HCCI HEALTH CARE COST INSTITUTE

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The Prevalence of Diagnosed Diabetes, Pre-Diabetes, and Gestational Diabetes among the ESI Population, 2008-2012

KEY STATISTICS FOR THE UNDER AGE 65 ESI POPULATION IN 2012

8.8% were identified as having diabetes in 2012.

0.6% of children (0-18) covered by ESI had diabetes.

11.6% of adults (19-64) covered by ESI had diabetes.

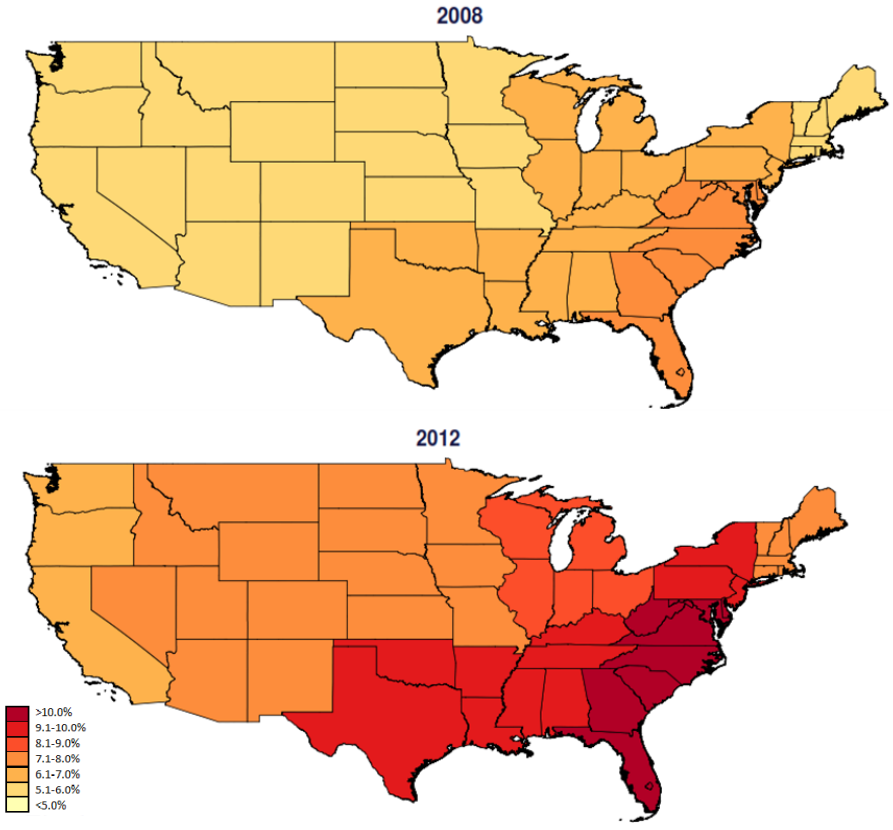
76.6% of individuals with diabetes were ages 45 through 64.

10.0% or more of the study population in the Mid-Atlantic, South Atlantic, and East South Central census divisions had diabetes.

This brief is the first by the Health Care Cost Institute (HCCI) to estimate the prevalence of diagnosed diabetes, pre-diabetes, and gestational diabetes in the younger than age 65 population with employer-sponsored health insurance (ESI). For this brief, individuals with "diabetes" refer to those diagnosed with diabetes (type 1 and type 2) and those at high risk for developing diabetes (individuals diagnosed with gestational diabetes or pre-diabetes). For 2012, HCCI found that the prevalence of diabetes was 8.8 percent among the study population. In all study years, diabetes was more prevalent among the study population's older adults (ages 45–64) compared with its younger adults (ages 19–44). For older adults, diabetes was more prevalent among men, whereas for younger adults, it was more prevalent among women. HCCI estimated that diabetes prevalence reached ten percent of the study population in the Southern and Mid-Atlantic states in 2012 (Figure 1). Though diabetes prevalence in the study population increased for the years studied, the rate of growth slowed.

