Appendix 1: Cohort Obesity Prevalence

The prevalence of obesity at age 25 in successive cohorts, used in our age/period/cohort model as a continuous variable, is shown in the following table:

Percent Obese at Age 25 in Successive Cohorts

Birth Years	Percent
1920-1924	2.00%
1925-1929	2.58%
1930-1934	3.34%
1935-1939	3.46%
1940-1944	3.96%
1945-1949	4.85%
1950-1954	5.99%
1955-1959	6.99%
1960-1964	8.47%
1965-1969	11.32%
1970-1974	14.52%
1975-1979	15.92%

Sources: Calculated from NHANES continuous waves 1999-2008 using the interview sample.

One limitation of our study is that we used retrospective data on height and weight to estimate trends in cohort obesity at age 25 for subsequent US birth cohorts. Recall data may be subject to errors of misreporting. However, prior research using longitudinal data found a relatively high degree of correspondence between recall and contemporaneously reported data on BMI (A1). Validity of recall data over longer intervals of time has not been investigated. A second limitation is that we were not able to investigate cohort trends in obesity at younger ages because of lack of data on trends in childhood and adolescence.

Appendix 2: Derivation of Formula for Estimating Incidence of Diabetes from Prevalence of Diabetes in a Cohort

Suppose that 20% of a cohort has diabetes at age 30 and 25% of that cohort has diabetes at age 35. Then the incidence of diabetes (number of new cases per diabetes-free member of the population) between ages 30 and 35 is approximately .05/.80=.0625. That figure refers to incidence over a five-year period, whereas incidence is normally measured annually. An annualized rate would be .0625/5=.0125. This figure is based on the number who are free of diabetes at the beginning of the interval, whereas incidence is typically measured using a denominator measured at the middle of the interval. So the corrected figure is (.05/.775)/5=.0129.

This calculation makes three basic assumptions: (1) Migration does not affect birth cohort prevalence; (2) Those with diabetes at age 30 do not become diabetes-free by age 35, and (3) Those with diabetes at age 30 have the same probability of dying by age 35 as those who were diabetes-free at age 30. In constructing our estimates of the incidence of diabetes, we retain assumption 1 and 2, that migration does not affect prevalence and that those who enter the diabetic state leave it only by death (see discussion at end of this section). To check the sensitivity of our results to assumption 1, we excluded foreign-born individuals from our sample, and results were not substantially altered. However, assumption 3 is demonstrably untenable (A2). Accordingly, our estimates of diabetes incidence adjust for the higher mortality of those with diabetes.

We develop the estimation formula first by referring to the population at exact ages and then substituting equivalent formulas for the population at discrete age intervals. Under our assumptions, the diabetes-free population is subject to two sources of decrement, incident diabetes and death (A3).

(A2.1) $${}_5p_x^O = \exp[-5(\mu_x^O + \delta_x^O)]$$, where

${}_5p_x^O =$ probability of surviving in the disease-free state from age x to age x+5 for a person free of diabetes at age x

$\mu_x^O =$ death rate at age x for a person free of diabetes

$\delta_x^O =$ rate of acquiring diabetes (incidence rate) at age x for a person free of diabetes.

(A2.2) $${}_5p_x = \exp[-5\mu_x]$$, where

${}_5p_x =$ probability of surviving from age x to age x+5 for a randomly-chosen member of the population

$\mu_x =$ death rate at age x for a randomly-chosen member of the population.

Equations A2.1 and A2.2 assume that death rates and the incidence rate of diabetes are constant in the age interval x to x+5.

Call the non-diabetes population at age x N_x^O and the total population at age x N_x. Then the prevalence of non-diabetes at age x is

$$\Pi_x = \frac{N_x^O}{N_x}.$$

The prevalence of non-diabetes in the same cohort at age x+5 is

$$\Pi_{x+5} = \frac{N_{x+5}^O}{N_{x+5}} = \frac{N_x^O \exp[-5(\mu_x^O + \delta_x^O)]}{N_x \exp[-5\mu_x]}$$

(A2.3) $$= \Pi_x \exp[-5\delta_x^O]\exp[-5(\mu_x^O - \mu_x)].$$

Rewriting equation A2.3 gives

$$\exp[-5\delta_x^O] = \frac{\Pi_{x+5}}{\Pi_x}\frac{\exp[-5\mu_x]}{\exp[-5\delta_x^O]}, \text{ or}$$

(A2.4) $$\delta_x^O = -\frac{1}{5}\ln[\frac{\Pi_{x+5}}{\Pi_x}\frac{{}_5p_x}{{}_5^Mp_x^O}], \text{ where}$$

${}_5^Mp_x^O =$ probability of surviving the risk of death from x to x+5 for a diabetes-free person at age x.

Equation A2.4 shows that the incidence rate of diabetes between ages x and x+5 can be derived from the ratio of non-diabetes prevalence at x and x+5 and from differences in the survival probabilities between the entire population and the diabetes-free population over that age span. It also shows why a moving average of incidence estimates made using this equation is appropriate: errors in prevalence estimates at any particular age will appear in the numerator of one age-specific incidence estimate and in the denominator of the adjacent incidence estimate.

Substituting expressions for discrete five-year intervals into the equivalent terms in A2.4 gives

(A2.5) $${}_{10}\overline{\delta}_x^O = -\frac{1}{5}\ln[\frac{{}_5\Pi_{x+5}}{{}_5\Pi_x}\frac{{}_5L_{x+5}/{}_5L_x}{{}_5^ML_{x+5}^O/{}_5^ML_x^O}], \text{ where}$$

${}_{10}\overline{\delta}_x^O$ = rate of developing diabetes for a non-diabetic person in the age interval x to x+10,

${}_5\Pi_x =$ prevalence of non-diabetes at ages x to x+5

${}_5L_x =$ person-years lived between ages x and x+5 in a life table for the population

${}_5^ML_x^O =$ person-years lived between ages x and x+5 in a life table for persons free of diabetes.

