematic assessment of key national health objectives, traditionally tracked for the population as a whole, but rarely reported or summarized for CSHCN using data from the NSCH. The NSCH is the only nationally representative survey that provides comparable data on the health and development of children with and without SHCN. We compared estimates for children with and without SHCN at 2 time periods for HP 2010 objectives selected according to the 2010 leading health indicators (LHIs). Disparities and temporal patterns were highlighted, and implications for practice and program planning were discussed.

METHODS

Data were obtained from the 2003 and 2007 NSCH. The surveys have been described in detail elsewhere.[23,24] In brief, the NSCH is a random-digit-dial, population-based telephone survey fielded through the State and Local Area Integrated Telephone Survey mechanism. The surveys were designed to collect information on the physical and emotional health of children younger than 18 years with a special emphasis on family and community factors that impact children's health. Data were collected for 1 randomly selected child in each household; a parent or caregiver who was knowledgeable about the child's health served as the respondent. Both the 2003 and 2007 NSCH were funded and directed by the Health Resources and Services Administration's MCHB and conducted by the Centers for Disease Control and Prevention's National Center for Health Statistics.

Information on HP 2010 focus areas, objectives, and related LHIs was obtained from publicly available sources.[6,10,25] The 2010 LHIs were developed by the US Department of Health and Human Services based on feedback from stakeholders; indicators reflected the 10 primary factors associated with morbidity, mortality, and disability within the United States.[3,26] Between 1 and 3 HP 2010 objectives were selected for each of the 10 LHIs for a total of 22 objectives; over time, 6 supplemental objectives were added, for a total of 28 objectives. We reviewed these 28 objectives to identify those that either targeted pediatric populations or were applicable to individuals younger than 18 years. We identified 14 objectives based on this criterion, which were then compared with survey items available in the 2003 and 2007 NSCH.

Variables

Children were defined with SHCN if they experienced at least 1 of 5 consequences associated with a chronic medical, behavioral, or other health condition that lasted or was expected to last at least 12 months. These consequences fell generally into 2 categories: (1) ongoing use of or need for medical, mental health, educational, or other health-related therapies, including prescription medications; and (2) functional limitations that prevented the child from engaging in age-appropriate activities.[27,28]

Indicators were selected from available survey items based on (1) relevance to HP 2010 LHIs and (2) availability of related items on both the 2003 and 2007 NSCH questionnaires. Selected survey items are presented in Table 1. Comparable items were available on both surveys for 7 of the 10 LHIs: physical activity, overweight and obesity, mental health, injury and violence, environmental quality, immunization, and access to health care. For some LHIs, (e.g., physical activity), NSCH survey items were directly comparable to the HP measure used to the track the LHI. In other cases (e.g., mental health, where no directly comparable survey item was available), a related item was selected based on etiological or conceptual relevance by the authors. For 2 items, environmental tobacco exposure and depressive symptomology, more specific measures were available in the 2007 survey; results for these items were presented where appropriate. All items were parent-reported.

Statistical Analyses

We used a combination of absolute and relative measures to examine changes between 2003 and 2007 in selected indicators by SHCN status and to evaluate changes over time in the disparity between children with and without SHCN. An absolute measure of difference or disparity is a simple arithmetic difference between 2 rates (i.e., percentage point difference, $R1 - R2$), whereas a relative measure of disparity expresses the ratio difference of one rate relative to the other (i.e., percent difference, $R1/R2 - 1$).[29] Together, these measures provide complementary, albeit sometimes contradictory, measures of the direction and magnitude of a disparity and have been used previously to assess progress toward HP targets and the reduction of health disparities.[29,30]

Absolute and relative disparities by SHCN status were evaluated in the following ways. First, for each time period, absolute (percentage point) and relative (percentage) differences between children with and without SHCN were calculated for each indicator. Second, absolute and relative measures were calculated to quantify the change over time in the proportion of children reporting each indicator within SHCN groups. Third, the change over time in

TABLE 1—Healthy People 2010 Leading Health Indicators, Related Objectives, and Measures for Children, and Corresponding Survey Items from the National Survey of Children's Health, 2003 and 2007