HCCI examined a dataset composed of health care claims that were weighted to be representative of the ESI population nationally for each year of the study, which covers 2008 to 2012. HCCI developed a methodology based on medical claims using codes suggested by the Dictionary of Disease Management Terminology (DDMT).[1] The limitations to using administrative claims data for public health purposes are well documented (see "Limitations").[2,3] Yet, as health care data become more readily available, administrative claims can aid in public health surveillance, including tracking emerging trends for chronic conditions.

Figure 1. Diabetes prevalence by census division, 2008 and 2012.



Source: HCCI, 2013.
Notes: All data weighted to reflect the national, younger than 65 ESI population. Diabetes prevalence statistics include those diagnosed with diabetes (type 1 or 2) and those diagnosed at high risk for developing diabetes (pre-diabetes and gestational diabetes).

Diabetes is widely considered to be a national health crisis.[4] For 2007, an estimated 19 million Americans (or 8.5% of the adult US population) had diabetes.[5] For 2010, the Centers for Disease Control (CDC) estimated that 25.8 million Americans (or 8.3%) had diabetes (diagnosed and undiagnosed).[6] The American Diabetes Association (ADA) estimated that 7.0 percent of the total population were diagnosed with diabetes in 2012.[7]

Survey data suggest that in 2009 58.3 percent of individuals with diabetes had private health insurance.[8] The ADA estimated that 4.6 percent of the privately insured population had diagnosed diabetes in 2012 (excluding individuals with pre-diabetes or gestational diabetes).[7] Less is known about the prevalence of diabetes among subpopulations of the privately insured.

This issue brief seeks to fill that gap by providing estimates of diabetes prevalence among those younger than age 65 and covered by employer-sponsored health insurance (ESI). Using data from the HCCI's repository of health care claims for the years 2007 to 2012, HCCI identified individuals in the study population as having diabetes (type 1 or type 2), pre-diabetes, or gestational diabetes.[9] This population of those with diabetes was limited to those who had a claim for diabetes-related medical treatment filed with an insurance provider (for more information see "Data and methods" and "Limitations").

Diabetes prevalence in the younger than 65 ESI population

To provide a consistent comparison of diabetes prevalence by year, HCCI calculated the number of months for which the individuals with diabetes were insured and then calculated the number of diabetic months per 1,000 insured months.[10] This helped explain changes in the study population, as the number of people with ESI declined over time (see "The effects of a changing younger than 65 ESI population on the calculation of diabetes prevalence"). While the number of people with ESI fell in absolute terms during the study years, the prevalence of those with diabetes rose as a percentage of the ESI population. In 2008, on average, 64 of every 1,000 ESI-insured months, or 6.4 percent, were for individuals identified as having diabetes (Table 1). By 2012, that figure was 88 of 1,000 ESI-insured months, or 8.8 percent.

Diabetes prevalence by age

Between 2008 and 2012, HCCI found an increase in the prevalence of diabetes within each age group, except for children younger than age 4 (Table 2). In all years, less than one percent of children ages 0 to 13 were diagnosed with diabetes, and the prevalence in teens (ages 14–18) was higher than one percent only in 2012. For children (ages 0–18), the prevalence rate was 0.6 percent in 2012.

The greatest change in prevalence occurred for adults older than age 25. In 2008, nearly 4.1 percent of insured adults ages 26 to 44 had diabetes. By 2012, that share had increased to 6.1 percent. Between 2008 and 2012, the percentage of adults ages 45 to 54 identified as having diabetes changed from 10.1 percent to 14.3 percent. The oldest age group (ages 55–64) experienced the greatest change

What is diabetes?

Diabetes occurs when the body cannot properly regulate blood sugar levels. Diabetes is a chronic disease, meaning that it is a long-term condition.[11] HCCI used administrative claims data to identify those with diabetes in the younger than 65 population of individuals with employer-sponsored insurance. In this brief, "diabetes" refers to:

Type 1: an autoimmune disease in which the pancreas does not adequately produce insulin.

