Clark County Vital Statistics Reports

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Mortality and morbidity from major cardiovascular diseases in Southern Nevada

Abstract

Objective: This report examines prominent cardiovascular diseases (CVD) that are important contributors to mortality and health expenditure in Clark County for available data years from 2001 through 2012.

Methods: Mortality and morbidity burden from major cardiovascular causes were estimated using vital records and health service usage data, and examined for temporal and spatial trends as well as disparities in socio-demographic factors.

Results: While cardiovascular deaths constituted the greatest proportion of mortality in terms of both number of deaths and total attributable years of potential life lost (YPLL), the mortality burden apportioned to CVD was lower in 2010-2012 (30% of all deaths) than in 2001-2003 (34%). At higher risk were those of non-Hispanic White (NHW) and Black (NHB) origins (risks relative to the 2010-2012 population age-adjusted death rate [226.9 per 100,000] of 1.1 and 1.3 respectively), accounting for 87% of all CVD deaths and 82% of the YPLL from CVD in 2010-2012. Heart disease, in addition to being the largest contributor to cardiovascular mortality (81%), was the most common underlying cause of death (UCD) in males and the second most common UCD (following cancer) in females in 2011. Much of the heart disease mortality was attributed to ischemic heart disease (IHD), accounting for 37% of the cardiovascular mortality in 2011. Also among the prominent circulatory diseases were stroke and hypertension (with or without heart or kidney diseases), responsible for 15% and 9% of cardiovascular mortality respectively. Where hypertension was listed as a cause of death (underlying or contributing), hypertension itself was the UCD in 30.8% of the cases, IHD in 22.9% (26.2% and 18.8% for males and females respectively), and stroke in 10.3% (9.2% and 11.8%). Further, when endocrine diseases (mainly diabetes) were listed as a cause of death, IHD was the UCD in 25.2% and 17.3% of the cases for males and females respectively, hypertension in 9.5% and 7.7%, and stroke in 2% and 2.5%. As well, the proportion of IHD deaths with endocrine diseases as a contributing cause was somewhat elevated among NHB and Hispanic groups. In addition, CVD was the principal diagnosis in 15% and 5% of primary diagnosis-attributable hospitalizations and emergency department (ED) visits in 2009-2011 respectively (23% and 5% of the total billed amount for all primary diagnosis-attributable hospital discharges and ED visits respectively). When both principal and secondary diagnoses were considered, CVD was listed in more than one-half of all hospitalizations and 18% of all ED visits attributed to primary disease groups in the same period.

Data sources

This report examined the Nevada State Health Division vital records systems' mortality files (i.e. death certificates) to present current patterns in mortality from major cardiovascular diseases (CVD) among Clark County residents. At the time the report was prepared, mortality data for Clark County residents (at time of death) that incorporated late and out-of-state registrations and were complete with resolved cause of death information were available for deaths that occurred prior to year 2012. Mortality statistics included in this report for deaths that occurred in 2012 were based on preliminary vital registration files, pending incorporation of late and out-of-state registrations as well as amendments. Where applicable, contemporary national trends in CVD mortality burden were presented to provide contextual information. Nationwide data were retrieved from the aggregate 2010 (the most recent data year available at the time this report was written) Underlying and Multiple Cause of Death Files (UMCDF), using the CDC WONDER Online Database (released 2012). Further, morbidity burden due to major CVDs including medical treatment costs were derived from hospital discharge and emergency department (ED) visit uniform billing data corresponding to the years 2009-2011. Event rates at both the county and national-level were calculated using population denominator data from the revised bridged-race intercensal 2000-2009 series (released 10/26/2012 by the National Center for Health Statistics [NCHS]) and vintage 2012 bridged-race postcensal series (released 6/13/2013 by the NCHS). Zip code (residence) level rate computations used Las Vegas Perspective 2010-2011 population estimates. Additionally, prevalence estimates of major cardiovascular conditions were obtained from the Centers for Disease Control's Behavioral Risk Factor Surveillance System (BRFSS).[a]

Methods

Identification of CVD-attributable deaths, hospitalizations and ED visits

The term CVD refers to all diseases and conditions of the heart and blood vessels.[b] Deaths due to CVD were identified on the basis of the underlying cause of death (UCD), by ICD-10 codes I00-I78. CVD-attributable causes were further classified into diseases of heart (ICD-10 codes I00-I09, I11, I13, I20-I51), essential hypertension and hypertensive renal disease (I10, I12, I15), cerebrovascular diseases or stroke (I60-I69), atherosclerosis (I70), and subcategories of heart disease including ischemic heart disease (I20-I25), pulmonary heart disease (I26-I28), and rheumatic fever/rheumatic heart disease (I00-I09). Conditions associated with hypertension were also examined using relevant ICD coding categories (I10-I15). Where CVD was the UCD, contributing causes (if mentioned on the death certificate) were

[a] The BRFSS is a state-based, random digit-dialing survey system which collects information on preventive health practices and risk behaviors as well as a wide range of health outcomes in the 50 states, DC, and three territories. Participants were selected in each state or territory using probability sampling from all households with telephones or from cell phone sampling frames.

[b] Mortality from congenital heart defect is categorized under a separate ICD chapter from circulatory diseases. These deaths were not considered cardiovascular deaths and thus not included in the mortality statistics reported here.

analyzed by ICD chapter, using records weighted inversely by the number of chapter-grouped contributing cause codes (a death certificate may contain up to 20 multiple causes including both UCD and contributing causes). In addition, any mention of CVD as a contributing cause is informative, and such deaths were also enumerated.

Hospital inpatient discharges and ED visits with any (principal or secondary) CVD-diagnosis were examined to provide additional measures of disease burden from cardiovascular complications. Unless otherwise noted, the first-listed or principal discharge diagnosis was used to summarize medical care encounter data (if present on the record), as it is often considered the most important or dominant condition among all comorbid conditions or diagnoses recorded. Mention should be made of the fact that the treatment and care of people with CVD cover a variety of settings and phases of care; as such, data on CVD expenditure in hospitals and EDs do not capture the whole spectrum of morbidity burden or health expenditure associated with CVD.

Prevalent CVD assessment

Subpopulation analyses were performed on weighted BRFSS samples to estimate the extent of cardiovascular conditions among adult populations in the county at given time points. The BRFSS survey questions pertaining to CVD were threefold, "Has a doctor, nurse, or other health professional ever told you that you had any of the following? (1) a heart attack, also called myocardial infarction; (2) angina or coronary heart disease; and (3) stroke." The weighting adjustment takes into account disproportionate selection probabilities (the NV BRFSS surveys used disproportionately stratified sample design so that smaller counties were adequately represented in the samples), corrects for noncoverage/nonresponse, and forces the sample sizes to equal statewide population estimates by post-stratification variables including, but not limited to age, gender, race/ethnicity.[1] As such, the weighted sample is considered to be representative of the adult population within each state. Effective with data year 2011, the BRFSS data collection, structure and weighting methodology changed to allow data to be collected by cell phones, in addition to landline telephones. The new weighting procedure for example, bridges the distributional differences between the sample and the population across categories of age by gender, detailed race/ethnicity groups, education levels, marital status, regions within states, gender by race/ethnicity, telephone source, renter/owner status, and age groups by race/ethnicity.[2]

Statistical methods and other considerations

Statistical methods were primarily descriptive and consisted of calculations of frequencies and rates. To facilitate comparisons of various indicator estimates over time and between groups, 95% confidence intervals (CI) were calculated and presented, which express the precision of point estimates (or the uncertainty around estimates). As an informal statistical test, the difference between two point estimates is considered significant at the 5% level of statistical significance if their respective CIs do not overlap. Results based on rare events were suppressed due to reliability and/or confidentiality constraints. Methods specific to selected indicators are described in Box 1.

It is important to point out that mortality and medical care encounter data were used to describe the incidence or new occurrence of an event (i.e. death, hospital admissions) in the population of interest over a specific time period. Therefore, measures of these incidences are dimensional quantities which have the form of number of events occurring in the given population per unit of time. By contrast, prevalence estimates from the BRFSS data are static measures of proportions of the population having the condition(s) of interest, regardless of how long ago the condition(s) occurred. Of note is that while prevalence can be estimated from cross-sectional population-based surveys, limitations of this approach need to be recognized including potential selection biases (e.g. noncoverage of those with no phone at all) and misclassification of disease/condition due to self-reported data not being independently verified.

Box 1

Methods for selected indicators

Age-specific mortality rate — computed as the number of deaths among persons in a specific age group and time period divided by the population of all residents in that same age group and time period.

Age-adjusted mortality rate (AjR) — an artificial measurement computed as the weighted average of the age-specific death rates where the weights are the standard population proportions by age. This direct adjustment method removes the potential confounding of mortality risks due to age heterogeneity across groups and over time. Calculation of the standard error of the AjR was based on Chiang's formula:[3,4]

$$\sqrt{\sum_{i=1}^{10}\left(\frac{P_i}{\sum_i P_i}\right)^2 * \frac{d_i}{P_i^{\,2}}}$$

where index i represents 10 age groups ranging from ages 0 to 85+ years and d_i is the number of deaths for the ith age group in the study population; P_i is the number of persons in age group i in the standard or reference population. The reference population adopted in this analysis was the July 1, 2000 bridged-race intercensal national population estimates (population distributions by age provided in Appendix A).

Standardized mortality rate ratio (SMRR) — computed as the ratio between two directly age-adjusted mortality rates. It represents the relative mortality risk across comparison groups. Calculation of the CI of the SMRR was based on Smith's formula:[5]

$$(AjR_1/AjR_2)^{1\pm\left(z_{\alpha/2}/X\right)}$$

where $X = \frac{(AjR_1 - AjR_2)}{\sqrt{(s.e.(AjR_1)^2 + s.e.(AjR_2)^2}}$,
$s.e. = standard\ error$, and $z_{\alpha/2} = 1.96$ (at the 95% level).

Years of potential life lost (YPLL) rate — a measure that considers both the rate and age of death, expressed as person-years lost for a given time period divided by the total population for that period in which these deaths occurred. The YPLL rate (per population or person-years) illustrates premature mortality, i.e. life lost when death occurs before the predicted life expectancy (life expectancy was estimated from three-year aggregated population and mortality data for each race/ethnicity, using the Chiang methodology[6]). The standard error of YPLL was calculated as:

$$\frac{\sqrt{\sum_{i=1}^{10} d_i^{\,2} * var.(e_i)}}{\sum_{i=1}^{10} p_i}$$

where index i represents 10 age groups ranging from ages 0 to 85+ years and d_i is the number of deaths (from all causes or a specific cause) for the ith age group in the study population; $var.(e_i)$ is the variance of the predicted life expectancy for persons in age group i; p_i is the number of persons in age group i in the study population.