2010 LHIs	Related Healthy People 2010 Objectives for Children	Healthy People 2010 Indicator (Data Source)	NSCH Questions (Item #)
Physical activity	Objective 22-7: Increase the proportion of adolescents who engage in vigorous physical activity that promotes cardiorespiratory fitness 3 or more days per week for 20 or more minutes per occasion	Students in grades 9–12 who reported exercising or participating for at least 20 min in physical activity that made them sweat and breathe hard on ≥ 3 days of the prior 7 d. (YRBSS)	2003 and 2007: During the past week, on how many days did SC exercise or participate in physical activity for at least 20 min that made (him/her) sweat and breathe hard? (S7Q21; K7Q41)
Overweight and obesity	Objective 19-3c: Reduce the proportion of children and adolescents who are overweight or obese[a]	Persons aged 6–19 y with a BMI at or above the gender- and age-specific 95th percentile form the CDC Growth Charts (NHANES)	2003 and 2007: BMI for age classification derived from questions related to the child's height and weight (BMICLASS)
Tobacco use	Objective 27-2b: Reduce past-month cigarette use by adolescents	Students in grades 9–12 who reported having smoked cigarettes on 1 or more of the prior 30 d (YRBSS)	None
Substance abuse	Objective 26-10a: Increase the proportion of adolescents not using alcohol or any illicit drugs during the past 30 d	Persons aged 12–17 y who reported not using any alcohol or illicit drugs during the past 30 d (NSDUH)	None
Responsible sexual behavior	Objective 25-11a: Increase the proportion of adolescents who never had sexual intercourse	Students in grades 9–12 who reported that they have never had sexual intercourse (YRBSS)	None
Mental health	Objective 18-1: Reduce the suicide rate	Deaths due to suicide (Vital Statistics)	2003 and 2007: How often during the past month (child) was sad, unhappy, or depressed (S7Q62; K7Q79) 2007: Does (child) currently have depression? (K2Q32B); If Yes: Would you describe his/her depression as mild, moderate or severe? (K2Q32C)
Injury and violence	Objective 15-15a: Reduce deaths caused by motor vehicle crashes Objective 15-32: Reduce homicides	Unintentional injury traffic deaths (Vital Statistics) Deaths due to homicides (Vital Statistics)	2003 and 2007: (During the past 12 mo/Since SC's birth), has SC been injured and required medical attention? (S6Q55; K6Q30)
Environmental quality	Objective 8-1a: Reduce the proportion of persons exposed to ozone	Persons living in nonattainment areas that exceed the National Ambient Air Quality Standards for ozone in 1997 (NAAQS)	None
	Objective 27-10: Reduce the proportion of nonsmokers exposed to secondhand smoke	Nonsmokers aged 4 y and older who had a serum cotinine level ≥ 0.05 ng/mL (NHANES)	None
	Objective 27-9: Reduce the proportion of children who are regularly exposed to tobacco smoke at home	Children aged 6 y and younger living in households where a household resident smoked inside the home at least 4 d/wk (NHIS)	2003 and 2007: Does anyone living in your household use cigarettes, cigars, or pipe tobacco? (S9Q11B; K9Q40)2007: Does anyone smoke inside SC's home? (K9Q41)
Immunization	Objective 14-24a: Increase the proportion of children aged 19–35 mo who receive all vaccines that have been recommended for universal administration for at least 5 y	Children aged 19–35 mo receiving at least 4 doses of DTaP, at least 3 doses of polio, at least 1 dose of MMR, at least 3 doses of Hib, and at least 3 doses of hepatitis B antigens (NIS)	2007: Has SC received a tetanus booster shot or Td or Tdap shot since (he/she) turned 11 y of age? (K2Q81)
Access to health care	Objective 1-1: Increase the proportion of persons with health insurance	Persons younger than age 65 y who reported coverage by any type of public or private health insurance (NHIS)	2003 and 2007: Does SC have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicaid? (S3Q01; K3Q01)

Continued

TABLE 1—*Continued*

	Objective 1-4a: Increase the proportion of persons who have a specific source of ongoing care	Persons who report having a specific source of primary care (NHIS)	2003 & 2007: Do you have 1 or more persons you think of as SC's personal doctor or nurse? (S5Q01; K4Q04).
	Objective 1-9a: Reduce hospitalization rates for ambulatory-care sensitive conditions–pediatric asthma	Number of hospitalizations among persons younger than 18 y with asthma as the principal diagnosis (HCUP)	2003: During the past 12 mo, has SC stayed overnight in a hospital because of (his/her) asthma? (S2Q53)

Note. BMI = body mass index; CDC = Centers for Disease Control and Prevention; DTaP = diphtheria-tetanus-acellular pertussis; HCUP = Healthcare Cost and Utilization Project; Hib = Haemophilus influenzae B; HMO = health maintenance organization; LHI = leading health indicators; MMR = measles-mumps-rubella; NAAQS = National Ambient Air Quality Standards; NHANES = National Health and Nutrition Examination Survey; NHIS = National Health Interview Survey; NIS = National Immunization Survey; NSCH = National Survey of Children's Health; NSDUH = National Survey on Drug Abuse and Health; SC = subject child; YRBSS = Youth Risk Behavior Surveillance System.