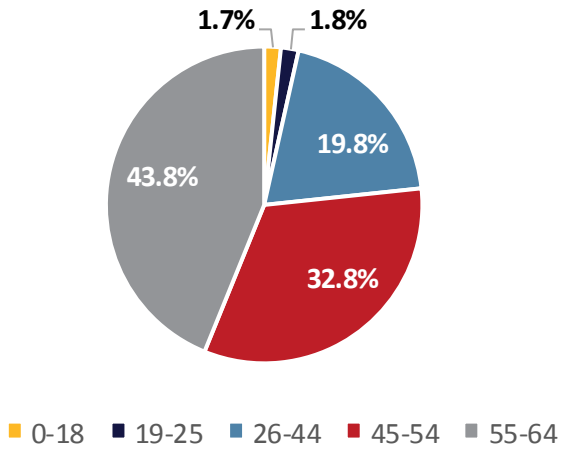
Type 2: a condition that occurs when the body develops an insensitivity to insulin or fails to produce an adequate amount of insulin.

Gestational diabetes: elevated blood sugar levels that occur during pregnancy and at high risk for developing type 2 diabetes.

Pre-diabetes: elevated blood sugar levels that could lead to type 2 diabetes.[12]

For more information on how HCCI identified those with diabetes, see "Data and methods" and HCCI's Analytic Methodology.[10]

Figure 2. Distribution of the under-65 ESI population with diagnosed diabetes by age group, 2012.



Source: HCCI, 2013.
Note: All data weighted to reflect the national, younger than 65 ESI population.

during those years, rising from 18.5 percent to 24 percent. For all adults (ages 19–64) in the study population, the prevalence rate in 2012 was 11.6 percent.

In all years of HCCI data, the majority of individuals with diabetes were older than age 44 (Table 3, Figure 2). Fewer than four percent of those were younger than age 26. In 2008, 18.7 percent of adults with diabetes were ages 26 to 44, compared with 19.8 percent in 2012. Although the share of individuals age 45 to 64 with diabetes declined from 78.1 percent to 76.6 percent between 2008 and 2012, this may not indicate a decline in the prevalence of diabetes, but rather an increase in the share of young people with diabetes over that period.

Diabetes prevalence by gender

Within the study population, HCCI found that a higher percentage of men than women were diagnosed with diabetes. In 2012, diabetes prevalence among men was 9.1 percent, compared with 8.4 percent for women (Table 4) . The prevalence rates for both genders changed by 2.4 percentage points over the period.

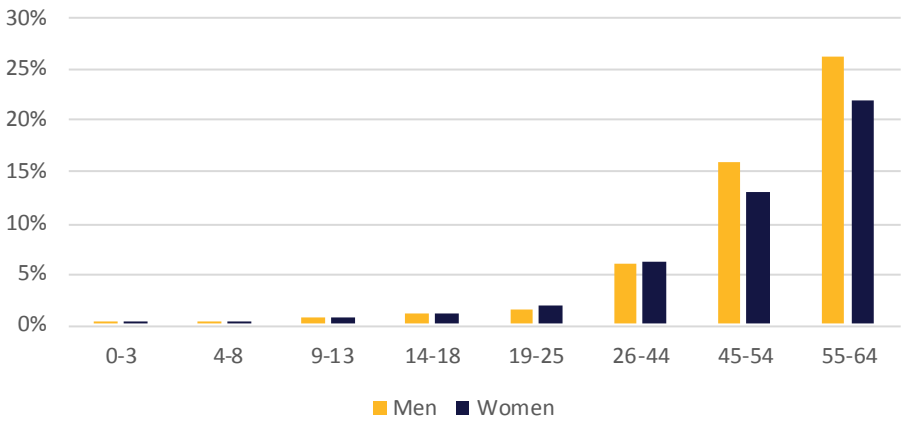
For both boys and girls younger than age 14, diabetes prevalence was less than one percent in each year (Table 4). Around the onset of puberty and through age 44, the prevalence of diabetes for women was higher than for men (Table 4, Figure 3).

After age 44, diabetes prevalence was higher for men than for women (Figure 3). In 2012, the prevalence of diabetes among adults ages 45 to 54 was 2.8 percentage points higher for men than for women; for adults ages 55 to 64, prevalence was 5.3 percentage points higher for men than for women.