Results and discussion

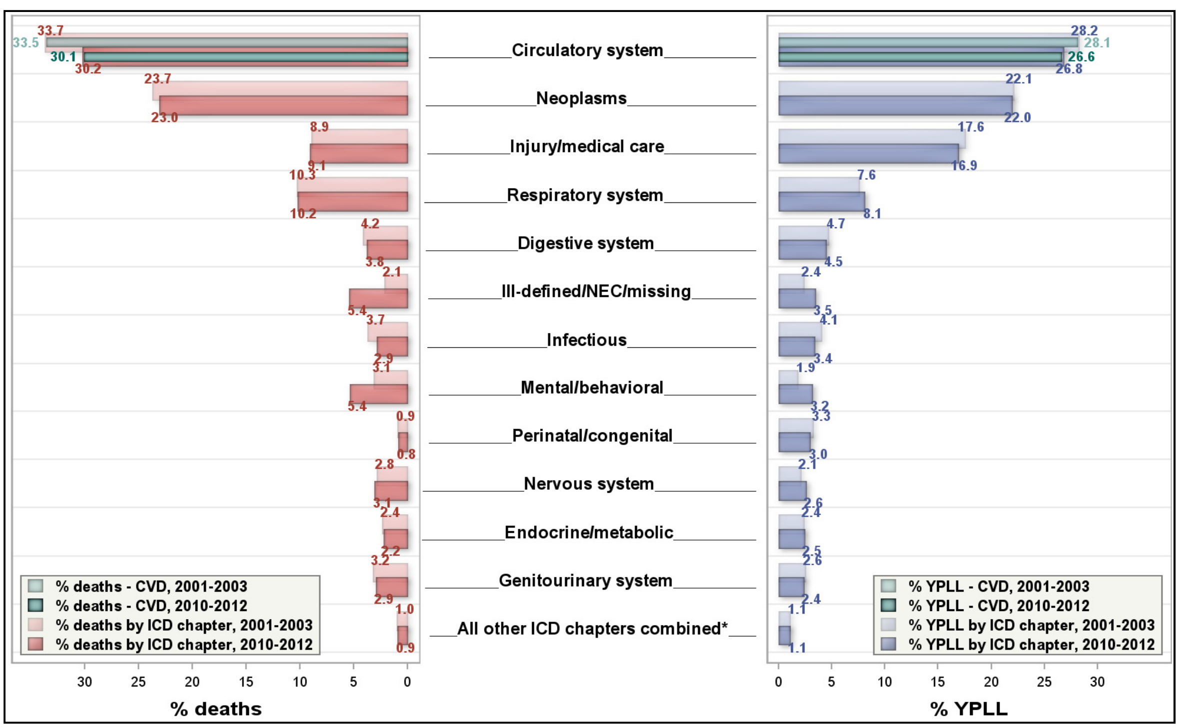
General mortality trends in cardiovascular disease

Among resident deaths registered in 2011, 4,071 had CVD (including heart disease, stroke, and vascular diseases) listed as the underlying cause, and 6,739 as either an underlying or contributing cause. While cardiovascular deaths constituted the greatest proportion of mortality in terms of both number of deaths and total attributable years of life lost, the mortality burden apportioned to CVD was lower in 2010-2012 (30% of all deaths) than in 2001-2003 (34%) (Figure 1). The reduction in cardiovascular mortality was probably related to changes in lifestyle, improvements in medical care and socio-economic conditions, reductions in known risks (e.g. smoking and hypertension) due to public health interventions, and potential increases in other causes of death.

Between 2001-2003 and 2010-2012, the CVD-attributable age-adjusted mortality rate (AjR) dropped significantly by 23% from 366.6 to 280.8 per 100,000 person-years for males (7,035 deaths in 2010-2012), and by 32% from 262.9 to 178.7 per 100,000 for females (5,109). In 2010-2012, decedents under 65 years of age made up less than 30% of CVD mortality, but accounted for half of the years of potential life lost (YPLL) from CVD of all ages. At higher risk were those of non-Hispanic White (NHW) and Black (NHB) origins (risks relative to the 2010-2012 population AjR [226.9 per 100,000] of 1.1 and 1.3 respectively), accounting for 87% of all CVD deaths and 82% of the YPLL in 2010-2012 (Figure 2). To assess how CVD mortality varied by physical and social settings, CVD death rates for the period 2010-2011 were spatially presented using zip code of residence as the enumeration area (Appendix B-Map1).

Figure 1

Percent deaths and total years of potential life lost (YPLL) by underlying cause of death (ICD chapter), Clark County-NV, 2001-2012

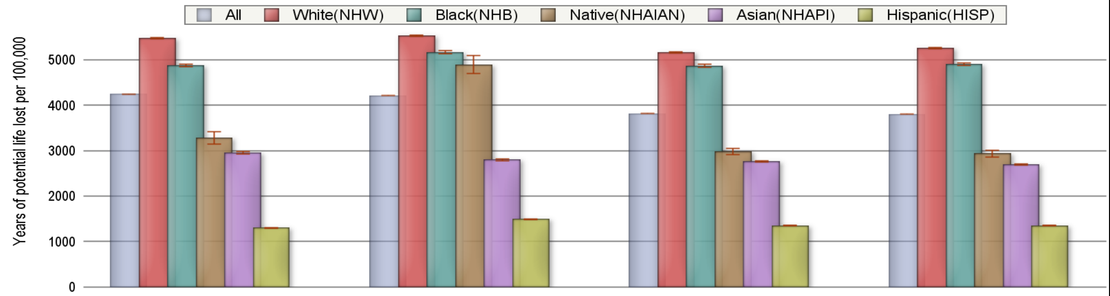


Source: Death certificate files (preliminary for 2012) restricted to Clark County residents at time of death.

*S or T chapter codes are not selectable as underlying cause of death.

Figure 2

Years of potential life lost (YPLL) per 100,000 population from major CVDs by race/ethnicity, Clark County-NV, 2001-2012



	2001-2003	2004-2006	2007-2009	2010-2012
YPLL(person-years)	193,867.58	218,868.48	218,132.72	225,008.89
Population*	4,567,628	5,196,069	5,719,573	5,922,107
YPLL per 100,000	4,244.38	4,212.19	3,813.79	3,799.47
95% LCL for YPLL rate	4,235.44	4,204.04	3,806.90	3,792.86
95% UCL for YPLL rate	4,253.33	4,220.35	3,820.69	3,806.09
YPLL-NHW	147,509.80	158,209.63	150,813.93	151,978.15
Population-NHW*	2,694,492	2,859,555	2,919,173	2,888,713
YPLL per 100,000	5,474.49	5,532.67	5,166.32	5,261.10
95% LCL for YPLL rate	5,460.90	5,519.71	5,154.72	5,249.51
95% UCL for YPLL rate	5,488.09	5,545.62	5,177.93	5,272.70
YPLL-NHB	21,539.89	27,349.10	29,855.67	32,059.20
Population-NHB*	441,725	529,083	613,148	654,168
YPLL per 100,000	4,876.31	5,169.15	4,869.24	4,900.76
95% LCL for YPLL rate	4,842.83	5,135.08	4,839.64	4,873.17
95% UCL for YPLL rate	4,909.80	5,203.22	4,898.85	4,928.35
YPLL-NHAIAN	967.00	1,576.66	997.15	955.42
Population-NHAIAN*	29,525	32,201	33,453	32,528
YPLL per 100,000	3,275.18	4,896.30	2,980.75	2,937.23
95% LCL for YPLL rate	3,138.07	4,700.16	2,906.34	2,861.09
95% UCL for YPLL rate	3,412.28	5,092.43	3,055.17	3,013.36
YPLL-NHAPI	9,451.58	11,981.49	14,891.53	16,130.63
Population-NHAPI*	320,065	427,906	538,380	598,846
YPLL per 100,000	2,953.02	2,800.03	2,765.99	2,693.62
95% LCL for YPLL rate	2,928.11	2,780.60	2,750.16	2,679.82
95% UCL for YPLL rate	2,977.92	2,819.46	2,781.82	2,707.42
YPLL-HISP	14,040.52	20,066.48	21,772.65	23,576.77
Population-HISP*	1,081,821	1,347,324	1,615,419	1,747,852
YPLL per 100,000	1,297.86	1,489.36	1,347.80	1,348.90
95% LCL for YPLL rate	1,289.43	1,481.51	1,341.35	1,342.71
95% UCL for YPLL rate	1,306.29	1,497.20	1,354.26	1,355.09

Abbreviations
NHW: non-Hispanic White
NHB: non-Hispanic Black
NHAIAN: non-Hispanic American Indian or Alaskan Native
NHAPI: non-Hispanic Asian or Pacific Islander
HISP: Hispanic

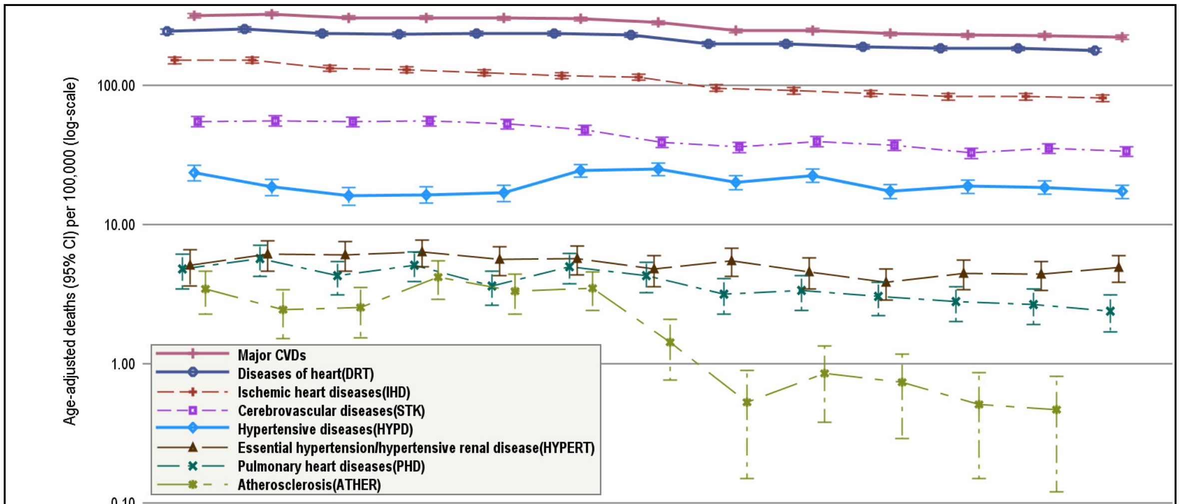
Source: Death certificate files (preliminary for 2012) restricted to Clark County residents at time of death.

*Bridged–race intercensal 2000-2009 series and vintage 2012 for 2010-2012 postcensal estimates used.

Heart disease (diseases of heart), in addition to being the largest contributor to cardiovascular mortality (81% of cardiovascular deaths), was the most common UCD in males (1,974 deaths from heart disease or 27% of deaths) and the second most common UCD (following cancer) in females (1,334 or 21%) in 2011. Much of the heart disease mortality was attributed to ischemic heart disease (IHD), also known as coronary heart disease (heart attack and angina are its two major clinical forms), which was the underlying cause in 37% (1,490) of cardiovascular mortality in 2011. Also among the prominent circulatory diseases was stroke (cerebrovascular diseases), responsible for 609 deaths or 15% of cardiovascular mortality. In an additional 348 deaths in 2011, hypertension (with or without heart or kidney diseases) was listed as the UCD (9% of CVD mortality), and close to 80% (275) of these hypertension-induced deaths was the result of hypertensive heart disease (with or without kidney disease). Furthermore, there were 49 deaths from pulmonary heart disease (1.2% of cardiovascular deaths), 8 from acute rheumatic fever/rheumatic heart disease (0.2%), and 7 from atherosclerosis (0.2%) in that year. While death rates for individual diseases vary in trends, the decline in IHD and stroke mortality appeared to have slowed down in recent years, whereas the hypertension death rate fluctuated between 16.1 and 25.1 per 100,000 during the period 2001-2012 (Figure 3). It should be noted that the hypertension mortality statistics provided here do not reflect the contribution hypertension makes to other UCDs, particularly heart, endocrine and renal diseases.