[a]The data label used for objectives 19-3a-c "overweight or obesity" in children and adolescents was revised after the Healthy People 2010 Midcourse Review and progress reviews to "obesity." The operational definition of the objective only measured obesity, as defined above. Additional information about the change can be found at: http://www.cdc.gov/nchs/healthy_people/hp2010/hp2010_final_review.htm.

absolute and relative disparities between children with and without SHCN was examined. Fourth, using absolute differences, the number of excess cases among CSHCN that could have potentially been averted if there was no disparity between children with and without SHCN was calculated for each indicator. The statistical significance of absolute and relative estimates of difference were tested using a Z statistic ($Z \geq 1.96$).[30]

In contrast to other reports measuring disparity in the achievement of HP objectives that utilized the group with the "best" rate as the referent group,[3] we selected children without SHCN (generally healthier) as the reference for all indicators in keeping with the study's goal to highlight disparities for CSHCN. Weighted point estimates and SEs that accounted for the complex survey design were produced using SAS-callable SUDAAN release 10.0.1 (RTI International, Research Triangle Park, North Carolina).

RESULTS

In both 2003 and 2007, CSHCN fared worse than children without SHCN with respect to physical activity, obesity, living with someone who used tobacco, past-month depressive symptoms, and past-year emergency department visits for injuries, but fared better on measures of current insurance and having a personal health care provider. Selected results are presented by LHI in Table 2.

Physical Activity and Overweight and Obesity

Compared with children without SHCN, a smaller proportion of high school–aged CSHCN were reported to engage in 20 minutes or more of vigorous physical activity on at least 3 days in the past week, and a larger proportion were obese in both 2003 and 2007 (Table 2). In relative terms, CSHCN were 14.4% (2003) and 10.0% (2007) less likely to meet recommended physical activity guidelines and 31.3% and 26.7% more likely to be obese than were children without SHCN in 2003 and 2007, respectively (Table 2). Between 2003 and 2007, the proportion of high school–aged CSHCN who engaged in recommended levels of physical activity increased 9.9%, whereas no statistically significant change was observed in the proportion of CSHCN who were obese between survey years. During the same period, the proportion of children without SHCN who were physically active also increased and the proportion that was obese increased more than 10% (Table 3).

Although the relative disparity between children with and without SHCN declined for both physical activity and obesity, 4.4 and 4.6 percentage points, respectively, neither change was statistically significant (Table 4). Elimination of these disparities would have increased the number of CSHCN who engaged in recommended levels of physical activity by more than 1 million in both survey years and decreased the number of obese CSHCN by 500 000 at both time points (data available upon request).

Mental Health

In both 2003 and 2007, a greater proportion of CSHCN were reported by their parents to have been sad, unhappy, or depressed usually or always during the past month compared with children without SHCN (5.2% vs 1.2% in 2003; 4.5% vs 1.0% in 2007). This reflected an absolute difference of approximately 4 percentage points but a relative difference of approximately 350% at both points in time (Table 2). Among those children with a diagnosis of depression in 2007, the relative disparity between children when classified by SHCN status was somewhat attenuated; CSHCN with diagnosed depression were 80% more likely to have parent-reported moderate or severe depression compared with those without SHCN but also currently diagnosed with depression (Table 2).

Observed declines in the proportion of children with reported depressive symptoms between survey years were not statistically significant, nor did the absolute or relative disparity between CSHCN and those without SHCN change significantly over time (Tables 3 and 4). Elimination of this disparity would have decreased the number of CSHCN experiencing depressive symptomology by approximately 500 000 cases at each time period.

Injury-Related Emergency Department Visits

In 2003 and 2007, CSHCN were significantly more likely to have visited an emergency department for a nonfatal injury in the past

TABLE 2—Prevalence of Selected Health Indicators Among Children, by Presence of Special Health Care Needs: National Survey of Children's Health, 2003 and 2007