We interpret ${}_{10}\overline{\delta}_x^O$ as pertaining to the age interval x+2.5 to x+7.5, i.e. the five-year age span at the middle of the ten-year age interval x to x+10. We use equation A2.5 for our incidence estimates in this study, assuming the incidence rate and differential mortality are constant within the five-year age intervals used. Values of ${}_5\Pi_x$ are calculated from fitted values in the age-cohort model of prevalence. Values of ${}_{10}\overline{\delta}_x^O$ shown in Figure 4 come from fitted values of prevalence that use the coefficient for the cohort born in 1950-1959, but the shape of the graph in Figure 4 is robust to the use of other cohort coefficients. Values of ${}_5L_x$ and ${}_5L_x^{OM}$ come from the life tables as described in the Statistical Methods section.

Our calculations assume that there is no remission once the diabetes-defining threshold is reached. Remissions would offset new cases and produce an underestimate of the incidence rate. The principal source of remission of diabetes is bariatric surgery. According to the American Society for Metabolic and Bariatric Surgery (ASMBS), the number of procedures reached 103,000 in 2003 (A4). There were approximately 21,708,000 Americans aged 20+ with HbA1c values of 6.5% or greater in that year (A5,A6). Assuming that all those who had the surgery were diabetic, the annual rate of surgery among people with diabetes was .00497 in 2003. Two recent randomized clinical trials investigated the efficacy of bariatric surgery among those with diabetes. One found a one-year success rate in reducing HbA1c below 6.0% of 42% (A7) and the other a two-year rate of success of reducing HbA1c below 6.5% of 75% (A8). If we assume that the higher figure applies to the 5-year success rate required in our calculations, bariatric surgery would produce a remission rate of (.75)(.00497) = .00373 among people with diabetes in 2003. Since the ratio of people without diabetes to people with diabetes in that year was 9.12 (A6), the rate of flow into the non-diabetic population as a result of successful bariatric surgery was .00373/9.12 = .00041. This value compares to an incidence rate above age 50 of about .010 in our calculations. So the incidence rate above age 50 would be perhaps higher by the factor 1.04 if allowance were taken of remission from bariatric surgery. There are other sources of remission, of course, but in these two randomized clinical trials the remission rates for very intensive non-surgical medical treatment was only 12% (A7) and 0% (A8). Due to the intensive nature of the medical treatment, these findings can be considered an upper bound on remission rates in the diabetic population at large. It is worth noting that projections of future diabetes prevalence assume the cure rate for diabetes is zero (A9), and clinical guidelines imply that people who have been diagnosed with diabetes are considered diabetic even if their blood glucose is under control (A10).

Appendix 3: Prevalence Estimates and Confidence Intervals

Results displayed in Figures 1a and 1b are shown in more detail in **Appendix Tables 3a and 3b**.

Appendix Table 3a: Age-Specific Prevalence Across Observation Periods

Period:	1988-1994		1999-2002		2003-2006		2007-2010	
Age	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
20-24	0.004397	(0,0.009)	0.004269	(-0.001,0.009)	0.006232	(0.002,0.011)	0.005288	(-0.002,0.012)
25-29	0.004864	(0.001,0.009)	0.017177	(0.007,0.027)	0.022937	(0.01,0.035)	0.021857	(0.011,0.033)
30-34	0.008792	(0.004,0.014)	0.026586	(0.008,0.045)	0.024158	(0.013,0.035)	0.028596	(0.018,0.039)
35-39	0.032287	(0.015,0.05)	0.029327	(0.016,0.043)	0.037264	(0.022,0.052)	0.039685	(0.028,0.051)
40-44	0.045436	(0.03,0.06)	0.046697	(0.033,0.061)	0.047103	(0.03,0.064)	0.052208	(0.036,0.069)
45-49	0.050596	(0.036,0.066)	0.070413	(0.045,0.096)	0.06769	(0.048,0.087)	0.085597	(0.061,0.11)
50-54	0.091078	(0.063,0.119)	0.096351	(0.073,0.12)	0.117324	(0.095,0.14)	0.1389	(0.113,0.165)
55-59	0.114349	(0.091,0.138)	0.114759	(0.087,0.142)	0.152951	(0.112,0.194)	0.156262	(0.12,0.192)
60-64	0.153817	(0.129,0.178)	0.178177	(0.146,0.21)	0.165387	(0.138,0.193)	0.192598	(0.151,0.234)
65-69	0.140782	(0.109,0.172)	0.193894	(0.158,0.23)	0.200292	(0.164,0.237)	0.264501	(0.204,0.325)
70-74	0.142179	(0.112,0.173)	0.160267	(0.126,0.194)	0.211401	(0.175,0.247)	0.248475	(0.218,0.278)
75-79	0.186321	(0.148,0.224)	0.160083	(0.113,0.207)	0.183436	(0.145,0.222)	0.230738	(0.182,0.279)

Appendix Table 3b: Age-Specific Prevalence Across Birth Cohorts

Cohort:	1910-1919		1920-1929		1930-1939		1940-1949	
Age	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
20-24								
25-29								
30-34								
35-39								
40-44							0.0613	(0.031,0.091)
45-49							0.0506	(0.036,0.066)
50-54					0.0743	(0.048,0.1)	0.1043	(0.075,0.134)
55-59					0.1143	(0.091,0.138)	0.1460	(0.119,0.173)
60-64			0.1596	(0.128,0.191)	0.1626	(0.131,0.194)	0.1814	(0.158,0.205)
65-69			0.1408	(0.109,0.172)	0.2059	(0.178,0.234)	0.2430	(0.191,0.295)
70-74	0.1337	(0.098,0.17)	0.1506	(0.119,0.182)	0.2190	(0.198,0.24)	0.2620	(0.13,0.394)
75-79	0.1863	(0.148,0.224)	0.1724	(0.14,0.204)	0.2246	(0.179,0.27)		

Cohort:	1950-1959		1960-1969		1970-1979		1980-1989	
Age	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
20-24			0.0079	(0,0.016)	0.0022	(-0.001,0.006)	0.0058	(0.002,0.009)
25-29			0.0049	(0.001,0.009)	0.0211	(0.013,0.03)	0.0201	(0.009,0.031)
30-34	0.0051	(0.001,0.009)	0.0203	(0.01,0.031)	0.0257	(0.017,0.034)	0.0364	(-0.009,0.081)
35-39	0.0323	(0.015,0.05)	0.0324	(0.023,0.042)	0.0403	(0.029,0.052)		
40-44	0.0364	(0.023,0.05)	0.0507	(0.04,0.061)	0.0497	(0.007,0.092)		
45-49	0.0733	(0.056,0.09)	0.0770	(0.057,0.097)				
50-54	0.1229	(0.106,0.14)	0.1054	(0.045,0.166)				
55-59	0.1406	(0.109,0.172)						
60-64	0.1721	(0.105,0.24)						
65-69								
70-74								
75-79								

Appendix 4: Results of Models of Prevalence of Diabetes

Results displayed in Figures 2 and 3 are shown in more detail in Appendix Tables 4a, 4b, and 4c.