Figure 3

Age-adjusted mortality rates (AjRs) for selected CVDs, Clark County-NV, 2000-2012

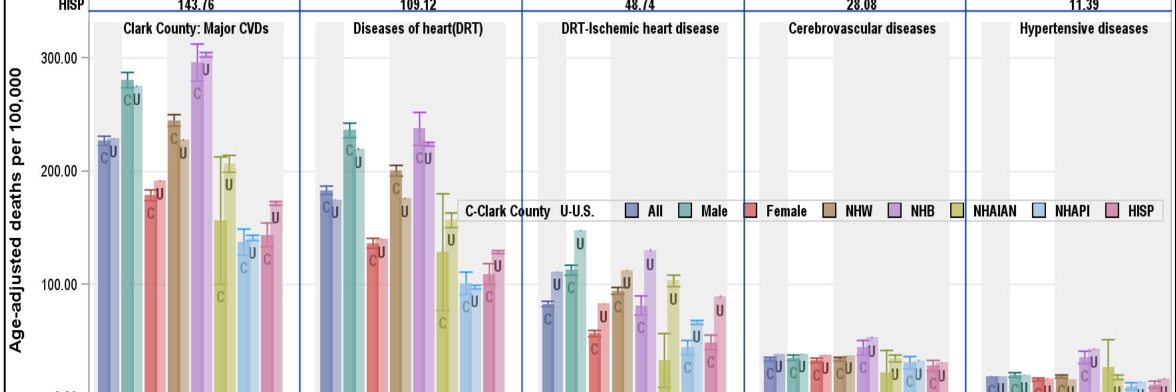


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Major CVDs	317.97	326.95	307.71	307.19	305.72	300.92	282.92	248.15	249.19	235.87	229.57	228.70	222.69
DRT	244.30	253.23	236.36	233.24	236.57	237.39	231.06	200.55	198.95	189.12	185.67	184.14	179.58
IHD	151.45	151.75	132.82	129.30	124.18	117.73	115.07	96.14	91.65	87.71	83.47	83.19	81.35
STK	55.05	55.96	54.82	55.64	52.89	48.09	39.20	36.12	39.76	37.28	32.82	35.47	33.79
HYPD	23.72	18.68	16.10	16.48	16.94	24.61	25.09	20.18	22.64	17.39	18.87	18.58	17.35
HYPERT	5.13	6.15	6.11	6.37	5.63	5.69	4.80	5.52	4.61	3.86	4.50	4.41	4.92
PHD	4.81	5.69	4.29	5.14	3.64	5.00	4.33	3.18	3.36	3.06	2.80	2.69	2.41
ATHER	3.47	2.47	2.55	4.20	3.34	3.50	1.43	0.53	0.86	0.74	0.51	0.47	X

Figure 4

AjRs for selected CVDs, Clark County-NV (2010-2012) and U.S. (2010)

	Clark County: Major CVDs	Diseases of heart(DRT)	DRT-Ischemic heart disease	Cerebrovascular diseases	Hypertensive diseases
All	226.91	183.07	82.68	34.05	18.24
Male	280.78	236.23	112.75	35.01	19.92
Female	178.71	136.27	56.62	32.69	15.98
NHW	244.86	200.67	94.16	33.89	18.46
NHB	296.49	237.67	81.26	44.16	35.28
NHAIAN	156.44	128.66	32.66	21.62	26.80
NHAPI	137.42	101.03	44.16	30.90	9.98
HISP	143.76	109.12	48.74	28.08	11.39



	U.S.: Major CVDs	Diseases of heart(DRT)	DRT-Ischemic heart disease	Cerebrovascular diseases	Hypertensive diseases
All	228.79	175.00	111.02	38.21	18.40
Male	275.33	219.76	147.71	38.37	19.68
Female	191.44	139.88	82.82	37.44	16.79
NHW	227.63	175.93	112.50	36.93	15.81
NHB	303.20	224.12	130.19	52.98	42.86
NHAIAN	206.78	156.91	103.12	34.72	17.72
NHAPI	141.17	97.49	66.52	32.29	13.65
HISP	171.91	128.36	89.14	31.01	16.71

Source: Death certificate files (preliminary for 2012) restricted to Clark County residents at time of death and UCD 1999-2010 CDC WONDER Online Database (accessed in September, 2013). Bridged–race intercensal 2000-2009 series and vintage 2012 for 2010-2012 postcensal estimates used in crude and age-specific rate calculations.

Note: Crude rates were age-standardized to the 10-group age distribution of the July 1, 2000 bridged-race intercensal national population estimates. Data suppression (denoted by X) applied if events<5.

The most recent data suggest that death rates for major CVDs among county residents were similar to or lower than the comparable national rates (Figure 4); however, mortality from 'other forms of heart disease' (a category [ICD codes I30-I52] which includes poorly differentiated causes of death such as cause-unspecified cardiac arrest or ill-defined description of heart disease) was considerably higher in the county than in the nation (data not shown).

Comorbidity at time of death

Multiple causes of death data are useful in assessing the contribution of various disorders to death. Based on weighted total mentions (of contributing causes) and among IHD-attributable deaths in 2007-2012, endocrine diseases, mainly diabetes, were listed as a contributing cause in 7.8% of cases (8.6% and 6.5% of male and female cases respectively), compared with 2.6% of all-cause deaths (Box 2). The proportion of IHD deaths with endocrine diseases as a contributing cause was somewhat elevated among NHB and Hispanic groups, listed in 9.4% and 9.9% of cases respectively, compared to 7.5% of cases among both NHW and non-Hispanic Asian or Pacific Islander (NHAPI) groups. Nervous system disorders (e.g. Alzheimer's disease and Parkinson's disease, the majority of deaths from which occur in older ages) and genitourinary diseases (e.g. renal complications including circulatory disease-associated kidney failure) were the other prominent contributing causes listed in IHD deaths. Of the cases where stroke was the UCD, cooccurrence with respiratory (e.g. COPD) and nervous system diseases was reported 10.7% and 2.7% of the time respectively, while the two categories were listed as a contributing cause 8.1% and 1% of the time among all-cause deaths. With regard to hypertension-attributable deaths, endocrine diseases were the most common contributing cause (other than circulatory diseases), listed in 18.2% of cases (21.2% and 14.4% of male and female cases respectively) for all races combined, and in almost one-quarter of cases among NHBs and Hispanics. Other important associated conditions in hypertension deaths included genitourinary and nervous system diseases (2.8% and 2.2% of cases).

On the other hand, where hypertension was listed as a cause of death (underlying or contributing), hypertension itself was the UCD in 30.8% of the cases, IHD in 22.9% (26.2% and 18.8% for males and females respectively), and stroke in 10.3% (9.2% and 11.8%). Further, when endocrine diseases were listed as a cause of death, IHD was the UCD in 25.2% and 17.3% of the cases for males and females respectively, hypertension in 9.5% and 7.7%, and stroke in 2% and 2.5% (Figure 5).

Box 2

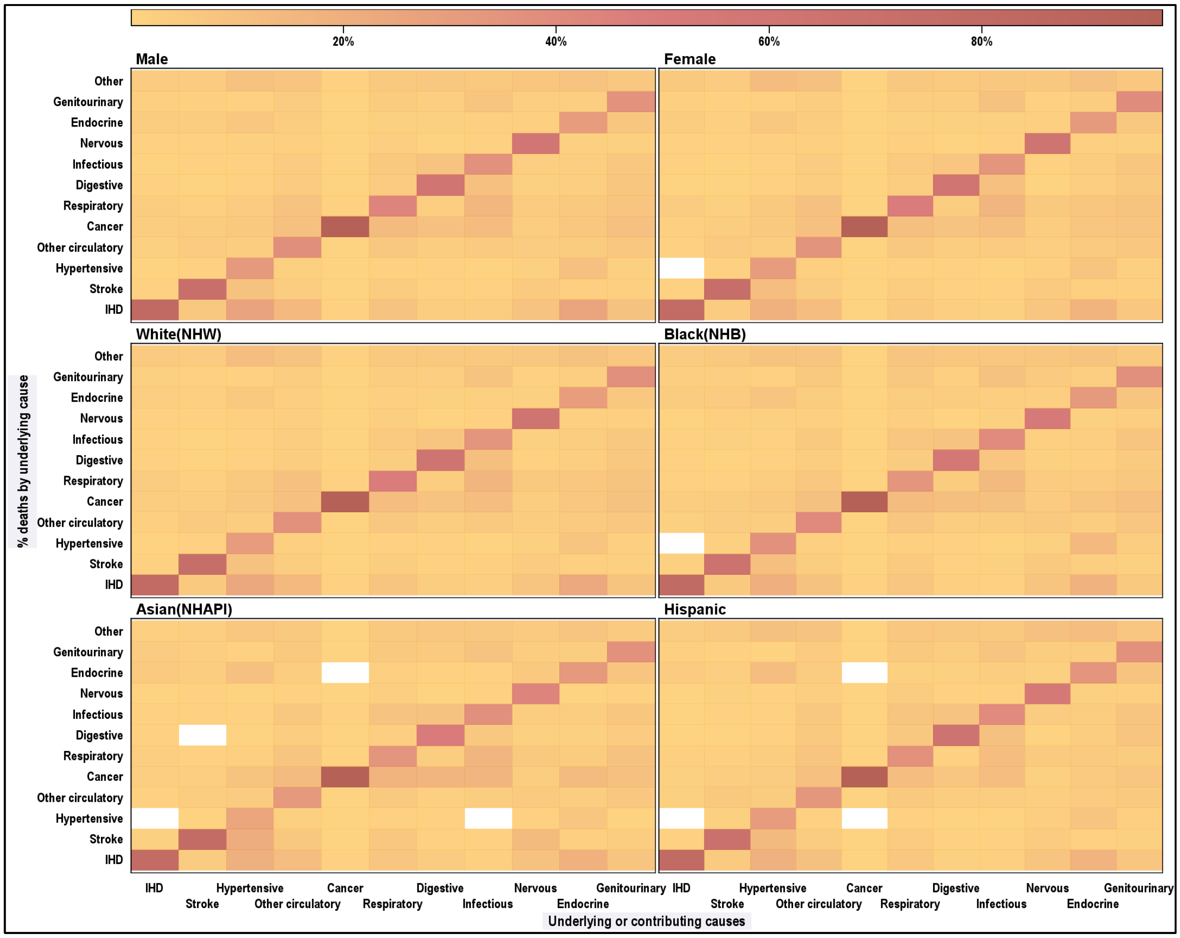
CVD-attributable and all-cause deaths by contributing causes (organized by ICD chapter), Clark County-NV, 2007-2012

Source: Death certificate files (preliminary for 2012) restricted to Clark County residents at time of death. Contributing causes of death data available from the statewide vital records system since 2007.

* Weighted total mentions.

	Underlying cause									
	CVD		IHD		Stroke		Hypertension		All-cause	
Contributing causes (ICD chapter)	**N***	**%**	**N***	**%**	**N***	**%**	**N***	**%**	**N***	**%**
Not available	7,856.00	33.0	2,115.00	23.8	1,271.00	36.0	621.00	31.1	26,599.00	33.9
Circulatory	6,238.30	26.2	3,391.31	38.2	1,027.94	29.1	368.72	18.4	14,841.05	18.9
Ill-defined	3,625.65	15.2	653.54	7.4	393.18	11.1	116.35	5.8	8,281.84	10.6
Respiratory	1,696.77	7.1	635.12	7.1	378.38	10.7	131.13	6.6	6,322.50	8.1
Endocrine/metabolic	1,217.11	5.1	691.47	7.8	50.04	1.4	363.77	18.2	2,060.55	2.6
Mental/behavioral	985.48	4.1	468.55	5.3	132.37	3.7	115.12	5.8	4,840.59	6.2
Injury/medical care	554.46	2.3	251.18	2.8	28.06	0.8	90.14	4.6	6993.87	8.9
Genitourinary	501.12	2.1	212.35	2.4	50.71	1.4	55.50	2.8	1,795.57	2.3
Nervous system	363.98	1.5	160.53	1.8	96.58	2.7	44.90	2.2	808.47	1.0
Infectious	255.64	1.1	67.44	0.8	37.00	1.0	15.20	0.8	2,249.22	2.9
Digestive	201.12	0.8	84.44	1.0	23.21	0.7	26.83	1.3	1,327.60	1.7
Neoplasms	190.73	0.8	104.02	1.2	23.43	0.7	28.83	1.4	1,281.41	1.6
Blood/blood-forming organs	58.93	0.2	17.29	0.2	10.40	0.3	9.60	0.5	315.31	0.4
Musculoskeletal	51.13	0.2	25.48	0.3	4.83	0.1	8.83	0.4	167.39	0.2
All other	38.59	0.2	10.28	0.1	7.86	0.2	4.08	0.2	478.63	0.6
All	**23,835**	**100**	**8,888**	**100**	**3,535**	**100**	**2,000**	**100**	**78,363**	**100**

Figure 5
Comorbidities at time of death expressed as percent of deaths by underlying cause (Y-axis) vs. multiple listed causes (X-axis)*, Clark County-NV, 2007-2012



Source: Death certificate files (preliminary for 2012) restricted to Clark County residents at time of death.