	Special Health Care Needs		No Special Health Care Needs		Absolute Difference (95% CI)[a]	Relative Difference (95% CI)[b]
Healthy People 2010 LHI (Age Range)	Weighted No.	% (SE)	Weighted No.	% (SE)		
	2003					
Total sample	12 820 481		59 916 484			
Vigorous physical activity ≥ 3 d/wk for 20 min (14–17 y)	3 508 483	58.3 (1.16)	12 555 793	68.1 (0.60)	-9.8 (-12.38, -7.25)	-14.4 (-18.0, -10.7)
Obese; BMI at or above the gender- and age-specific 95th percentile (10–17 y)	6 757 852	18.2 (0.69)	24 303 619	13.9 (0.33)	4.3 (2.84, 5.85)	31.3 (20.2, 43.3)
Usually/always unhappy, sad, or depressed during the past mo (6–17 y)	10 135 702	5.2 (0.36)	38 615 315	1.2 (0.08)	4.1 (3.35, 4.81)	350.2 (270.6, 447.0)
ED visits for nonfatal injuries during the past 12 mo (0–5 y)	2 643 929	14.5 (1.04)	21 156 758	8.8 (0.27)	5.8 (3.64, 7.85)	65.6 (42.1, 93.0)
Anyone in household use of cigarettes, cigars, or pipe tobacco (0–6 y)[c]	2 363 838	33.7 (1.52)	17 022 045	25.0 (0.48)	8.7 (5.56, 11.81)	34.7 (22.4, 48.3)
Current insurance (0–17 y)	12 806 715	94.8 (0.30)	59 766 209	90.5 (0.20)	4.3 (3.64, 5.05)	4.80 (4.0, 5.6)
Personal doctor or nurse (0–17 y)	12 798 586	90.0 (0.42)	59 677 282	81.9 (0.26)	8.0 (7.06, 9.01)	9.81 (8.6, 11.0)
	2007					
Total sample	14 136 454		59 622 162			
Vigorous physical activity ≥ 3 d/wk for 20 min (14–17 y)	3 971 843	64.1 (1.64)	12 870 211	71.2 (0.94)	-7.1 (-10.83, -3.42)	-10.0 (-15.0, -4.8)
Obese; BMI at or above the gender- and age-specific 95th percentile (10–17 y)	7 444 763	19.5 (0.98)	24 166 139	15.4 (0.56)	4.1 (1.90, 6.33)	26.7 (12.2, 43.1)
Usually/always unhappy, sad, or depressed during the past mo (6–17 y)	11 221 607	4.5 (0.44)	37 913 893	1.0 (0.13)	3.5 (2.56, 4.36)	346.3 (222.9, 516.8)
Moderate/severe depression (2–17)[e,f]	1 110 333	52.8 (3.31)	171 834	29.4 (6.82)	23.5 (8.60, 38.32)	79.9 (12.2, 188.3)
ED visits for nonfatal injuries during the past 12 mo (0–5 y)	2 854 051	18.3 (1.82)	21 600 899	9.4 (0.44)	8.9 (5.22, 12.55)	94.7 (57.0, 141.5)
Anyone in household use of cigarettes, cigars, or pipe tobacco (0–6 y)	3 642 925	30.5 (1.63)	24 532 528	24.8 (0.66)	5.7 (2.29, 9.16)	23.1 (9.5, 38.3)
Use of cigarettes, cigars, or pipe tobacco in home (0–6 y)[e]	3 642 925	7.7 (0.92)	24 531 607	4.7 (0.27)	3.1 (1.18, 4.92)	65.5 (27.6, 114.6)
Current insurance (0–17 y)	14 131 207	93.9 (0.48)	59 449 404	90.2 (0.31)	3.8 (2.63, 4.86)	4.2 (2.9, 5.4)
Personal doctor or nurse (0–17 y)	14 093 965	94.7 (0.41)	59 322 031	91.6 (0.27)	3.2 (2.19, 4.12)	3.4 (2.4, 4.5)
Received a tetanus booster or Td/Tdap shot or up-to-date on all shots (12–17 y)[e,g]	5 612 286	88.1 (0.85)	18 133 993	84.2 (0.57)	3.9 (1.91, 5.91)	4.7 (2.3, 7.1)

Note. BMI = body mass index; CI = confidence interval; CSHCN = children with special health care needs; ED = emergency department; LHI = leading health indicators; Td/Tdap = Tetanus-Diphtheria or Tetanus-Diphtheria-Pertussis.

[a] Percentage point difference, CSHCN – non-CSHCN.

[b] Percent difference, (CSHCN/non-CSHCN) – 1.

[c] Question added midway through survey; 12.3% of the sample were missing as a result and were dropped from these analyses.

[d] Among children who currently have asthma (parent has been told by a doctor or other health care provider that child has asthma).

[e] Added to Survey in 2007.

[f] Among children who currently have depression (parent has been told by a doctor or other health care provider that child has depression).