Appendix Table 4a: Results of Age-Cohort Model

Dependent Variable = Log Diabetes Prevalence

Indicator	Coefficient	SE	t-statistic	p-value	95% CI	
Age 25-29	1.080695	0.292925	3.689325	0.001283	0.473206	1.688185
Age 30-34	1.704125	0.314012	5.426944	1.89E-05	1.052904	2.355346
Age 35-39	2.532282	0.328767	7.702351	1.1E-07	1.85046	3.214103
Age 40-44	2.96014	0.342128	8.652146	1.57E-08	2.25061	3.669669
Age 45-49	3.384705	0.367831	9.201791	5.36E-09	2.62187	4.14754
Age 50-54	3.988511	0.395827	10.0764	1.05E-09	3.167616	4.809406
Age 55-59	4.232604	0.430616	9.829178	1.65E-09	3.33956	5.125647
Age 60-64	4.553761	0.435592	10.45419	5.35E-10	3.650399	5.457124
Age 65-69	4.748697	0.46782	10.15069	9.19E-10	3.778497	5.718897
Age 70-74	4.791991	0.494981	9.68117	2.17E-09	3.765464	5.818518
Age 75-79	4.92001	0.536914	9.163504	5.77E-09	3.806519	6.0335
1920-29 cohort	0.0491136	0.446574	0.109979	0.913423	-0.87702	0.975251
1930-39 cohort	0.3153463	0.443356	0.711272	0.48439	-0.60412	1.234809
1940-49 cohort	0.4939475	0.492615	1.002704	0.326905	-0.52767	1.515569
1950-59 cohort	0.5045705	0.527574	0.956399	0.349263	-0.58955	1.598691
1960-69 cohort	0.809644	0.554556	1.459987	0.158427	-0.34043	1.959722
1970-79 cohort	1.161477	0.583122	1.991825	0.058947	-0.04784	2.370798
1980-89 cohort	1.588968	0.630111	2.521726	0.019422	0.282197	2.895739
constant	-6.687672	0.60934	-10.9753	2.16E-10	-7.95137	-5.42398
R-Squared	0.9486					
N	41					

Age/Cohort Model: $ln(Y_{ia}) = \alpha + \beta_a X_a + \beta_i X_i$, where Y_{ia} = the proportion of the population in cohort *i* at age *a* with diabetes, X_a is a dummy variable indicating that the observation pertains to age *a*, and X_i is a dummy variable indicating that the observation pertains to cohort *i*.

Appendix Table 4b: Results of Age-Period Model

Dependent Variable: Log Diabetes Prevalence

Indicator	Coefficient	SE	t-statistic	p-value	95% CI	
Age 25-29	0.8340861	0.177858	4.689627	4.59E-05	0.472232	1.19594
Age 30-34	1.229262	0.176308	6.972242	5.69E-08	0.87056	1.587963
Age 35-39	1.935714	0.176051	10.99518	1.43E-12	1.577535	2.293892
Age 40-44	2.256934	0.173813	12.98482	1.61E-14	1.903309	2.61056
Age 45-49	2.564451	0.181592	14.12202	1.52E-15	2.194998	2.933903
Age 50-54	3.056156	0.183954	16.61367	1.36E-17	2.681898	3.430414
Age 55-59	3.259276	0.195733	16.65169	1.27E-17	2.861055	3.657497
Age 60-64	3.512932	0.177514	19.78963	7.07E-20	3.151777	3.874086
Age 65-69	3.625526	0.187088	19.37873	1.34E-19	3.244892	4.006159
Age 70-74	3.586429	0.189392	18.93653	2.7E-19	3.201108	3.97175
Age 75-79	3.620085	0.210792	17.17377	5.08E-18	3.191226	4.048944
2001 NHANES	0.2922673	0.108457	2.694766	0.010993	0.071609	0.512926
2005 NHANES	0.4265295	0.108519	3.930467	0.00041	0.205746	0.647313
2009 NHANES	0.5343021	0.100049	5.34043	6.76E-06	0.330752	0.737852
constant	-5.571567	0.133038	-41.8794	3.46E-30	-5.84224	-5.3009
R-Squared	0.9686					
N	48					

Age/Period model: $ln(Y_{ia}) = \alpha + \beta_a X_a + \beta_p X_p$, where Y_{ia} = the proportion of the population in cohort i at age a with diabetes, X_a is a dummy variable indicating that the observation pertains to age a, and X_p is a dummy variable indicating that the observation pertains to period p.

Appendix Table 4c: Results of Age-Period-Cohort Obesity Model

Dependent Variable: Log Diabetes Prevalence

Indicator	Coefficient	SE	t-statistic	p-value	95% CI	
Age 25-29	0.9926029	0.155681	6.375895	5.71E-07	0.6742	1.311005
Age 30-34	1.655445	0.18084	9.154213	4.71E-10	1.285587	2.025304
Age 35-39	2.672352	0.22659	11.79378	1.38E-12	2.208924	3.13578
Age 40-44	3.191595	0.25972	12.28859	5.08E-13	2.660407	3.722782
Age 45-49	3.636119	0.288422	12.60695	2.71E-13	3.046231	4.226008
Age 50-54	4.259973	0.314103	13.56235	4.38E-14	3.61756	4.902385
Age 55-59	4.545092	0.333427	13.63146	3.86E-14	3.863158	5.227026
Age 60-64	4.892977	0.345447	14.16418	1.46E-14	4.186459	5.599496
Age 65-69	5.07219	0.360942	14.05265	1.79E-14	4.333981	5.810399
Age 70-74	5.107939	0.392845	13.00242	1.26E-13	4.304481	5.911398
Age 75-79	5.116603	0.416248	12.2922	5.04E-13	4.26528	5.967926
2001 NHANES	-0.0517601	0.119307	-0.43384	0.667616	-0.29577	0.192251
2005 NHANES	0.0782829	0.119932	0.652728	0.519073	-0.16701	0.323571
2009 NHANES	0.0561693	0.142336	0.394624	0.696008	-0.23494	0.347279
obesity	13.10013	2.828275	4.631844	7.05E-05	7.315658	18.8846
constant	-7.107672	0.35859	-19.8212	2.09E-18	-7.84107	-6.37427
R-Squared	0.9813					
N	45					

Age/Period/Cohort model: $ln(Y_{ia}) = \alpha + \beta_a X_a + \beta_p X_p + \gamma Coh\_ob$, where Y_{ia}, X_a, and X_p are defined as in the Age/Period model and *Coh_ob* is a continuous variable representing the prevalence of obesity at age 25 in the cohort corresponding to the given age and period.