Diabetes prevalence by region

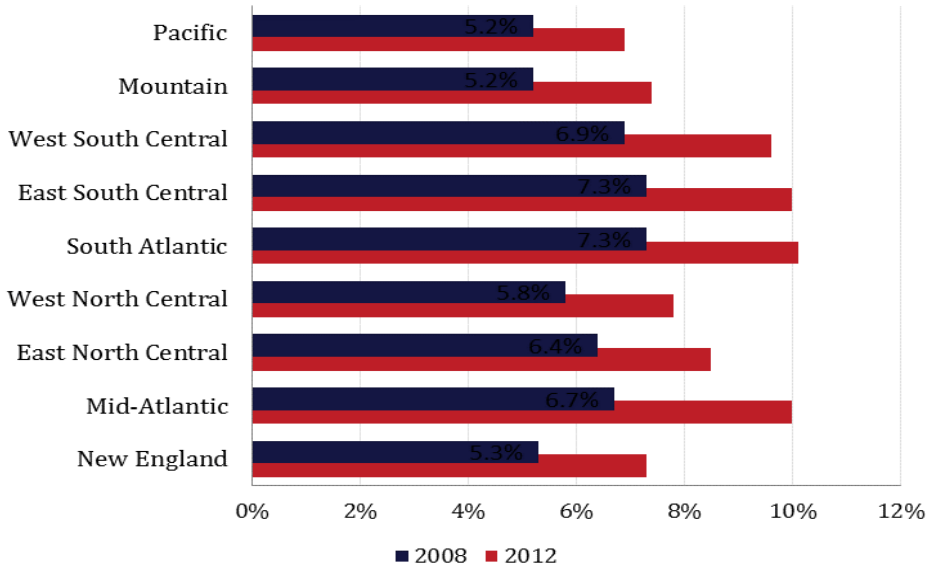
HCCI found that diabetes prevalence in the study population varied by both census region and census division, which are subsets of the four geographic census regions – North, Midwest, South, and West (Table 5, Figure 4). In all years of HCCI data, prevalence in the West census region was lower than other regions. Likewise, in all years, diabetes prevalence was highest in the South census region.

Figure 3. Prevalence of diagnosed diabetes for under-65 ESI population by age group and gender, 2012.



Source: HCCI, 2013.
Note: All data weighted to reflect the national, younger than 65 ESI population.

Figure 4. Percent of under-65 ESI population with diagnosed diabetes by census division, 2008 and 2012.



Source: HCCI, 2013.
Note: All data weighted to reflect the national, younger than 65 ESI population.

In 2012, prevalence in the Northeast region's New England division was 7.3 percent, compared with 10.0 percent in its Mid-Atlantic division. The Mid-Atlantic division was one of three census divisions to reach prevalence rates of ten percent or higher. Between 2008 and 2012, diabetes prevalence rose from 7.3 percent to 10.1 percent in the Southern region's South Atlantic division, and from 7.3 percent to 10.0 percent in its East South Central division.

Growth of diabetes prevalence over time

Between 2008 and 2012, the identifiable prevalence of diagnosed diabetes and diagnosed high risk conditions such as pre-diabetes and gestational diabetes increased among the study population; however, the growth of prevalence was not consistent across years. Between 2008 and 2009, the population of individuals with diabetes grew 12.0 percent, compared with a growth rate of 5.4 percent between 2011 and 2012. This slowdown in the growth rate occurred for every age group, across gender, and in every census region and division. The CDC observed a similar trend in the prevalence growth rates of diagnosed diabetes.[13]

The effects of a changing younger than 65 ESI population on the calculation of diabetes prevalence

Between 2008 and 2010, nearly 7.8 million individuals younger than age 65 lost employer-sponsored health insurance (ESI) coverage.[14] Between 2010 and 2012, the total number of ESI insureds younger than age 65 began to stabilize, averaging nearly 156 million people per year. Despite this, an additional 700,000 adults ages 45 to 64 lost their ESI coverage in 2011, even as more than 300,000 young adults ages 19 to 25 gained ESI. As a result, the overall ESI population in 2012 may have been slightly younger than in 2008.