*Data not available for non-colored cells.

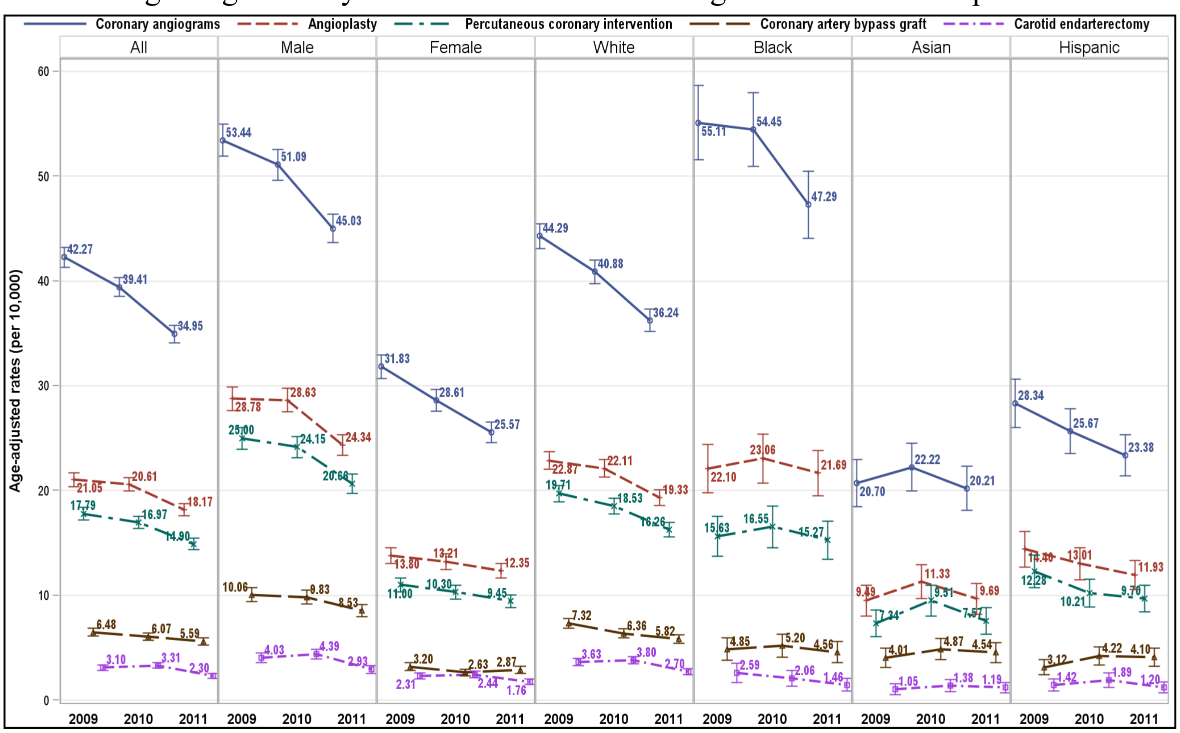
Hospitalizations, emergency department visits, and cardiovascular procedures

Among primary disease groups (ICD-9 codes 001-799), cardiovascular diseases and conditions accounted for the greatest proportion of hospitalizations and related health expenditure (it should be emphasized that disease expenditure as reported here does not reflect the costs associated with lost productivity, the economic and mental hardships imposed on those affected by the disease, and lost quality and quantity of life). CVD was the principal diagnosis for 71,543 hospitalizations (15% of all primary diagnosis-attributable hospitalizations) in 2009-2011, accounting for $5.9 billion in total billed amount or 23% of the total $25.3 billion in billed amount for all primary diagnosis-attributable hospital discharges. Of these CVD-induced hospitalizations, 26% were due to IHD, 19% to stroke, 8% to hypertension, 4.3% to pulmonary heart disease, and 2.5% to atherosclerosis. Over the same period, 27,197 visits were made to the ED as a result of cardiovascular events (2.6% of all primary diagnosis-attributable ED visits), accounting for $0.25 billion in total billed amount or 5% of the total $5.1 billion in billed amount for all primary diagnosis-attributable visits. Of these CVD-induced ED visits, 42% were due to hypertension, 13% to stroke, 7.3% to IHD, 1.5% to pulmonary heart disease, and 0.2% to atherosclerosis. When both principal and secondary diagnoses were considered, CVD was listed in more than one-half (253,749 hospitalizations) of all hospitalizations and 18% (193,235 visits) of all ED visits attributed to primary disease groups in 2009-2011. The geographic distribution of CVD-attributable hospitalizations and ED visits by residential zip code is presented in Appendix B (Maps 2-3).

Males were more likely to be hospitalized or treated in ED for CVD than females, constituting 57% and 51% of CVD-induced hospitalizations and ED visits in 2009-2011 (compared with 40% and 43% of all primary diagnosis-attributable hospitalizations and ED visits), respectively. Those aged 55 and over accounted for the bulk of medical encounters due to CVD (79% and 64% of CVD-attributable hospitalizations and ED visits respectively), although this general age pattern masked variations across individual diseases. For example, 18% of hospitalizations and 21% of ED visits due to hypertension were accounted for by the 25-44 age group, compared to 4.6% and 8.2% of those due to IHD. The racial patterns for hospitalizations and ED visits due to IHD were broadly similar to those due to stroke, with NHWs accounting for 66 to 71% of these medical encounters, NHBs 10 to 15%, Hispanics 9 to 10%, and NHAPIs 4 to 6%. Approximately one-half of hypertension-induced hospitalizations and ED visits, on the other hand, were accounted for by NHBs (30 to 34%) and Hispanics (14 to 21%). The average length of stay for hospitalizations due to IHD, stroke, and hypertension was 5, 6, and 4.7 days in 2011, compared with 4.9, 5.4, and 4 days in 2009 respectively. In males, hospitalizations due to stroke and hypertension averaged 6.8 and 5 days of stay respectively in 2011, compared to 5.2 and 4.4 days in females, while the average length of stay was much the same across genders for IHD hospitalizations.

Figure 6

Cardiovascular procedures by inpatient characteristics, Clark County-NV, 2009-2011



Source: Uniform billing hospital discharge data restricted to Clark County residents at time of discharge. Bridged–race intercensal 2000-2009 series and vintage 2012 for 2010-2012 postcensal estimates used in crude and age-specific rate calculations

Note: Crude rates were age-standardized to the 10-group age distribution of the July 1, 2000 bridged-race intercensal national population estimates.

In 2011, 6,996 coronary angiograms (X-ray of coronary arteries) and 3,019 percutaneous coronary interventions or coronary angioplasties (mechanical widening of narrowed coronary arteries) were performed, at an age-adjusted rate of 35 and 15 per 10,000 population respectively, compared to 42 coronary angiograms and 18 coronary angioplasties per 10,000 in 2009 (respective procedure totals of 8,120 and 3,423) (Figure 6). In addition, 1,130 coronary artery bypass graft (grafting of arteries or veins to coronary arteries to bypass blockages) surgeries were undertaken (5.6 per 10,000), compared to 1,251 in 2009 (6.5 per 10,000). A total of 442 carotid endarterectomies (surgically removing plaques from carotid arteries that supply blood to the brain) were also performed in 2011 (2.3 per 10,000), mostly on those hospitalized for stroke, compared to 559 in 2009 (3.1 per 10,000).

Leading causes of cardiovascular morbidity and mortality

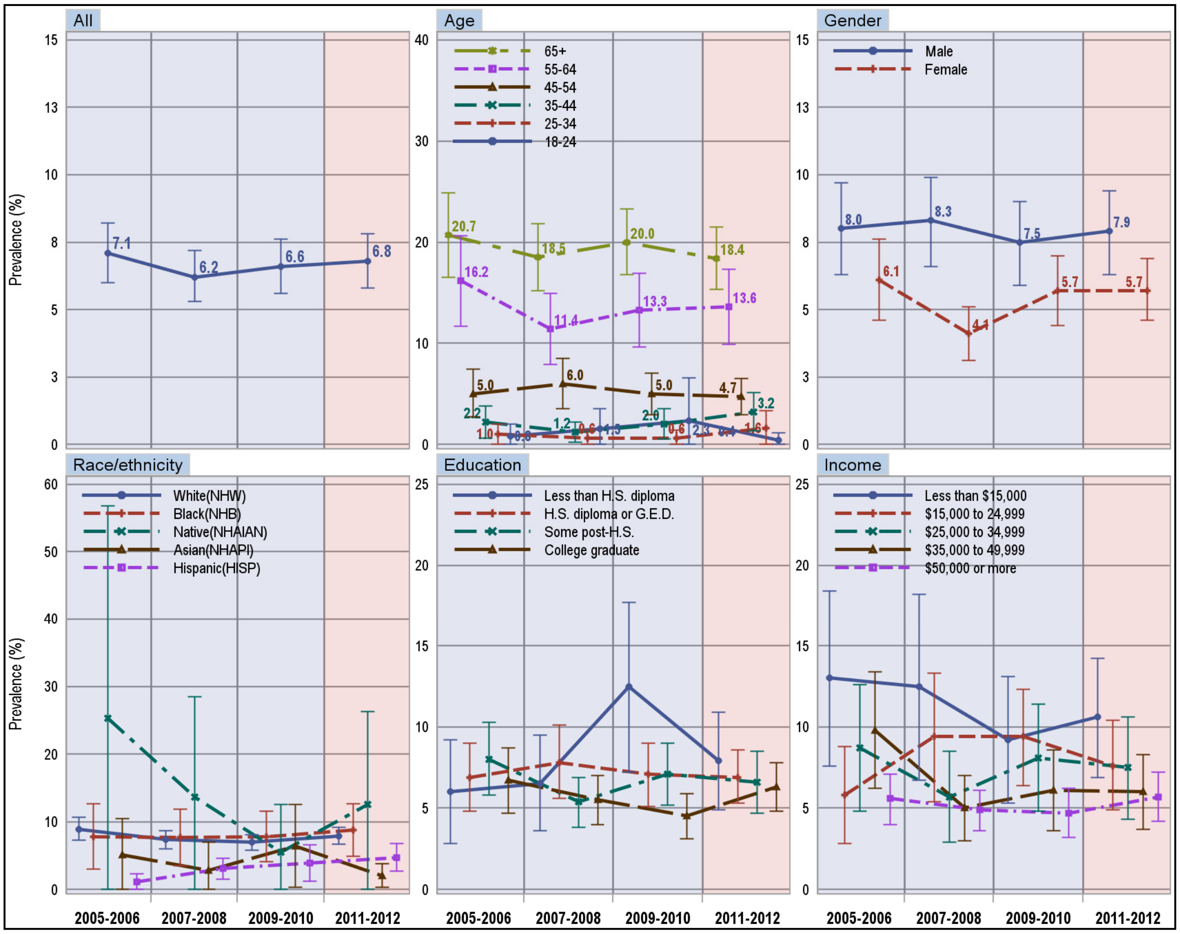
In the 2011-2012 BRFSS survey, 8.9% of Clark County respondents reported having one or more CVD symptoms, which corresponded to around 133,100 adults suffering from (nonfatal) cardiovascular problems. Of this group, 76% reported having IHD (heart attack or angina), and 37% reported experiencing stroke. CVD prevalence increased rapidly with age, from around 4% in 35 to 44-year-olds to 8% in 45 to 54-year-olds, and rising to around 25% among those aged 65 years and over. Cardiovascular complications were more common among males (9.7%) than females (8.2%) aged 18 and older, and among NHW (10.4%) and NHB (13.1%) than among Hispanic (5.7%) adults. There was also a negative association between CVD prevalence and income (Rao-Scott chi-square test P value of 0.0064), with the same data showing a two-fold reduction in prevalence from 13.5% among households earning less than $15,000 annually, to 6.5% among those earning $50,000 or more. The geographic breakdown of CVD prevalence by residential zip code is provided in Appendix B (Map 4).