Appendix 5: Model Age Pattern of Diabetes Incidence

The model age pattern of diabetes incidence shown in Figure 4 is shown in detail in the following table:

Appendix Table 5: Estimates of Annual Incidence (New Cases Per Person-Year without Diabetes) for 1950-59 birth cohort

Age Interval	Incidence	Incidence with no differential mortality
20-24 to 25-29	0.000994	0.000934
25-29 to 30-34	0.001693	0.001617
30-34 to 35-39	0.002422	0.002303
35-39 to 40-44	0.003611	0.003429
40-44 to 45-49	0.006399	0.00612
45-49 to 50-54	0.007944	0.007516
50-54 to 55-59	0.011015	0.010359
55-59 to 60-64	0.011268	0.010269
60-64 to 65-69	0.010361	0.008846
65-69 to 70-74	0.009888	0.007609
70-74 to 75-79	0.008723	0.006022

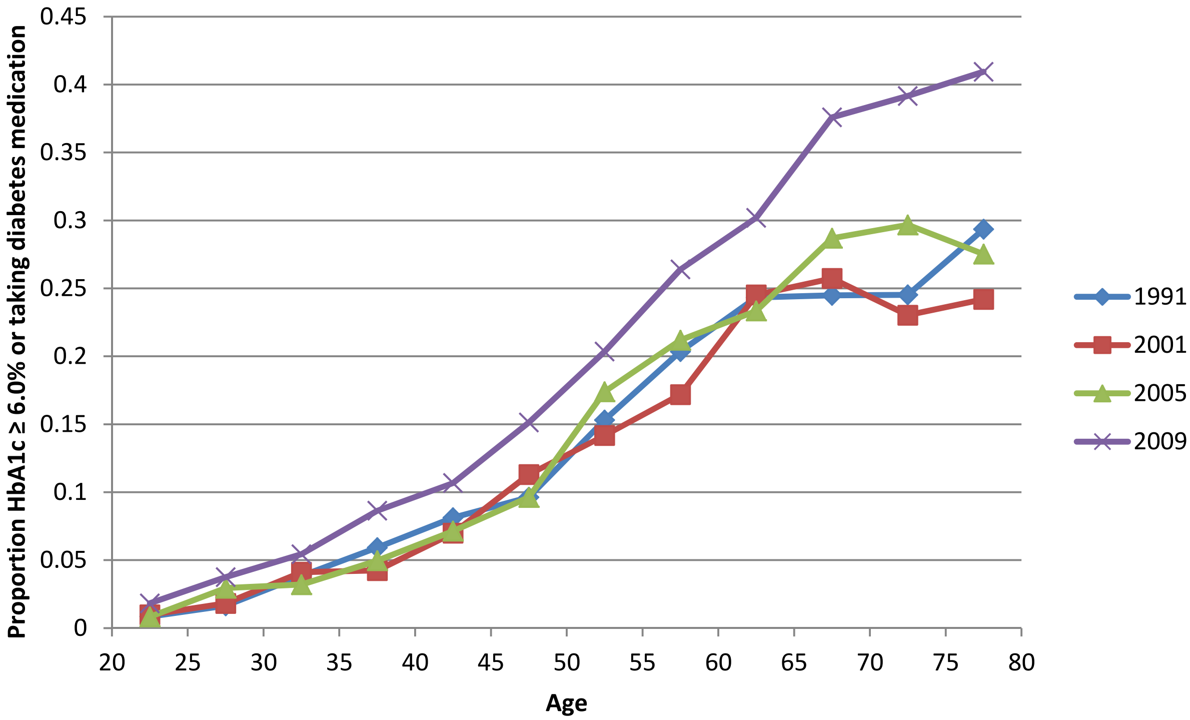
Incidence estimates are based on cohort prevalence estimates from age-cohort model and life-table values by diabetes status (nondiabetic versus entire population); see Methods section in text and Appendix 2 for details. Figure 4 plots the values in the "Incidence" column above. To demonstrate the effect of using mortality differences by diabetes status on the estimates, we present the estimates of incidence that would result if we had ignored mortality differences by diabetes status.