Determining changes in the ESI population with diabetes was complicated by changes in overall ESI population size and composition. To address this methodological problem, HCCI standardized changes in the number of months the individuals with ESI had coverage (ESI member months) and the number of months those with diabetes had ESI coverage (diabetic ESI member months) using 2008 as a baseline for the standardized indices. HCCI compared the change in the two indices over time. Between 2008 and 2012, the cumulative change in the indexed ESI member months was a decline of 2.5 percent, whereas the cumulative change of the indexed diabetic member months was an increase of nearly 35 percent (data not shown). This suggests that changes in the size of the ESI population were not the sole cause of changes in the prevalence of diabetes. More research is necessary to determine the effects of population changes on diabetes prevalence rates.

Factors such as changes in the insured population and public awareness of diabetes may help explain the changes in the prevalence growth rates. For example, notable changes occurred between 2008 and 2012 in the number of people covered by ESI. Also, since diabetes became a national concern in the early 2000s, there has been an increased emphasis on early screenings and prevention, which may have increased the number of associated diagnoses.[15]

Data and methods

We used a standard analytic dataset that consisted of weighted and aggregated claims data for people younger than age 65 with ESI for calendar years 2007 to 2012.[10] The HCCI dataset was derived from claims for 40 million Americans per year contributed by three national insurers, and was used for the *2012 Health Care Cost and Utilization Report*.[16] All data used for our study were de-identified and compliant with the Health Insurance Portability and Accountability Act.

We determined ESI coverage rates using the number of insured member months for our populations of interest. Some individuals in the HCCI data were not insured for a full calendar year; therefore, our population calculations were by member months, not individual members.

We calculated the number of member months for which an individual with diabetes was insured. A diagnosis of diabetes was determined using the DDMT methodology for identifying health care activity associated with diabetes, gestational diabetes, and pre-diabetes.[1] Individuals diagnosed with diabetes in at least one inpatient admission, one outpatient visit or two office visits within the same calendar year were flagged in current and subsequent years as having diabetes. We then calculated the percent of member months for individuals who had ESI and were flagged as having diabetes.[17] HCCI began flagging individuals as having diabetes using 2007 data. In order to capture change over time, this brief covers the period from 2008 to 2012. We excluded radiology and laboratory claims from this methodology, as these can be used for screening purposes and may not reflect a diagnosis of diabetes.

Therefore, HCCI captured the prevalence of diabetes in the younger than 65 ESI population overall, by age, gender, and region (see "Incidence and prevalence: what's the difference?"). HCCI could not capture incidence in this data, as some individuals with ESI may gain or lose coverage throughout the year, due to personal decisions, employment status, or employer decisions (see "The effects of a changing younger than 65 ESI population on the calculation of diabetes prevalence"). In addition, some people may enter the ESI population in a given year while having been diagnosed with diabetes in a previous year. Because we could not confirm the first treatment or diagnosis of diabetes or pre-diabetes for the study population, we could not determine the rate of new cases.

For the study population in this report, HCCI grouped individuals diagnosed with diabetes, diagnosed with pre-diabetes, and diagnosed with gestational diabetes into a single category. HCCI included the individuals diagnosed with pre-diabetes (ICD-9 Codes 790.21, 790.22, 790.29) and gestational diabetes (ICD-9 Code 648.0) to produce as complete a picture of diabetes prevalence as possible in the study population. In future work, HCCI intends to explore the effects of each of these chronic conditions separately on the utilization of health care services by the privately insured.

Our estimates, relying on only diagnosed cases of diabetes, gestational diabetes, and pre-diabetes, are somewhat lower than those for the CDC.[6] The CDC estimates one out of three adults (ages 20 or older) has pre-diabetes, but this estimate includes both undiagnosed as well as diagnosed cases of pre-diabetes. For gestational-related diabetes, CDC estimates that between two percent and ten percent of pregnant women have gestational diabetes, and that between 35

Incidence and prevalence – what's the difference?

In population health studies, two types of statistics are commonly used:

Prevalence: the percentage of a population that is affected with a particular disease at a given time;

Incidence: rate of occurrence of new cases of a particular disease in a population being studied.[18]

In this brief, HCCI estimated prevalence and not incidence.

percent and 60 percent of those women will develop diabetes within one to two decades following pregnancy.[6]

Limitations

Our study has several limitations that can affect the interpretation of the findings. For this reason, HCCI considers its work a starting point for analysis and research on individuals younger than age 65 with ESI and diagnosed with diabetes, rather than a complete analysis of this population's effect on health care in the United States.