Ischemic heart disease

About 6.8% of the 2011-2012 BRFSS respondents from Clark County, corresponding to 101,700 adults, reported lifetime occurrence of either myocardial infarction (heart attack) or angina. The prevalence estimates based on these self-reports were slightly higher for heart attack than for angina, at 5.1% (95% CI: 4.2-5.9%) and 4.3% (CI: 3.5-5.1%) respectively. The comparable national rates (medians among participating states as well as DC and territories) averaged 4.5% for heart attack and 4.2% for angina during the same period. As with the rest of the nation, IHD prevalence was higher among resident males than females: heart attack was experienced by 6.4% (CI: 5-7.9%; national median: 5.8%) of male and 3.7% (CI: 2.7-4.6%; national median: 3.2%) of female respondents, whereas angina by 4.7% (CI: 3.5-5.9%; national median: 5.2%) and 3.9% (CI: 2.9-4.9%; national median: 3.3%) respectively. Trends in IHD prevalence by selected characteristics are presented in Figure 7.

Figure 7

Prevalence of ischemic heart disease (heart attack or angina) by selected characteristics, Clark County-NV, 2005-2012



Source: Weighted data from the Behavioral Risk Factor Surveillance System.

Note: Prevalence estimates for 2011 onwards were based on combined landline and cell phone module data while only landline phone survey data were available in previous years.

Deaths due to IHD (1,490) accounted for 11% of all deaths registered in 2011, while those involving IHD (as an underlying or contributing cause) 14.3% (1,930). In comparison, IHD hospitalizations and ED visits were a relatively small proportion of all hospitalizations and ED visits: 3.8% (5,756 vs. 6,547 in 2009) and 0.2% (691 vs. 671 in 2009) of all primary diagnosis-attributable hospitalizations and ED visits in 2011 had a principal diagnosis of IHD respectively. However, more than four times as many hospitalizations (26,720 or 17.5%) and fifteen times as many ED visits (10,489 or 2.9%) had IHD as any (principal or secondary) diagnosis. The proportion of ED visits carrying any IHD diagnosis also increased steadily from 2009 through 2011 (data not shown). Further, IHD was a major area of health expenditure—about $2.1 billion in IHD hospitalization costs or 8% of the total billed amount for all primary diagnosis-attributable hospitalizations in 2009-2011. It also contributed about 1% ($48 million) of the total billed amount for all primary diagnosis-attributable ED visits in that period. For those hospitalized due to IHD, the average inpatient discharge charge was $126,862 ($131,505 among males and $117,944 among females) in 2011, more than twice the average charge of all hospitalizations due to primary diagnoses ($58,884). In the same year, the average discharge charge of $27,141 ($27,122 and $27,169) per ED visit for IHD was four time higher than that for all visits attributed to primary

Figure 8

Ischemic heart disease-attributable event rates by age, Clark County-NV, 2009-2011

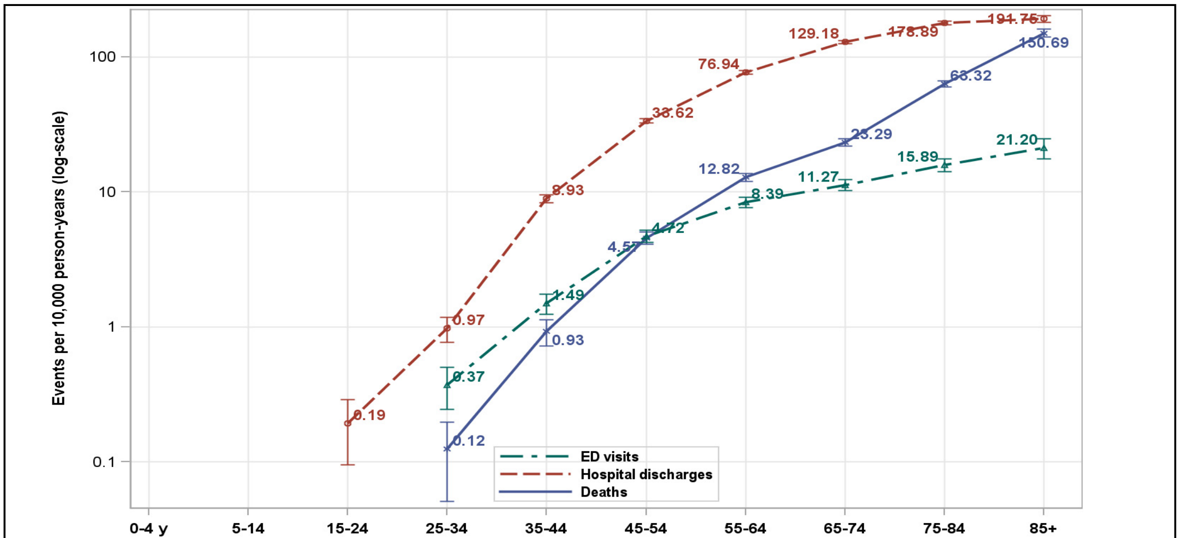


Figure 9

Ischemic heart disease-attributable deaths and years of potential life lost (YPLL) by age, Clark County-NV, 2010-2012

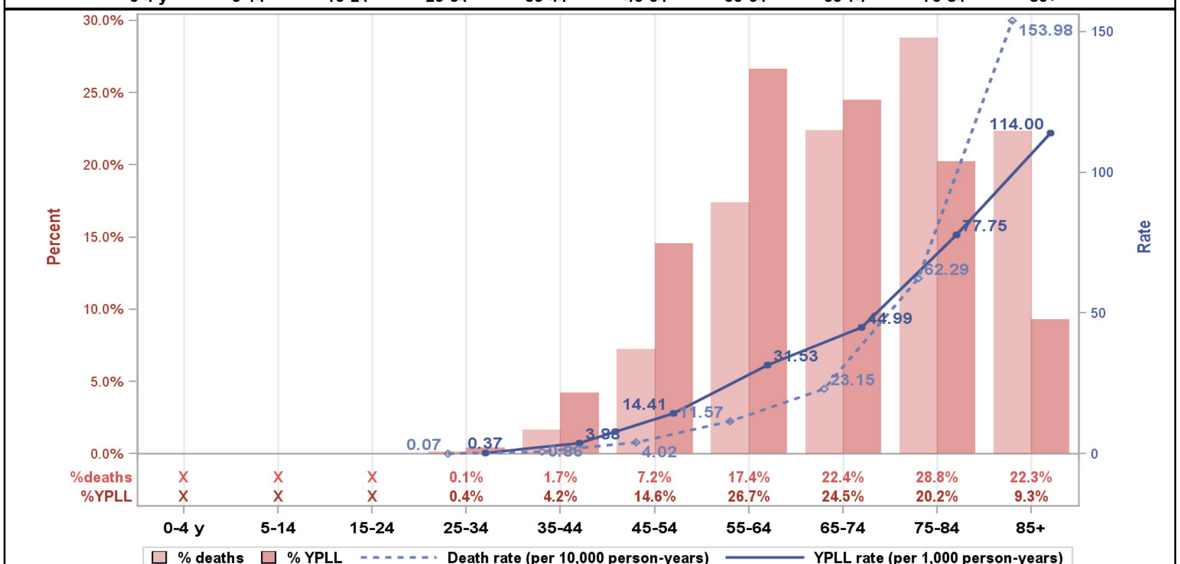
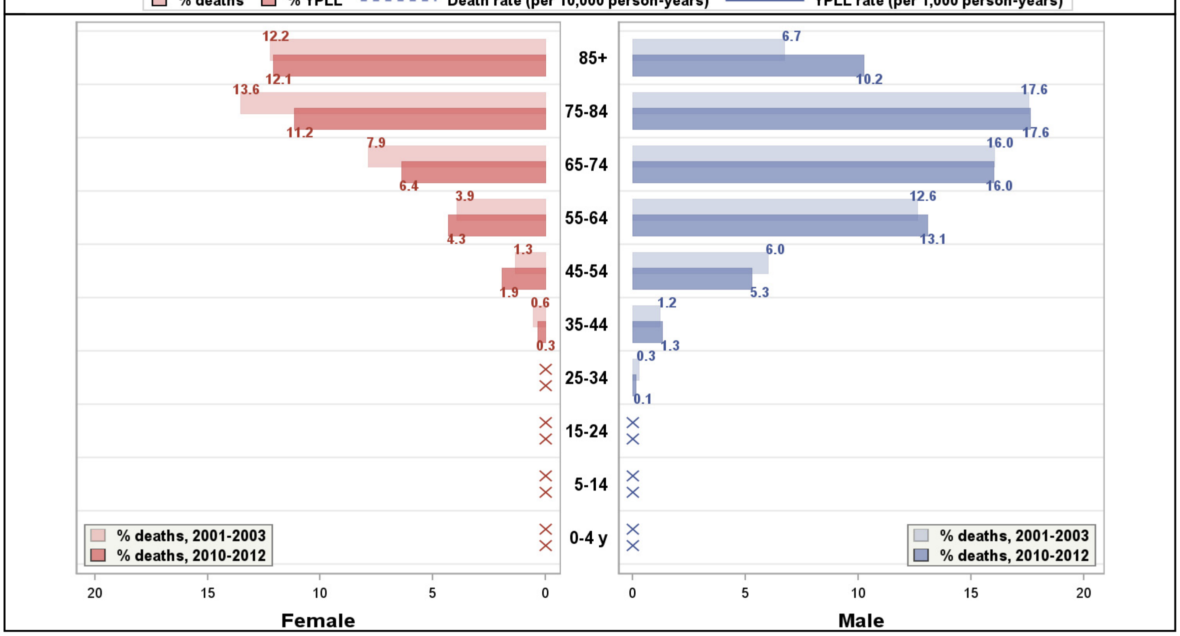


Figure 10

Percent ischemic heart disease-attributable deaths by age and gender, Clark County-NV, 2001-2012



Source: Death certificate (preliminary for 2012), uniform billing hospital discharge and ED visit data restricted to Clark County residents at time of death or discharge. Bridged–race intercensal 2000-2009 series and vintage 2012 for 2010-2012 postcensal estimates used in crude and age-specific rate calculations.

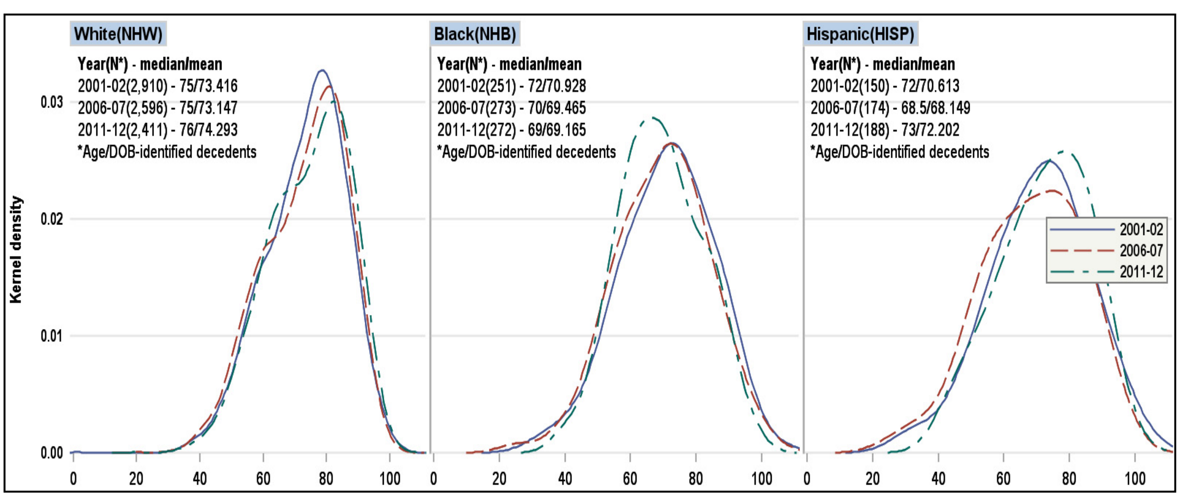
Note: Data suppression (denoted by X) applied if events<5.

diagnoses ($5,514). Combining mortality with nonfatal hospitalization episodes as well as ED visits (UCD and principal diagnosis-based data), about 7,700 coronary events are estimated to have occurred in the county in 2011 (compared with 8,500 in 2009), and slightly less than one-fifth of these events proved fatal (mention needs to be made of the partial nature of gauging incidence from medical encounter data as cases where symptoms were not apparent to or seriously affecting the individual were not counted). Those aged 85 and over were at the greatest risk for both fatal and nonfatal coronary events (Figure 8), whereas the 55-74 age group accounted for over one-half of the YPLL due to IHD in 2010-2012 (Figure 9). High IHD fatality also occurred among males in younger age groups (Figure 10).