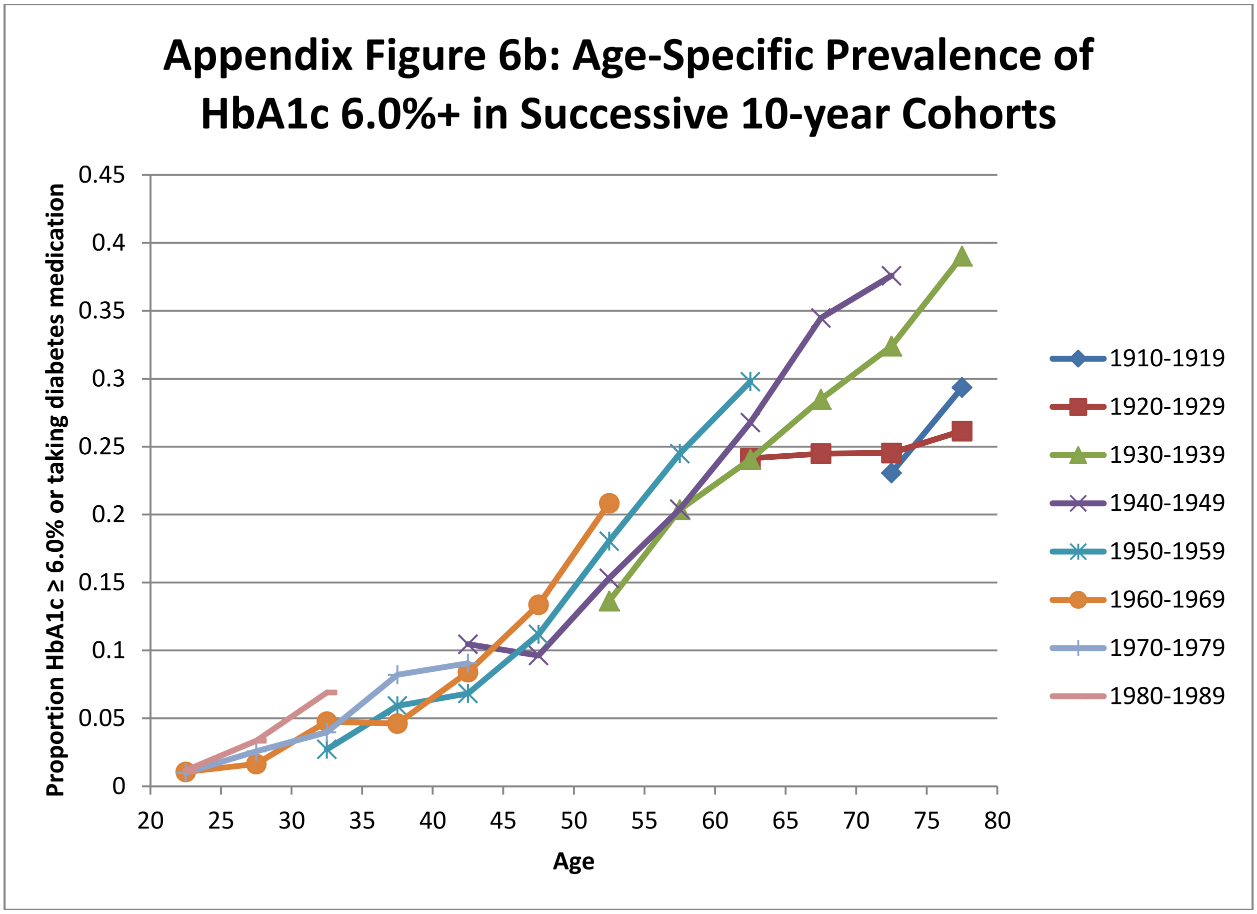
Appendix 6: Results based on "High Risk" of Diabetes, and Discussion of Threshold Choice

Appendix Figures 6a and 6b show estimates of the prevalence of "at least high risk" of diabetes, using HbA1c ≥ 6.0% (42 mmol/mol) (A11), by period and cohort. Appendix Figure 6c shows the cohort coefficients from the age/cohort model. Appendix Figure 6d shows the period effects in the age/period and age/period/cohort models discussed in the Statistical Methods section, as applied to the threshold HbA1c ≥ 6.0%. Appendix Figure 6e shows the modeled age-pattern of "at least high risk."

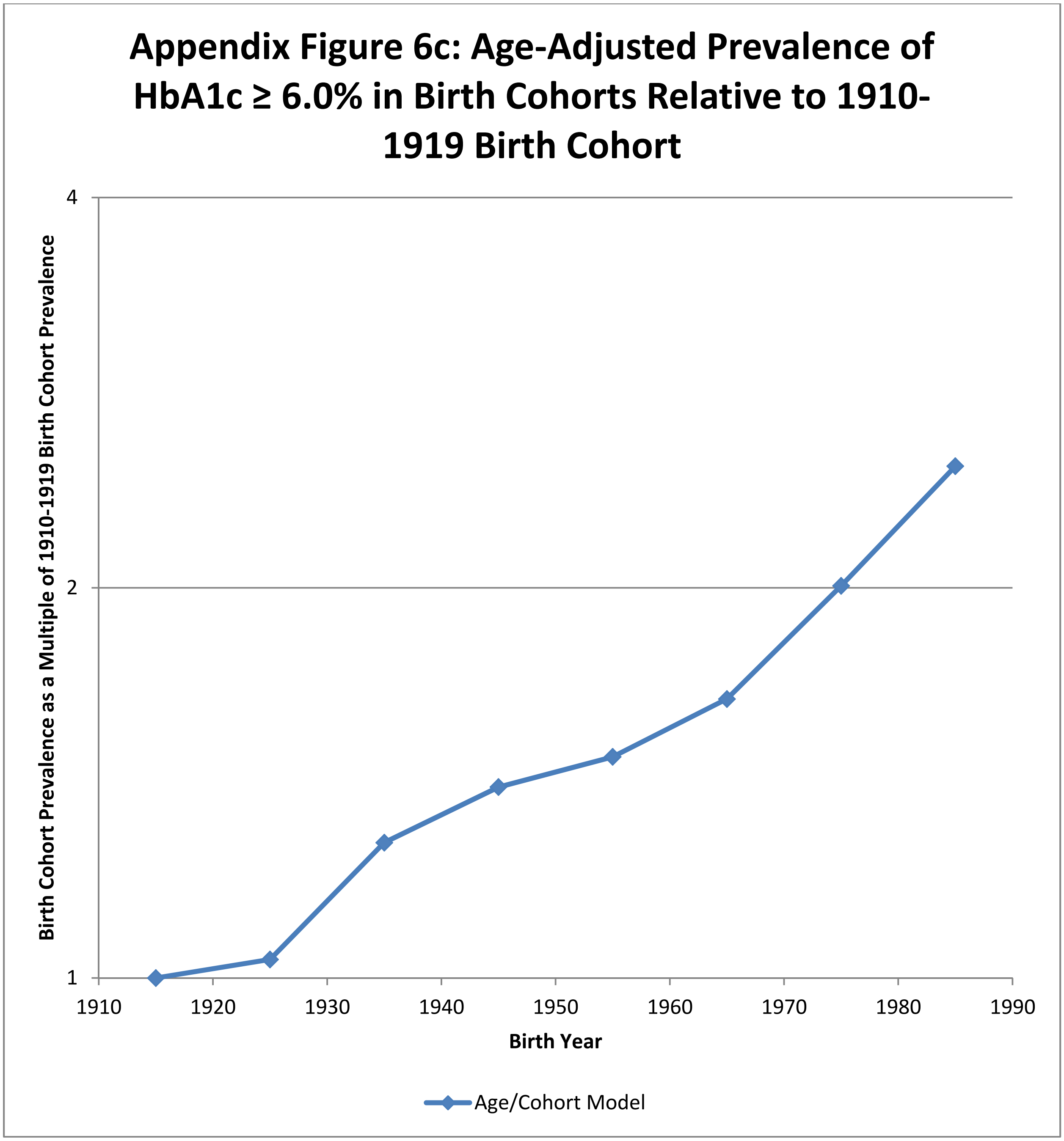
Although the recent ADA guidelines mention 6.0% as a possible threshold, they note that there is a "continuum of risk for diabetes with all glycemic measures" and did not formally identify 6.0% as a formal "high risk" threshold (A11). A recent meta-analysis indicated that there is no clear HbA1c-based threshold above which the risk of incident diabetes increases dramatically (A12). Nevertheless, using the 6.0% threshold is a useful way to test the sensitivity of our methods to the choice of threshold. The patterns we find using the 6.0% threshold are similar to the patterns we find using the 6.5% threshold.