First, our findings are estimates for the US population based on a sample of approximately 25 percent of ESI insureds younger than age 65. The estimates for numbers of insured individuals by each plan type were weighted to account for any demographic differences between the HCCI sample and population estimates based on the US Census, making the dataset representative of the national, ESI population younger than age 65.[9]

Second, because HCCI's claims holdings reflect only explicit health care activity, HCCI could not identify individuals with diabetes, pre-diabetes, and gestational diabetes who (1) did not seek medical care between 2007 and 2012; (2) did not meet our criteria for study inclusion; (3) did not file a claim with their health insurer that indicated they had a diagnosis of diabetes, pre-diabetes, or gestational diabetes; or (4) had undiagnosed diabetes, pre-diabetes, and gestational diabetes. Moreover, claims data have a mixed record of utility for population health studies.[1] Work is ongoing to improve the methods used to determine health status from administrative claims. To that end, HCCI invites readers to review the methodology for this report and to comment on how to better identify the chronically ill in claims data.[9] Suggestions and other inquiries should be directed to the contact form on the HCCI website (http://www.healthcostinstitute.org/contact-us).

Third, this is a descriptive study, and findings are not causal. The tables and figures presented here are limited to descriptive statistics for individuals covered by ESI and younger than age 65.

Fourth, diabetes may onset in childhood due to genetic factors (type 1 diabetes) or later due to environmental or lifestyle factors (type 2 diabetes). HCCI did not distinguish between type 1 and type 2 diabetes in this report.

Fifth, readers should be cautious when interpreting changes in prevalence rates. We are not able to establish the initial onset of diabetes or high-risk for diabetes due to the nature of claims data. We determined the share of the ESI population in each year who either was diagnosed in that year as having diabetes or at high risk for diabetes. We also included in the annual statistics those who had been diagnosed with either condition in prior years. We assumed that these individuals would have diabetes or be at high-risk for diabetes in future years, as would be expected from a chronic condition. Carrying forward health status from one year to the next creates a positive change in the prevalence rate over time.

Authors' note

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Endnotes

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9. There is debate within the field about how to classify gestational diabetes. These women, similar to individuals with pre-diabetes, have a higher risk for developing type 2 diabetes. Therefore, to be comprehensive, HCCI has included individuals with gestational diabetes in the prevalence measures in this brief. For more information, see: Kitzmiller, John, Leona Dang-Kilduff, and Mark Taslimi. "Gestational Diabetes After Delivery: Short-term Management and Long-term Risks." Diabetes Care 30. Supplement 2 (2007): S225-235.

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17. Diabetes was alternatively flagged in the data using prescriptions for insulin and oral anti-diabetic agents. Members who had a filled prescription to treat diabetes were flagged as diabetic in that year and in subsequent years. Adding the prescription flag increased the number of diabetic member months by between 0.12 percent and 0.2 percent per year. The prescription flag was not included in the final methodology to identify individuals with diabetes due to concerns about uses of flagged drugs for purposes other than the treatment of diabetes.

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Suggested citation

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Table 1. Diabetes prevalence among ESI insureds, 2008-2012.

	2008	2009	2010	2011	2012
Percent of ESI Population	6.4%	7.1%	7.8%	8.3%	8.8%
Diabetes per 1,000 Insured Months	64	71	78	83	88
Change from Prior Year	N/A	12.0%	9.2%	7.2%	5.4%

Source: HCCI, 2013.
Note: All data weighted to reflect the national, younger than 65 ESI population.

Table 2. Percent diabetes prevalence by age group, 2008-2012.