[g] 5.9% of the sample were missing and were dropped from the analyses.

year than children without SHCN. In 2003 and 2007, 14.5% and 18.3% of CSHCN made such a visit compared with 8.8% and 9.4% of children without a SHCN (Table 2). Although observed measures of both absolute and relative differences over time both within and between SHCN groups appeared to increase, none of the changes were statistically significant (Tables 3 and 4). In 2007, 1.2 million injury-related emergency department visits by CSHCN could have been potentially avoided if the disparity between children by SHCN status was not present.

Environmental Quality

Nearly one third of CSHCN lived in a household with someone who used tobacco products in both survey years compared with one quarter of children without SHCN (Table 2). CSHCN were 35% and 23% more likely to live in a household with someone who used tobacco products in 2003 and 2007, respectively. A more specific measure added in 2007 (which captured use of tobacco products, including cigarettes, cigars, or pipes in the home), showed that although only 7.7% of CSHCN lived in households where tobacco use took place, they were 66% more likely to do so than children without SHCN (Table 2).

Although the proportion of children in both groups living with someone who used tobacco products declined between survey years, these changes were not statistically significant (Table 3). Similarly, declines in both absolute and relative measures of disparity between children by SHCN status between 2003 and 2007 were not statistically significant (3.0 and 11.6 percentage points, respectively; Table 4).

Access to Health Care

More than 90% of children, regardless of SHCN status, were currently insured during both surveys, although the rate for CSHCN was slightly higher at both times (94.8% and 93.9% in 2003 vs 90.5% and 90.2% in 2007; Table 2). Point estimates of insurance coverage declined less than 1% between survey years for both groups, yielding no statistically significant change in observed disparity (Tables 3 and 4). However, both CSHCN and those without SHCN experienced significant increases in the

TABLE 3—Absolute and Relative Change Over Time in Prevalence of Selected Health Indicators, by Special Health Care Need Status: National Survey of Children's Health, 2003 and 2007

	Children With Special Health Care Needs		Children Without Special Health Care Needs	
Healthy People 2010 LHI (Age Range)	Absolute Change 2007 – 2003[a]	Relative Change 2007 – 2003[b]	Absolute Change 2007 – 2003[a]	Relative Change 2007 – 2003[b]
Vigorous physical activity ≥ 3 d/wk for 20 min (14–17 y)	5.8*	9.9*	3.1*	4.5*
Obese; BMI at or above the gender- and age-specific 95th percentile (10–17 y)	1.3	7.0	1.5*	10.9*
Usually/always unhappy, sad, or depressed during the past mo (6–17 y)	-0.8	-14.9	-0.2	-14.2
ED visits for nonfatal injuries (0–5 y)	3.8	25.9	0.6	7.1
Anyone in household uses cigarettes, cigars, or pipe tobacco (0–6 y)	-3.2	-9.4	-0.2	-0.8
Currently insured (0–17 y)	-0.9	-0.9	-0.3	-0.3
Personal doctor or nurse (0–17 y)	4.8*	5.3*	9.7*	11.8*

Note. BMI = body mass index; ED = emergency department; LHI = leading health indicators.
[a] Percentage point difference.
[b] Percent difference.
**P* < .05; *Z*-statistic > 1.96.

proportion with a personal doctor or nurse between 2003 and 2007—a relative increase of 5.3% among CSHCN and 11.8% among their counterparts without such needs (Table 3).

The significant increase in the proportion of children without SHCN who had a personal health care provider drove a 4.9 percentage point decline in the disparity between CSHCN and those without SHCN, corresponding to a 6.4 percentage point reduction in disparity between these groups (Table 4).

DISCUSSION

Using the HP 2010 LHIs, we found significant disparities for key health-related measures between children with and without SHCN. Disparities were observed for CSHCN in 5 of the 7 indicators at each time point and persisted over the decade. Among CSHCN, progress was observed for 2 measures, whereas the relative disparity between children with and without SHCN remained static for all but 1 indicator. Our results were consistent with

TABLE 4—Absolute and Relative Disparities Over Time in Prevalence of Selected Health Indicators Between Children With and Without Special Health Care Needs: National Survey of Children's Health, 2003 and 2007