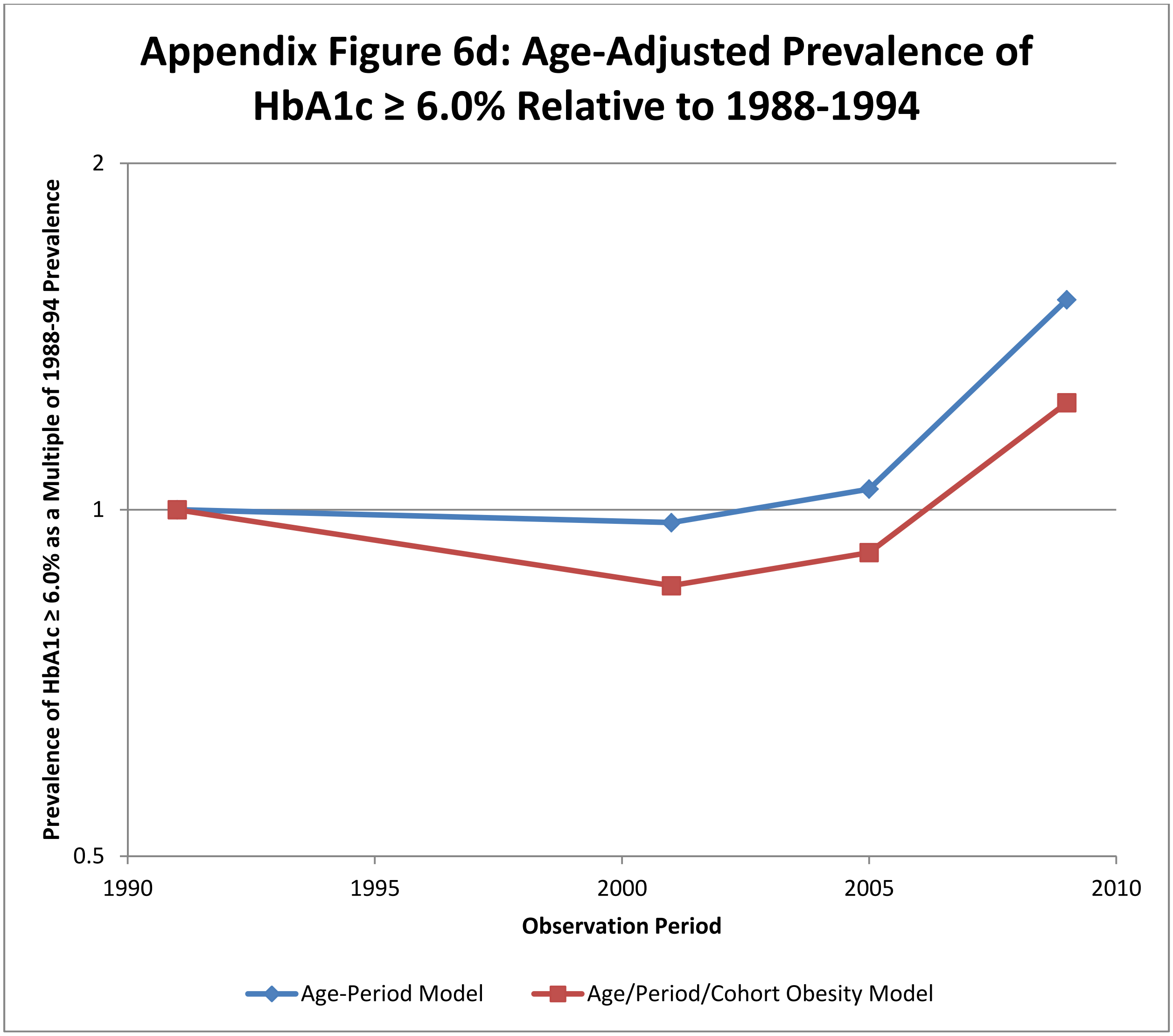
Appendix Figure 6a: Age-Specific Prevalence of HbA1c 6.0%+ in Successive Observation Periods