The age-adjusted IHD death rate in 2010-2012, 82.7 deaths per 100,000 person-years, was 40% lower than the rate in 2001-2003 (137.5 per 100,000). Rates declined by 36% and 45% compared with 2001-2003 for males and females respectively, and the mortality rate among males in 2010-2012 was twice as high as that among females (2,831 male and 1,609 female deaths, at AjRs of 112.8 [95% CI: 108.4-117.1] and 56.6 [CI: 53.8-59.4] per 100,000 respectively). Whereas all races have experienced declines in IHD mortality since 2001, AjRs were higher among NHWs and NHBs, at 94.2 (CI: 91-97.3; 3,540 deaths) and 81.3 (CI: 72.7-89.8; 391) per 100,000 in 2010-2012 respectively, compared with 44.2 (CI: 37.5-50.8; 205) and 48.7 (CI: 42.5-55; 284) per 100,000 among NHAPIs and Hispanics respectively. The age-at-death trend also varied across races, with a higher median/mean age of death from IHD seen among NHWs than among other groups (Figure 11). In 2010-2012, the highest age-adjusted IHD mortality occurred among NHW males, at 127.3 per 100,000 or 1.13 times (CI: 1.07-1.2) the age-adjusted male population rate during that period, compared to a standardized mortality rate ratio (SMRR) of 1.07 (CI: 1.01-1.13) in 2001-2003. A similar relative risk (1.13 compared to the female population AjR) was observed for both NHW (CI: 1.04-1.21) and NHB (CI: 0.94-1.34) females for the period 2010-2012, compared to respective SMRRs of 1.04 (CI: 0.97-1.11) and 1.22 (CI: 1.01-1.46) in 2001-2003.

Figure 11

Ischemic heart disease age-at-death densities among selected race/ethnicities, Clark County-NV, 2001-2012



Source: Death certificate files (preliminary for 2012) restricted to Clark County residents at time of death.

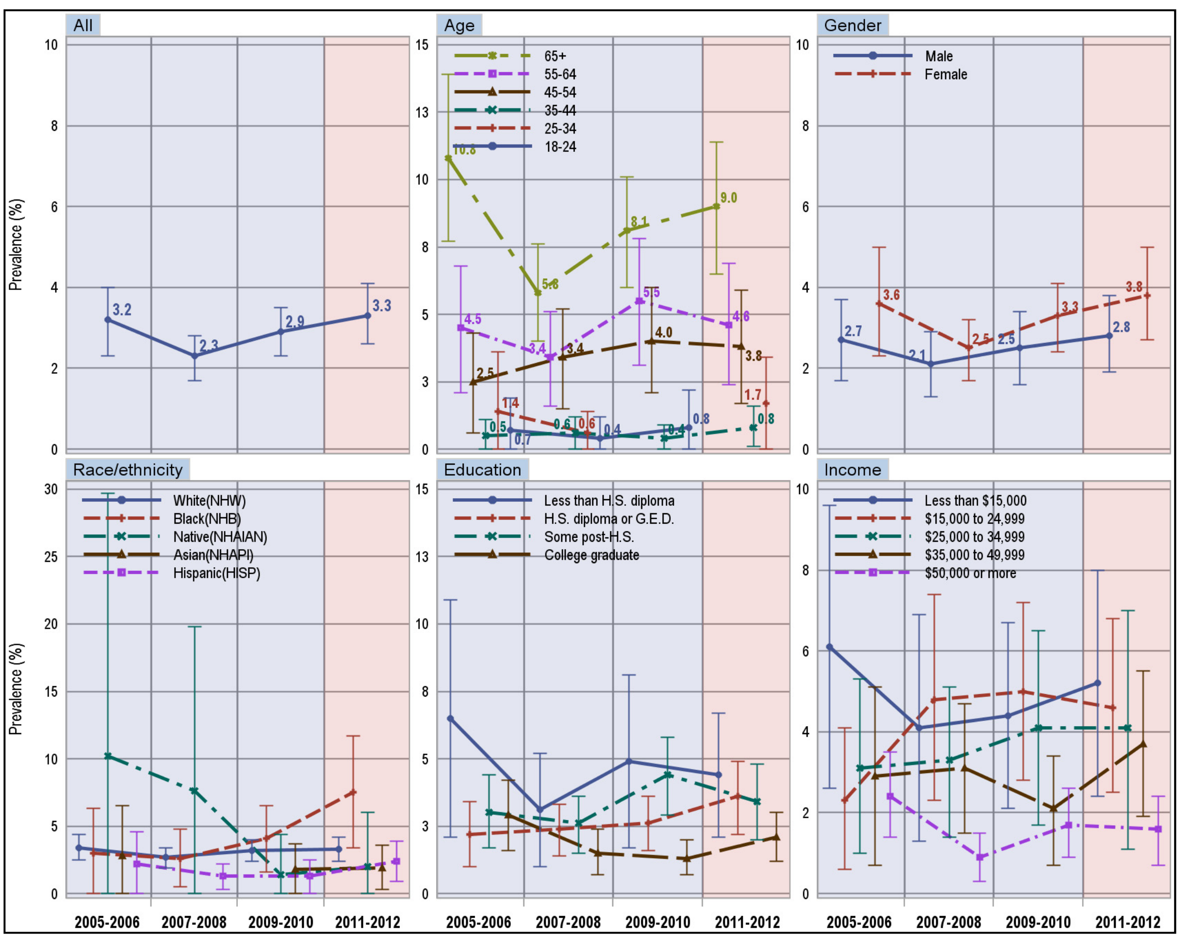
Stroke

Based on the 2011-2012 BRFSS survey, about 49,300 persons aged 18 and above had lifetime occurrence of stroke, representing 3.3% (95% CI: 2.6-4.1%) of the adult population in the county, compared with a national median prevalence of 2.9% during the same period. The prevalence was higher in females than in males, at 3.8% (CI: 2.7-5%; national median: 2.9%) and 2.8% (CI: 1.9-3.8%; national median: 2.8%) respectively. Trends in stroke prevalence by selected characteristics are presented in Figure 12.

Incidences of stroke (as UCD or principal diagnosis in nonfatal hospitalization episodes or ED visits) remained much the same between 2009 and 2011, with at least 6,000 events occurring annually. About one-tenth of these stroke events resulted in death in 2011, accounting for 4.5% (609) of all deaths in that year, and the proportion rose to 6.4% (865) when both underlying and contributing causes of death were considered. Stroke also accounted for 2.9% (4,394 vs. 4,601 in 2009) and 0.3% (1,245 vs. 1,102 in 2009) of all primary diagnosis-attributable hospitalizations and ED visits in 2011, and its share of primary diagnosis-attributable discharges rose to 5.8% (8,830) and 0.7% (2,345) respectively, when both

Figure 12

Prevalence of stroke by selected characteristics, Clark County-NV, 2005-2012



Source: Weighted data from the Behavioral Risk Factor Surveillance System.

Note: Prevalence estimates for 2011 onwards were based on combined landline and cell phone module data while only landline phone survey data were available in previous years.

Figure 13

Stroke-attributable event rates by age, Clark County-NV, 2009-2011

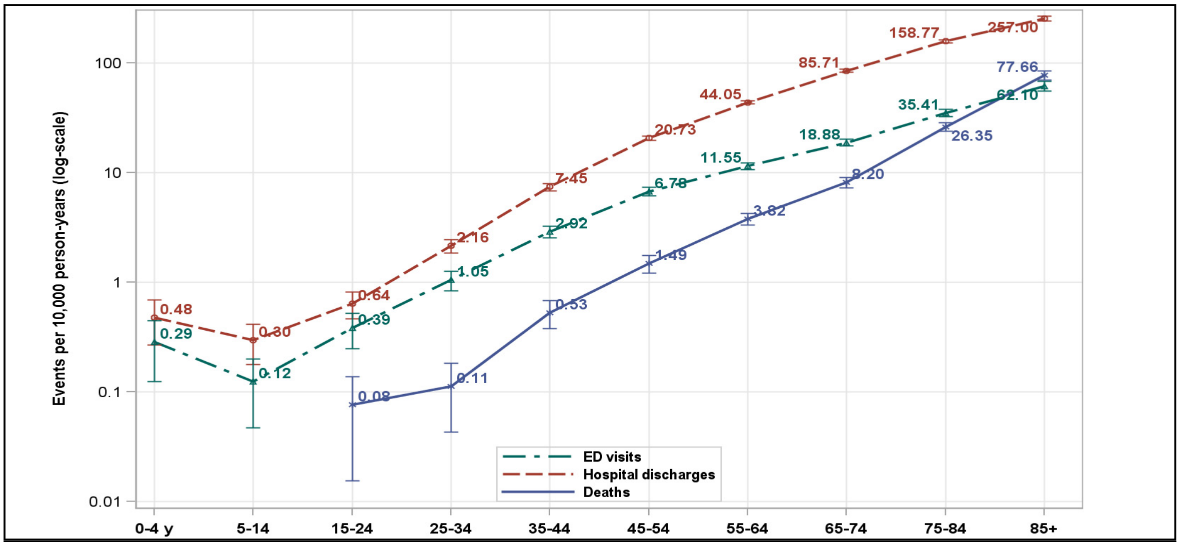


Figure 14

Stroke-attributable deaths and years of potential life lost (YPLL) by age, Clark County-NV, 2010-2012