	Absolute Disparity			Relative Disparity		
Healthy People 2010 LHI (Age Range)	Absolute Disparity 2003[a]	Absolute Disparity 2007[a]	Change in Absolute Disparity 2007–2003[b]	Relative Disparity 2003[c]	Relative Disparity 2007[c]	Change in Relative Disparity 2007–2003[d]
Vigorous physical activity ≥ 3 d/wk for 20 min (14–17 y)	-9.8	-7.1	-2.7	-14.4	-10.0	-4.4
Obese; BMI at or above the gender- and age-specific 95th percentile (10–17 y)	4.3	4.1	-0.2	31.3	26.7	-4.6
Usually/always unhappy, sad, or depressed during the past mo (6–17 y)	4.1	3.5	-0.6	350.2	346.3	-3.8
ED visits for nonfatal injuries during the past 12 mo (0–5 y)	5.8	8.9	3.1	65.6	94.7	29.1
Anyone in household use of cigarettes, cigars, or pipe tobacco (0–6 y)	8.7	5.7	-3.0	34.7	23.1	-11.6
Current insurance (0–17 y)	4.3	3.8	-0.6	4.8	4.2	-0.6
Personal doctor or nurse (0–17 y)	8.0	3.2	-4.9*	9.8	3.4	-6.4*

Note. BMI = body mass index; ED = emergency department; LHI = leading health indicators.
[a] Percentage point difference between children with and without special health care needs.
[b] Change in percentage point difference between children with and without special health care needs between 2003 and 2007. Negative values indicate a reduction in absolute disparity; positive values indicate an increase in absolute disparity.
[c] Percent difference between children with and without special health care needs.
[d] Change in percent difference between children with and without special health care needs between 2003 and 2007 (measured in percentage points). Negative values indicate a reduction in relative disparity; positive values indicate an increase in relative disparity.
**P* < .05; *Z*-statistic > 1.96.

previous research on individual indicators,[17,31,32] which illustrated important differences between children by the presence of SHCNs. Our analyses extended this body of knowledge in 2 ways. First, we provided an aggregated picture of these differences across 2 time periods using generally congruent data sources. Second, we illustrated how population-based initiatives to assess and monitor the health and well-being of all Americans can be used to better understand the specific health challenges of vulnerable populations within the contexts in which they live.

The ability to track and report on CSHCN in the context of national health policy platforms is an important tool for public health professionals accountable for the health and well-being of children with chronic illnesses and disabilities. Such capability is particularly critical amid growing demands for governmental accountability[33] and an increasing focus on use of data for quality improvement and cost reductions.[34] The HP framework is widely used to support core public health functions (assessment, policy development, and assurance) and 10 related essential services. Forty-eight states had a HP 2010 Plan online, and according to a 2010 report by the National Opinion Research Center, more than 81% of surveyed state, local, and tribal health organizations and agencies reported using HP 2010 for planning, goal-setting, and agenda-building, as well as for preparing funding applications.[19] At the national level, the Office of the Surgeon General, the White House, and agencies within the Department of Health and Human Services draw on HP to engage the general public in public health problem recognition and to generate support for policy responses. These analyses illustrate new methods that communities, states, the federal government, and national advocacy organizations can use to position CSHCN within the broader population of children and increase their visibility in the public policy discourse. More concretely, they provide state Title V programs for CSHCN with new reporting capabilities with respect to Title V Block Grant requirements and opportunities to contextualize issues and program impact in future funding applications.

This study had 3 primary limitations. First, HP objectives were tracked using a variety of data sources that relied on different reporters. For some indicators (e.g., those related to adolescent health risk behaviors), youths themselves are often the preferred data providers whereas clinical and biomarker measures are preferred for other indicators. Because the goal of our analysis was to provide comparable estimates for children by SHCN status, the use of a single data source with a consistent definition of SHCN was deemed most appropriate. However, given that NSCH data are parent-reported, it is possible that estimates for some of the selected indicators might be differentially biased. The limitations of relying on parent report also extend to the identification of CSHCN. Children with chronic conditions who did not experience any of the 5 qualifying health or functional consequences captured by the screener would not be reflected in our results. Second, our analyses reflected only a sample of the possible health-related indicators for which children with and without SHCN could be compared. We chose to use the priorities for health and well-being codified by the nation's LHIs to highlight disparities among children by SHCN status. Third, our analyses did not account for differences among children that may be expected based on the presence or absence of a SHCN. For example, we might expect children living with certain physical conditions to be limited in their ability to engage in vigorous physical activity or to be regularly weighed and measured for the purposes of tracking weight status; for these children, the goal might not be parity with nonaffected children. Furthermore, SHCN presence might complicate consistent assessment via preventative screenings, such as the measurement and tracking of weight status, when office visits were more often for the management of the child's unique acute and chronic health issues than well-child checks.[35,36] However, our analyses demonstrated how within-group progress for such indicators could be tracked over time. Our analysis extended recent work in this area[37] and provided 1 example of how such comparisons could be analytically approached. The release of LHIs for 2020 provide new opportunities to compare progress among children with and without SHCN on these and other indicators, including oral health care utilization and academic achievement, which are new for HP 2020.[38] Additional limitations included those associated with the use of a landline telephone survey mechanism, including coverage and nonresponse bias.[39,40]