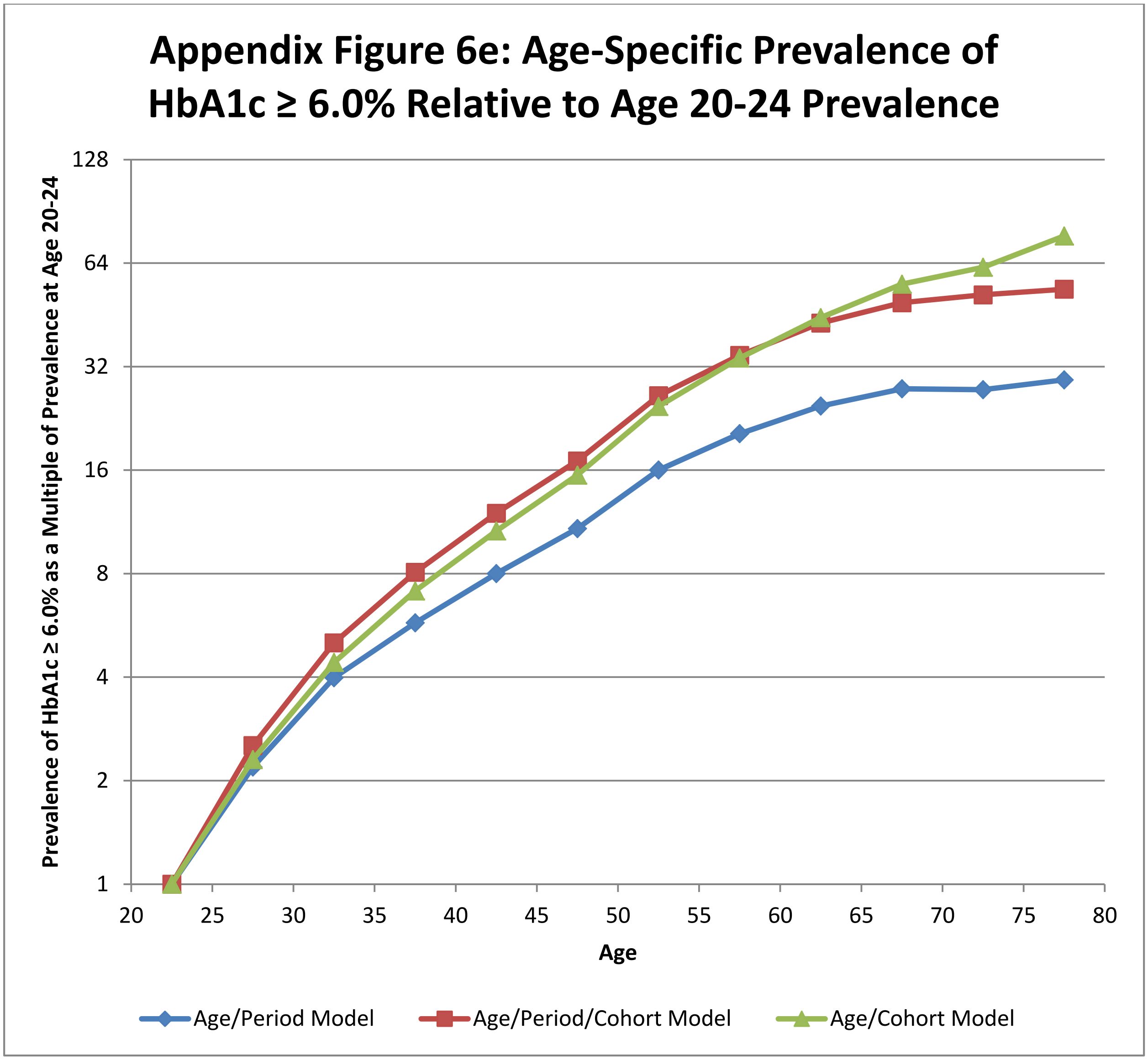


Appendix Figure 6b: Age-Specific Prevalence of HbA1c 6.0%+ in Successive 10-year Cohorts
Proportion HbA1c ≥ 6.0% or taking diabetes medication
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
20
25
30
35
40
45
50
55
60
65
70
75
80
Age
1910-1919
1920-1929
1930-1939
1940-1949
1950-1959
1960-1969
1970-1979
1980-1989


Appendix Figure 6c: Age-Adjusted Prevalence of HbA1c ≥ 6.0% in Birth Cohorts Relative to 1910-1919 Birth Cohort
Birth Cohort Prevalence as a Multiple of 1910-1919 Birth Cohort Prevalence
4
2
1
1910
1920
1930
1940
1950
1960
1970
1980
1990
Birth Year
Age/Cohort Model



Appendix Figure 6d: Age-Adjusted Prevalence of HbA1c ≥ 6.0% Relative to 1988-1994
Prevalence of HbA1c ≥ 6.0% as a Multiple of 1988-94 Prevalence
2
1
0.5
1990
1995
2000
2005
2010
Observation Period
Age-Period Model
Age/Period/Cohort Obesity Model


Appendix Figure 6e: Age-Specific Prevalence of HbA1c ≥ 6.0% Relative to Age 20-24 Prevalence
Prevalence of HbA1c ≥ 6.0% as a Multiple of Prevalence at Age 20-24
128
64
32
16
8
4
2
1
20
25
30
35
40
45
50
55
60
65
70
75
80
Age
Age/Period Model
Age/Period/Cohort Model
Age/Cohort Model

Appendix Table 6a: Results of Age-Cohort Model

Dependent variable = Log Prevalence of (HbA1c ≥ 6.0%)

Indicator	Coefficient	SE	t-statistic	p-value	95% CI	
Age 25-29	0.8303195	0.121278	6.846402	7.07E-07	0.578804	1.081835
Age 30-34	1.474147	0.130009	11.33883	1.17E-10	1.204525	1.743768
Age 35-39	1.944194	0.136118	14.28316	1.31E-12	1.661903	2.226485
Age 40-44	2.33351	0.141649	16.47384	7.35E-14	2.039747	2.627273
Age 45-49	2.691181	0.152291	17.67128	1.74E-14	2.375348	3.007013
Age 50-54	3.129008	0.163882	19.09303	3.51E-15	2.789137	3.468879
Age 55-59	3.4235	0.178286	19.20231	3.11E-15	3.053757	3.793242
Age 60-64	3.654953	0.180346	20.26636	1.01E-15	3.280939	4.028967
Age 65-69	3.828174	0.193689	19.76451	1.71E-15	3.426487	4.229861
Age 70-74	3.876574	0.204934	18.91618	4.26E-15	3.451566	4.301582
Age 75-79	4.00686	0.222296	18.02492	1.16E-14	3.545847	4.467873
1920-29 cohort	0.0330163	0.184893	0.17857	0.85991	-0.35043	0.41646
1930-39 cohort	0.240484	0.18356	1.31011	0.203674	-0.1402	0.621165
1940-49 cohort	0.3391446	0.203955	1.66284	0.110527	-0.08383	0.762121
1950-59 cohort	0.3927891	0.218429	1.79825	0.085875	-0.0602	0.845782
1960-69 cohort	0.4955284	0.2296	2.158226	0.042089	0.019368	0.971689
1970-79 cohort	0.6965528	0.241427	2.885149	0.008593	0.195864	1.197242
1980-89 cohort	0.9089721	0.260882	3.48423	0.002102	0.367937	1.450008
constant	-5.280235	0.252282	-20.9299	5.14E-16	-5.80344	-4.75703
R-Squared	0.9878688					
N	41					