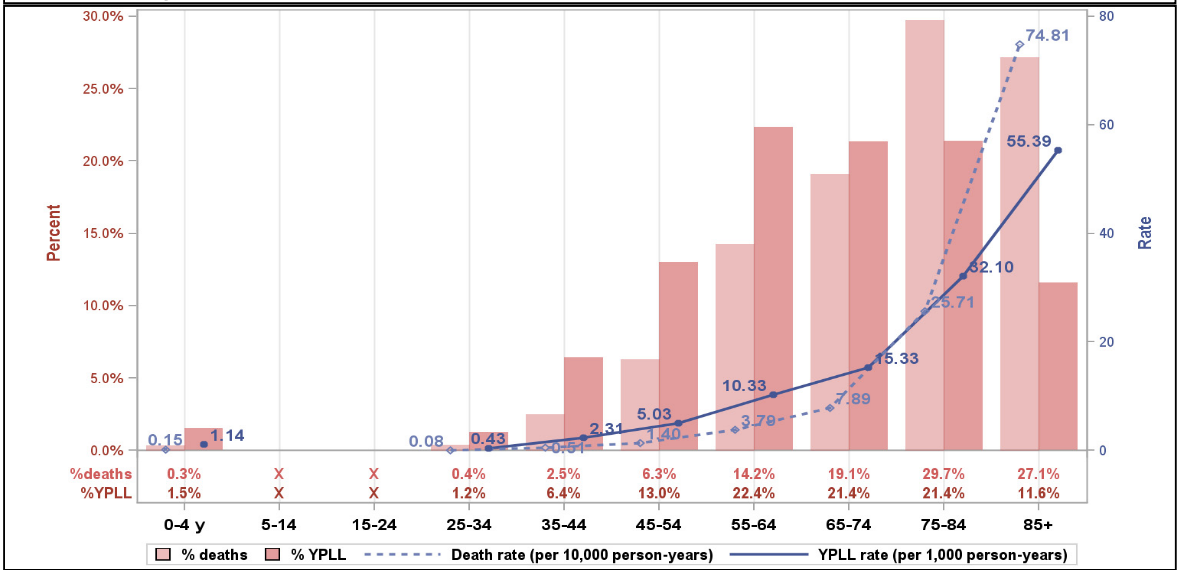
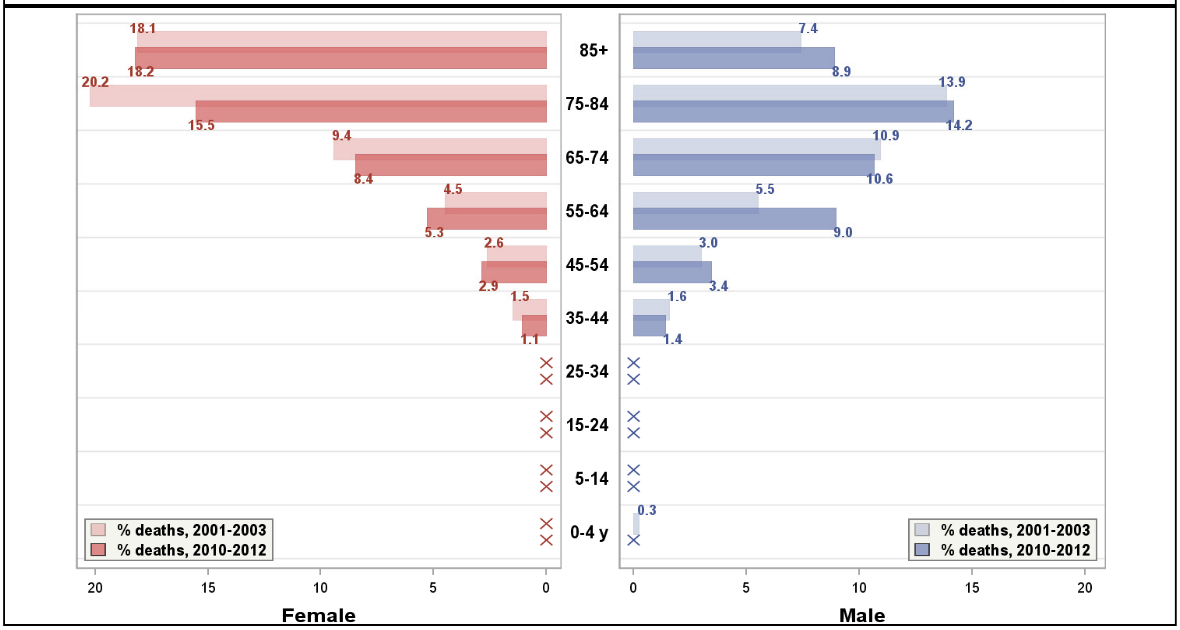


Figure 15

Stroke-attributable deaths by age and gender, Clark County-NV, 2001-2012



Source: Death certificate (preliminary for 2012), uniform billing hospital discharge and ED visit data restricted to Clark County residents at time of death or discharge. Bridged–race intercensal 2000-2009 series and vintage 2012 for 2010-2012 postcensal estimates used in crude and age-specific rate calculations.

Note: Data suppression (denoted by X) applied if events<5.

principal and secondary diagnoses were considered. With its deadly and debilitating complications, stroke was a major contributor to health care expenditure, accounting for 4% (1 billion) of the total billed amount for all primary diagnosis-attributable hospitalizations, and 1% ($52 million) of the total billed amount for all primary diagnosis-attributable ED visits over the period 2009-2011. Among hospitalizations and ED visits for stroke that occurred in 2011, the average discharge charges were $81,608 ($88,945 among males and $74,304 among females) and $16,656 ($16,301 and $16,971) respectively.

Similar to the mortality trend in IHD, the age-adjusted stroke death rate declined approximately 40% (33% among males and 43% among females) from 55.5 to 34.1 per 100,000 person-years between 2001-2003 and 2010-2012. While the majority of both stroke and IHD fatalities occurred among those aged 75 and over, hospitalizations due to stroke were more common among persons aged under 35 or 85 and over when compared with those due to IHD, and more ED visits were attributed to stroke than IHD across the age spectrum (Figures 8,9,13,14). Overall more females than males received treatment for stroke in hospitals or EDs (2,862 compared with 2,777 primary diagnoses in 2011), or died from it (313 deaths compared with 296, at crude rates of 32 and 29.9 per 100,000 respectively). In particular, females aged 75 and over made up over one-third of stroke deaths (compared to a similar proportion of IHD deaths accounted for by males aged 65-84), whereas males comprised a higher proportion of stroke deaths in younger ages (Figure 15). In 2010-2012, the AjR due to stroke was slightly higher among males (35 [95% CI: 32.6-37.5] per 100,000; 854 deaths) than females (32.7 [CI: 30.6-34.8] per 100,000; 922), reflecting a 'senescence' gap between county residents and the standard population, particularly in males (age-standardization accentuates old-age mortality patterns when the age structure of the population to be standardized is younger than that of the hypothetical standard population; as such, AjRs tend to be higher than crude/unadjusted rates if the mortality risk of interest increases with age).

Between 2001-2003 and 2010-2012, NHWs saw AjRs due to stroke fell by 37% from 53.7 (95% CI: 50.9-56.5) to 33.9 (CI: 32-35.8) per 100,000, NHBs by 47% from 82.6 (CI: 69.7-95.6) to 44.2 (CI: 37.7-50.6), NHAPIs by 54% from 67.7 (CI: 53.4-82) to 30.9 (CI: 25.4-36.4), and Hispanics by 30% from 39.9 (CI: 31.4-48.4) to 28.1 (23.4-32.8). The stroke deaths corresponding to respective AjRs in 2010-2012 numbered 1,247 among NHWs, 204 among NHBs, 147 among NHAPIs, and 167 among Hispanics. Across races, the median/mean age of death from stroke was highest among NHWs (79/76.8 in 2011-2012, compared with 71/68.2, 72/68.5, and 72/69.1 among NHBs, NHAPIs, and Hispanics respectively). Further, the highest relative risk for stroke death occurred among NHBs, with both sexes having 1.3 (male SMRR CI: 1-1.7; female: 1.06-1.68) times the gender-specific population AjRs in 2010-2012.

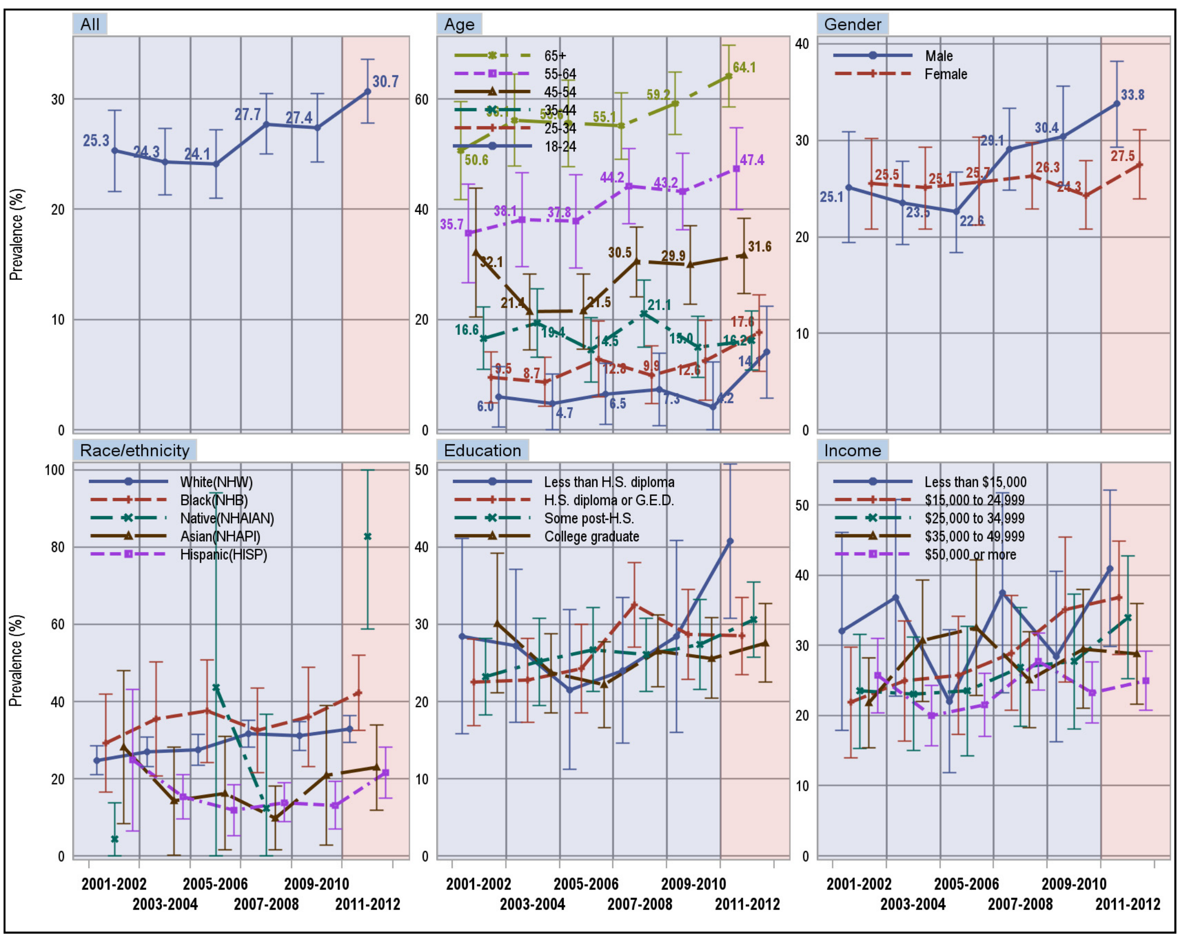
Hypertension

Hypertension is both a disease on its own and a risk factor for other circulatory diseases and pathologies such as renal failure. The 2011 BRFSS survey (hypertension awareness surveyed in odd-numbered years only) puts the prevalence of hypertension among those aged 18 and older at 30.7% (95% CI: 27.8-33.6%; national median: 30.8%), corresponding to around 454,600 adults in the county affected by the condition, with higher prevalence among males (33.8% [CI: 29.3-38.2%]; national median: 31.9%) than females (27.5% [CI: 23.9-31.1%]; national median: 29.9%). Trends in hypertension prevalence by selected characteristics are presented in Figure 16.

Hypertension and its complications (hypertensive heart and/or kidney diseases) were listed as the UCD in 2.6% (348) of all deaths registered in 2011, and as a (underlying or contributing) cause of death in 9.6% (1,306). Furthermore, principal diagnoses of hypertensive disease (HYPD) accounted for 1.2% (1,752 vs. 1,975 in 2009) and 1.1% (4,049 vs. 3,880 in 2009) of all primary diagnosis-attributable hospitalizations and ED visits in 2011 respectively, whereas any (principal or secondary) diagnoses of HYPD constituted 45% (68,531) and 16.9% (60,364). As well, the proportion of mortality involving

Figure 16

Prevalence of hypertension by selected characteristics, Clark County-NV, 2001-2012*



Source: Weighted data from the Behavioral Risk Factor Surveillance System.

Note: Prevalence estimates for 2011 onwards were based on combined landline and cell phone module data while only landline phone survey data were available in previous years.