We found that throughout the previous decade, CSHCN fared consistently worse than their typically developing peers with respect to measures related to the nation's 10 LHIs, with the exception of access to a personal health care provider. These analyses suggested that continued monitoring of and programmatic focus on CSHCN both as a population with unique needs and, perhaps more importantly, as a sizable and growing proportion of our nation's overall pediatric population is warranted. Public policy tools like HP and the LHIs can provide a useful framework for such investigations and the translation of such research into policy and programs. ■

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This article was accepted July 20, 2012.

Contributors

R. M. Ghandour conceptualized the study, performed the analyses, and led the writing and revision of the article. H. A. Grason contributed to the conceptualization of the study. A. H. Schempf selected statistical methods for use in the study and assisted with the design of the analytic plan. All of the authors contributed to the interpretation of results and to the writing and revisions of the article.

Human Participant Protection

No protocol approval was necessary because data were obtained from secondary sources.

References

1. US Department of Health and Human Services, Office of Disease Prevention and Health Promotion. About Healthy People. Available at: http://www.healthypeople.gov/2020/about/default.aspx. Accessed September 15, 2011.

2. Koh HK. A 2020 vision for healthy people. *N Engl J Med*. 2010;362(18):1653–1656.

3. Sondik EJ, Huang DT, Klein RJ, Satcher D. Progress toward the Healthy People 2010 goals and objectives. *Annu Rev Public Health.* 2010;31:271–281.

4. US Department of Health and Human Services, Centers for Disease Control and Prevention. About Healthy People 2010. Available at: http://www.cdc.gov/nchs/healthy_people/hp2010.htm. Accessed January 25, 2012.

5. National Center for Health Statistics. *Healthy People 2000 Final Review.* Hyattsville, MD: Public Health Service; 2001.

6. National Center for Health Statistics. Healthy People 2010 Final Review. Hyattsville, MD: US Department of Health and Human Services, Centers for Disease Control and Prevention; 2011. Available at: http://www.cdc.gov/nchs/healthy_people/hp2010/hp2010_final_review.htm. Accessed January 25, 2012.

7. McPherson M, Arango P, Fox H, et al. A new definition of children with special health care needs. *Pediatrics.* 1998;102(1 Pt 1):137–140.

8. US Department of Health and Human Services, National Center for Heath Statistics. NCHS Survey Measures Catalog: Child and Adolescent Functioning and Disability. Available at: http://wwwn.cdc.gov/child surveymeasures/disabilities/SearchCatalog.aspx. Accessed September 30, 2011.

9. Child and Adolescent Health Measurement Initiative. Data Resource Center for Child & Adolescent Health. Available at: http://childhealthdata.org/home. Accessed January 13, 2012.

10. US Department of Health and Human Services, Centers for Disease Control and Prevention. CDC Wonder: Data 2010. Available at: http://wonder.cdc.gov/data2010/index.htm. Accessed September 30, 2011.

11. McPherson M, Honberg L. Identification of children with special health care needs: a cornerstone to achieving Healthy People 2010. *Ambul Pediatr.* 2002;2(1):22–23.

12. Newacheck PW, Kim SE. A national profile of health care utilization and expenditures for children with special health care needs. *Arch Pediatr Adolesc Med.* 2005;159(1):10–17.

13. Kenney MK, Kogan MD, Crall JJ. Parental perceptions of dental/oral health among children with and without special health care needs. *Ambul Pediatr.* 2008;8(5):312–320.

14. Van Cleave J, Davis MM. Preventive care utilization among children with and without special health care needs: associations with unmet need. *Ambul Pediatr.* 2008;8(5):305–311.

15. Okumura MJ, McPheeters ML, Davis MM. State and national estimates of insurance coverage and health care utilization for adolescents with chronic conditions from the National Survey of Children's Health, 2003. *J Adolesc Health.* 2007;41(4):343–349.

16. Silver EJ, Stein RE. Access to care, unmet health needs, and poverty status among children with and without chronic conditions. *Ambul Pediatr.* 2001;1(6):314–320.

17. Minihan PM, Must A, Anderson B, Popper B, Dworetzky B. Children with special health care needs: acknowledging the dilemma of difference in policy response to obesity. *Prev Chronic Dis.* 2011;8(5):A95.