Appendix Table 6b: Results of Age-Period Model

Dependent variable = Log Prevalence of (HbA1c ≥ 6.0%)

Indicator	Coefficient	SE	t-statistic	p-value		
Age 25-29	0.785042	0.089818	8.740355	4.21E-10	0.602306	0.967778
Age 30-34	1.382502	0.089036	15.52754	9.9E-17	1.201358	1.563646
Age 35-39	1.750047	0.088906	19.68429	8.32E-20	1.569167	1.930927
Age 40-44	2.079389	0.087776	23.6898	2.73E-22	1.900808	2.25797
Age 45-49	2.381469	0.091704	25.96907	1.53E-23	2.194896	2.568043
Age 50-54	2.77329	0.092897	29.85342	1.85E-25	2.58429	2.962291
Age 55-59	3.016927	0.098845	30.52183	9.13E-26	2.815825	3.218028
Age 60-64	3.201748	0.089644	35.71608	5.92E-28	3.019365	3.384131
Age 65-69	3.317046	0.094479	35.10868	1.03E-27	3.124826	3.509265
Age 70-74	3.311332	0.095643	34.6218	1.61E-27	3.116745	3.505919
Age 75-79	3.376998	0.10645	31.7239	2.66E-26	3.160425	3.593572
2001 NHANES	-0.0258708	0.054771	-0.47235	0.639789	-0.1373	0.085562
2005 NHANES	0.0411817	0.054802	0.751463	0.4577	-0.07031	0.152677
2009 NHANES	0.4200199	0.050525	8.313196	1.33E-09	0.317227	0.522813
constant	-4.683064	0.067184	-69.7048	2.09E-37	-4.81975	-4.54638
R-Squared	0.9897704					
N	48					

Appendix Table 6c: Results of Age-Period-Cohort Obesity Model

Dependent variable = Log Prevalence of (HbA1c ≥ 6.0%)

Indicator	Coefficient	SE	t-statistic	p-value	95% CI	
Age 25-29	0.9286565	0.087923	10.5622	1.88E-11	0.748835	1.108479
Age 30-34	1.61597	0.102132	15.82242	8.41E-16	1.407087	1.824853
Age 35-39	2.088447	0.12797	16.31986	3.74E-16	1.82672	2.350175
Age 40-44	2.484058	0.146681	16.93516	1.41E-16	2.184062	2.784053
Age 45-49	2.834346	0.16289	17.40037	6.89E-17	2.501198	3.167493
Age 50-54	3.271163	0.177394	18.44012	1.46E-17	2.908352	3.633973
Age 55-59	3.541548	0.188307	18.8073	8.63E-18	3.156417	3.92668
Age 60-64	3.757913	0.195096	19.26188	4.54E-18	3.358897	4.156929
Age 65-69	3.893697	0.203847	19.1011	5.69E-18	3.476784	4.31061
Age 70-74	3.946568	0.221865	17.78819	3.83E-17	3.492804	4.400332
Age 75-79	3.984019	0.235082	16.94739	1.39E-16	3.503223	4.464814
2001 NHANES	-0.1520016	0.06738	-2.25588	0.031793	-0.28981	-0.01419
2005 NHANES	-0.0857865	0.067733	-1.26654	0.2154	-0.22432	0.052743
2009 NHANES	0.2139795	0.080386	2.661893	0.012539	0.049571	0.378388
obesity	4.388277	1.597306	2.747298	0.010222	1.121419	7.655136
constant	-5.274105	0.202519	-26.0426	1.15E-21	-5.6883	-4.85991
R-Squared	0.9925176					
N	45					

References

A1. Perry GS, Byers TE, Mokdad AH, Serdula MK, Williamson DF. The Validity of Self-Reports of Past Body Weights by U.S. Adults. *Epidemiology*. 1995;6(1):61–66.

A2. Stokes A, Mehta NK. Mortality and excess risk in US adults with pre-diabetes and diabetes: a comparison of two nationally representative cohorts, 1988-2006. *Popul Heal. Metr*. 2013;11(1):7.

A3. Preston SH, Guillot M, Heuveline P. *Demography*. Oxford: Blackwell; 2001.

A4. National Institute of Diabetes and Digestive and Kidney Diseases. Longitudinal Assessment of Bariatric Surgery (LABS).http://win.niddk.nih.gov/publications/labs.htm. Published 2011.

A5. U.S. Census Bureau. Statistical Abstract of the United States, 2004-2005.http://www.census.gov/prod/2004pubs/04statab/pop.pdf. Published 2005.

A6. Cheng YJ, Imperatore G, Geiss LS, et al. Secular changes in the age-specific prevalence of diabetes among U.S. adults: 1988-2010. *Diabetes Care*. 2013;36(9):2690–6.

A7. Schauer PR, Kashyap SR, Wolski K, et al. Bariatric surgery versus intensive medical therapy in obese patients with diabetes. *N Engl J Med*. 2012;366(17):1567–1576.

A8. Mingrone G, Panunzi S, De Gaetano A, et al. Bariatric surgery versus conventional medical therapy for type 2 diabetes. *N Engl J Med*. 2012;366(17):1577–1585.

A9. Boyle JP, Thompson TJ, Gregg EW, Barker LE, Williamson DF. Projection of the year 2050 burden of diabetes in the US adult population: dynamic modeling of incidence, mortality, and prediabetes prevalence. *Popul Heal. Metr*. 2010;8:29.

A10. Ali MK, Bullard KM, Saaddine JB, Cowie CC, Imperatore G, Gregg EW. Achievement of goals in U.S. diabetes care, 1999-2010. *N Engl J Med*. 2013;368(17):1613–1624.

A11. American Diabetes Association. Diagnosis and classification of diabetes mellitus. *Diabetes Care*. 2012;35 Suppl 1:S64–71.

A12. Gregg EW, Geiss L, Zhang P, Zhuo X, Williamson DF, Albright AL. Implications of risk stratification for diabetes prevention: the case of hemoglobin A1c. *Am J Prev Med*. 2013;44(4 Suppl 4):S375–80.