	2008	2009	2010	2011	2012
Age Group					
0-3	0.1%	0.1%	0.1%	0.1%	0.1%
4-8	0.2%	0.3%	0.3%	0.3%	0.3%
9-13	0.5%	0.5%	0.6%	0.6%	0.7%
14-18	0.7%	0.8%	0.9%	1.0%	1.1%
19-25	1.1%	1.3%	1.4%	1.5%	1.6%
26-44	4.1%	4.8%	5.3%	5.8%	6.1%
45-54	10.1%	11.4%	12.4%	13.5%	14.3%
55-64	18.5%	20.4%	21.8%	23.1%	24.0%
Total					
Children (0-18)	0.4%	0.5%	0.5%	0.6%	0.6%
Adults (19-64)	8.4%	9.4%	10.3%	11.0%	11.6%

Source: HCCI, 2013.
Note: All data weighted to reflect the national, younger than 65 ESI population.

Table 3. Distribution ESI population with diabetes by age group, 2008-2012.

	2008	2009	2010	2011	2012
Age Group					
0-3	0.1%	0.1%	0.1%	0.1%	0.1%
4-8	0.2%	0.2%	0.2%	0.2%	0.2%
9-13	0.5%	0.5%	0.5%	0.6%	0.5%
14-18	0.9%	0.9%	0.9%	0.9%	0.9%
19-25	1.5%	1.6%	1.6%	1.7%	1.8%
26-44	18.7%	19.5%	19.8%	19.8%	19.8%
45-54	33.6%	33.2%	32.9%	32.7%	32.8%
55-64	44.5%	44.0%	43.9%	44.0%	43.8%

Source: HCCI, 2013.
Note: All data weighted to reflect the national, younger than 65 ESI population.

Table 4. Percent diabetes prevalence by gender and age group, 2008-2012.

	2008	2009	2010	2011	2012
Men by Age Group					
All Ages	6.7%	7.5%	8.2%	8.7%	9.1%
0-3	0.1%	0.1%	0.2%	0.2%	0.1%
4-8	0.3%	0.3%	0.3%	0.3%	0.3%
9-13	0.5%	0.5%	0.6%	0.6%	0.7%
14-18	0.7%	0.8%	0.9%	1.0%	1.0%
19-25	0.9%	1.1%	1.2%	1.3%	1.4%
26-44	4.1%	4.7%	5.2%	5.6%	5.9%
45-54	11.3%	12.6%	13.8%	14.9%	15.8%
55-64	20.6%	22.6%	24.2%	25.5%	26.3%
Women by Age Group					
All Ages	6.0%	6.8%	7.4%	8.0%	8.4%
0-3	0.1%	0.1%	0.1%	0.1%	0.1%
4-8	0.2%	0.3%	0.3%	0.3%	0.3%
9-13	0.5%	0.5%	0.6%	0.6%	0.7%
14-18	0.8%	0.9%	1.0%	1.1%	1.1%
19-25	1.2%	1.4%	1.6%	1.7%	1.9%
26-44	4.1%	4.8%	5.3%	5.9%	6.2%
45-54	9.1%	10.2%	11.2%	12.2%	13.0%
55-64	16.6%	18.4%	19.7%	21.0%	21.9%

Source: HCCI, 2013.
Note: All data weighted to reflect the national, younger than 65 ESI population.

Table 5. Percent diabetes prevalence by census region and division, 2008-2012.

	2008	2009	2010	2011	2012
Northeast	6.3%	7.2%	8.0%	8.6%	9.3%
New England	5.3%	5.9%	6.4%	6.9%	7.3%
Mid-Atlantic	6.7%	7.7%	8.5%	9.3%	10.0%
Midwest	6.2%	6.9%	7.5%	8.0%	8.3%
East North Central	6.4%	7.1%	7.7%	8.1%	8.5%
West North Central	5.8%	6.5%	7.0%	7.6%	7.8%
South	7.2%	8.0%	8.8%	9.4%	9.9%
South Atlantic	7.3%	8.2%	8.9%	9.5%	10.1%
East South Central	7.3%	8.1%	8.9%	9.5%	10.0%
West South Central	6.9%	7.7%	8.4%	9.0%	9.6%
West	5.2%	5.8%	6.3%	6.8%	7.0%
Mountain	5.2%	5.8%	6.4%	7.0%	7.4%
Pacific	5.2%	5.7%	6.3%	6.7%	6.9%

Source: HCCI, 2013.
Note: All data weighted to reflect the national, younger than 65 ESI population.