18. Salamon LM. *Beyond Privatization: The Tools of Public Action.* Washington, DC: Urban Institute Press; 1989.

19. National Opinion Research Center. NORC Final Report: Healthy People User Study; 2010. Available at: http://aspe.hhs.gov/health/reports/09/userstudy/report.shtml. Accessed January 25, 2012.

20. Birkland TA. *After Disaster: Agenda Setting, Public Policy and Focusing Events.* Washington, DC: Georgetown University Press; 1997.

21. US Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau. The National Survey of Children with Special Health Care Needs Chartbook 2005-2006. Rockville, MD: US Department of Health and Human Services; 2008. Available at: http://mchb.hrsa.gov/cshcn05. Accessed January 25, 2012.

22. van der Lee JH, Mokkink LB, Grootenhuis MA, Heymans HS, Offringa M. Definitions and measurement of chronic health conditions in childhood: a systematic review. *JAMA.* 2007;297(24):2741–2751.

23. Blumberg SJ, Olson L, Frankel MR, Osborn L, Srinath KP, Giambo P. *Design and Operation of the National Survey of Children's Health, 2003.* Hyattsville, MD: National Center for Health Statistics; 2005.

24. Blumberg SJFE, Frasier AM, Satorius J, et al. *Design and Operation of the National Survey of Children's Health, 2007.* Hyattsville, MD: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics; 2009.

25. Institute of Medicine. *Division of Health Promotion and Disease Prevention, Committee on Leading Health Indicators for Healthy People 2010. Leading Health Indicators for Healthy People 2010: Final Report.* Washington, DC: National Academy of Science; 1999.

26. US Department of Health and Human Services. *Healthy People 2010: Understanding and Improving Health.* 2nd ed. Washington, DC: US Government Printing Office; 2000.

27. Bethell CD, Read D, Stein REK, Blumberg SJ, Wells N, Newacheck PW. Identifying children with special health care needs: development and evaluation of a short screening instrument. *Ambul Pediatr.* 2002;2(1):38–48.

28. Bramlett MD, Read D, Bethell C, Blumberg SJ. Differentiating subgroups of children with special health care needs by health status and complexity of health care needs. *Matern Child Health J.* 2009;13(2):151–163.

29. Keppel K, Pamuke E, Lynch J, et al. *Methodological Issues in Measuring Health Disparities.* Hyattsville, MD: National Center for Health Statistics; 2005.

30. Keppel K, Pearcy JN, Klein RJ. *Measuring Progress in Healthy People 2010.* Hyattsville, MD: National Center for Health Statistics; 2004.

31. Blackman JA, Gurka MJ, Gurka KK, Oliver MN. Emotional, developmental and behavioural co-morbidities of children with chronic health conditions. *J Paediatr Child Health.* 2011;47(10):742–747.

32. Mulvihill BA, Altarac M, Swaminathan S, Kirby RS, Kulczycki A, Ellis DE. Does access to a medical home differ according to child and family characteristics, including special-health-care-needs status, among children in Alabama? *Pediatrics.* 2007;119(suppl 1):S107–S113.

33. 111th Congress of the United States. GPRA Modernization Act of 2010. Available at http://www.gpo.gov/fdsys/pkg/PLAW-111publ352/pdf/PLAW-111publ352.pdf. Accessed January 25, 2012.

34. Honoré PAWD, Berwick DM, Clancy CM, Lee P, Nowinski J, Koh HK. Creating a framework for getting quality into the public health system. *Health Aff (Millwood).* 2011;30(4):737–745.

35. Schor EL. Should children with special health care needs have separate preventive care visits? *Arch Pediatr Adolesc Med.* 2007;161(12):1216–1218.

36. Van Cleave J, Heisler M, Devries JM, Joiner TA, Davis MM. Discussion of illness during well-child care visits with parents of children with and without special health care needs. *Arch Pediatr Adolesc Med.* 2007;161(12):1170–1175.

37. Maternal and Child Health Bureau. *Children with Special Health Care Needs in Context: A Portrait of States and the Nation, 2007.* Rockville, MD: Health Resources and Services Administration, US Department of Health and Human Services; 2011.

38. US Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Leading Health Indicators. Available at: http://www.healthypeople.gov/2020/LHI/default.aspx. Accessed November 28, 2011.

39. Blumberg SJ, Luke JV. Reevaluating the need for concern regarding noncoverage bias in landline surveys. *Am J Public Health.* 2009;99(10):1806–1810.

40. Lepkowski JMTC, Brick JM, Leeuw EDD, et al. eds. *Advances in Telephone Survey Methodology.* Hoboken, NJ: John Wiley & Sons, Inc.; 2007.