*Hypertension awareness only surveyed in odd-numbered years, with the inquiry 'have you been told you have high blood pressure by a doctor, nurse or other health professional?' Odd-numbered, single-year data (i.e. 2001, 2003 and so forth) are reported here.

Figure 17

Hypertensive disease-attributable event rates by age, Clark County-NV, 2009-2011

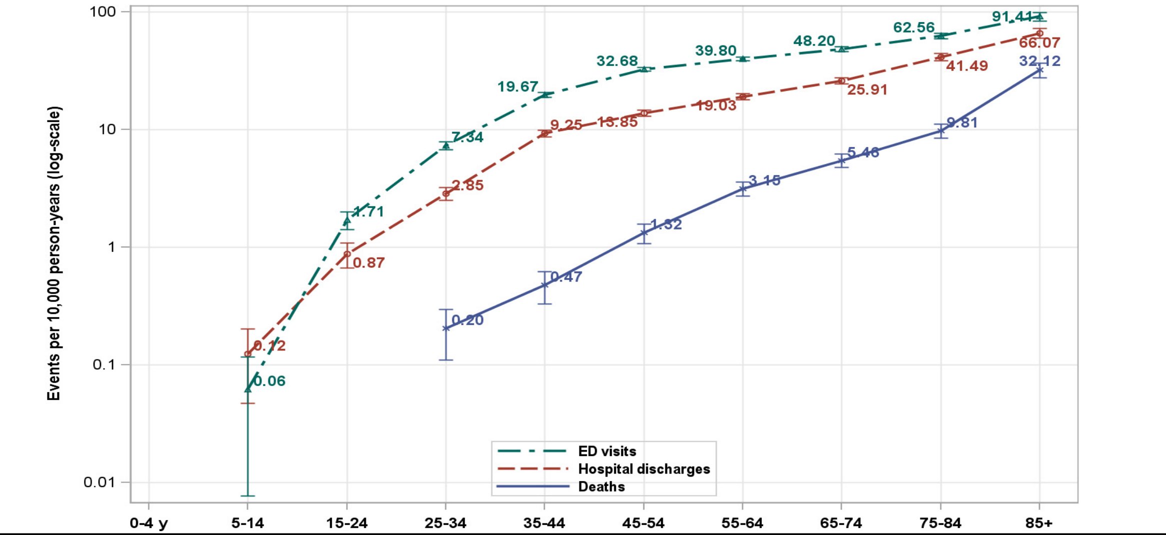


Figure 18

Hypertensive disease-attributable deaths and years of potential life lost (YPLL) by age, Clark County-NV, 2010-2012

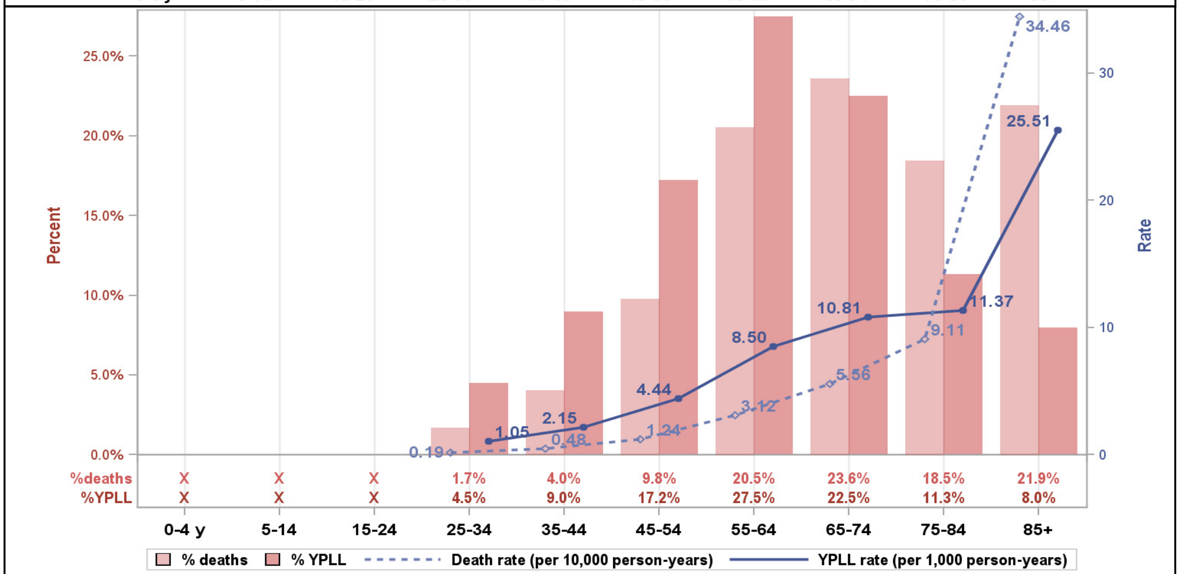
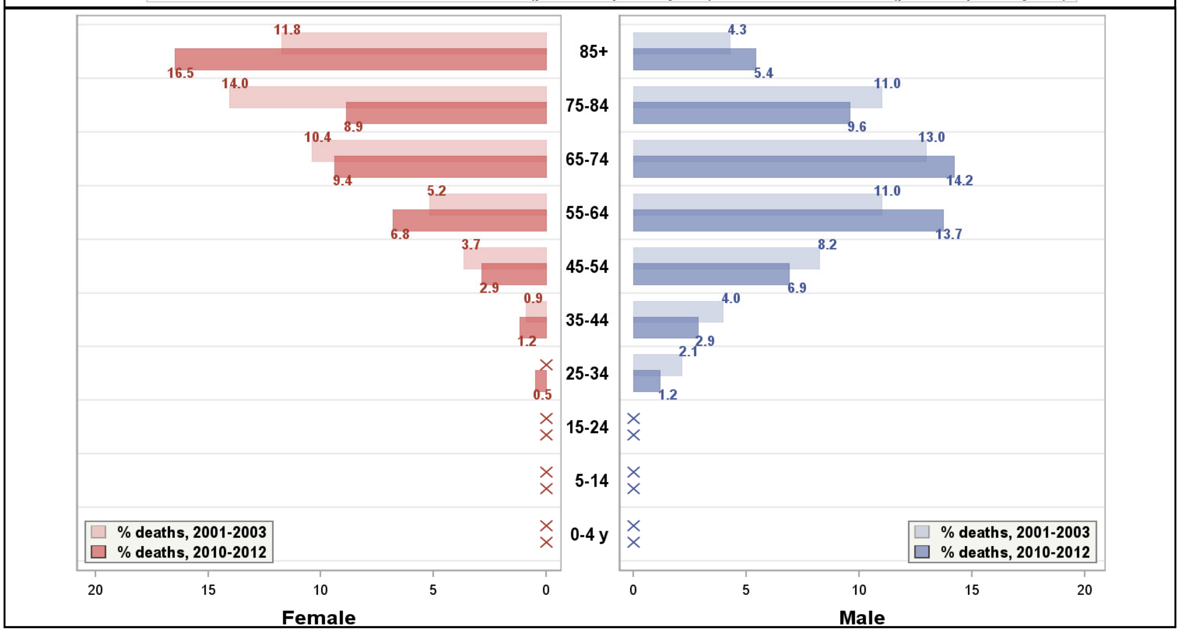


Figure 19

Hypertensive disease-attributable deaths by age and gender, Clark County-NV, 2001-2012



Source: Death certificate (preliminary for 2012), uniform billing hospital discharge and ED visit data restricted to Clark County residents at time of death or discharge. Bridged–race intercensal 2000-2009 series and vintage 2012 for 2010-2012 postcensal estimates used in crude and age-specific rate calculations.

Note: Data suppression (denoted by X) applied if events<5.

HYPD (as a underlying or contributing cause) and that of inpatient discharges or ED visits carrying any HYPD diagnosis appeared to be on the rise over recent years (data not shown). In 2009-2011, estimated HYPD treatment costs were around $0.3 billion for HYPD-attributable hospitalizations and $61 million for HYPD-attributable ED visits, representing 1% of the total billed amount for all primary diagnosis-attributable hospitalizations and ED visits combined. Among principal diagnoses of HYPD, the average discharge charge in 2011 was $57,589 ($62,434 among males and $53,693 among females) per hospitalization and $5,932 per ED visit ($5,043 and $6,653).

Hypertensive disorders were a major reason for health service use, accounting for a higher proportion of ED visits among those aged 15 and above, and a higher proportion of hospitalizations among those aged 15-44, than those due to IHD or stroke in comparable age ranges (Figures 8,13,17). As with most degenerative disorders that progress with age, the HYPD death rate peaked in old age (85 years and above); nevertheless, the 55-74 age group accounted for one-half of the HYPD-attributable YPLL (Figure 18). Whereas more females than males were hospitalized or treated in EDs for HYPD (3,208 compared with 2,593 primary diagnoses in 2011), more males died of HYPD than females, with crude death rates of 19.1 (189 deaths) and 16.3 (159) per 100,000 respectively. A slightly younger age-at-death profile was also observed among male HYPD deaths when compared to those due to IHD and stroke (Figures 10,15,19).

The age-adjusted HYPD death rate was relatively unchanged, from 17.1 per 100,000 in 2001-2003 to 18.2 per 100,000 in 2010-2012, with higher mortality risks among males (19.9 [95% CI: 18.2-21.7] per 100,000 in 2010-2012; 546 deaths) than females (16 [CI: 14.5-17.4] per 100,000; 467), and among NHBs (35.3 [CI: 29.8-40.8] per 100,000; 179) than other races (AjRs of 18.5 [CI: 17.1-19.9] per 100,000 NHWs [699 deaths], 10 [CI: 6.8-13.2] per 100,000 NHAPIs [48], and 11.4 [CI: 8.5-14.3] per 100,000 Hispanics [77]). In terms of age of death, NHBs (median/mean of 62/62.4 years in 2011-2012) and Hispanics (64/67 years) did not compare favorably with the population as a whole (70/69.8 years). As well, NHB males and females had 1.79 (CI: 1.34-2.4) and 2.05 (CI: 1.49-2.8) times the male and female population AjRs in 2010-2012 respectively.

Geographic variations in CVD risk factors

Data on selected indicators of socio-economic circumstances and cardiovascular risks (health insurance coverage, smoking, physical inactivity, obesity, hypertension, hypercholesterolemia, diabetes) were presented spatially to identify opportunities for health promotion and disease abatement at the areal level. The geographic breakdowns of these indicators are presented in Appendix B (Maps 5-11).

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Appendix A – The standard population distribution

July 1, 2000 U.S. intercensal population estimates

Age group	Population estimates	Proportions
<5 years	19,178,293	0.067969
5-14	41,101,548	0.145666
15-24	39,411,622	0.139677
25-34	39,804,497	0.141069
35-44	45,168,843	0.160081
45-54	37,998,974	0.134671
55-64	24,429,066	0.086578
65-74	18,383,937	0.065154
75-84	12,423,159	0.044028
85+	4,262,472	0.015106
Total	**282,162,411**	**1**

Source: U.S. Census Bureau. National intercensal estimates (2000). Available from http://www.census.gov/popest/data/intercensal/national/nat2010.html

Appendix B

Map 1 – Cardiovascular disease-attributable death rates by residential zip code, Clark County-NV, 2010-2011

Map 2 – Cardiovascular disease-attributable hospitalization rates by residential zip code, Clark County-NV, 2010-2011

Map 3 – Cardiovascular disease-attributable emergency department visit rates by residential zip code, Clark County-NV, 2010-2011

Map 4 – Prevalence of cardiovascular disease (any occurrence of heart attack / angina / stroke) by residential zip code, Clark County-NV, 2005-2010

Map 5 – Percent no health insurance by residential zip code, Clark County-NV, 2005-2010

Map 6 – Prevalence of current smokers by residential zip code, Clark County-NV, 2005-2010

Map 7 – Prevalence of physical inactivity by residential zip code, Clark County-NV, 2005-2010

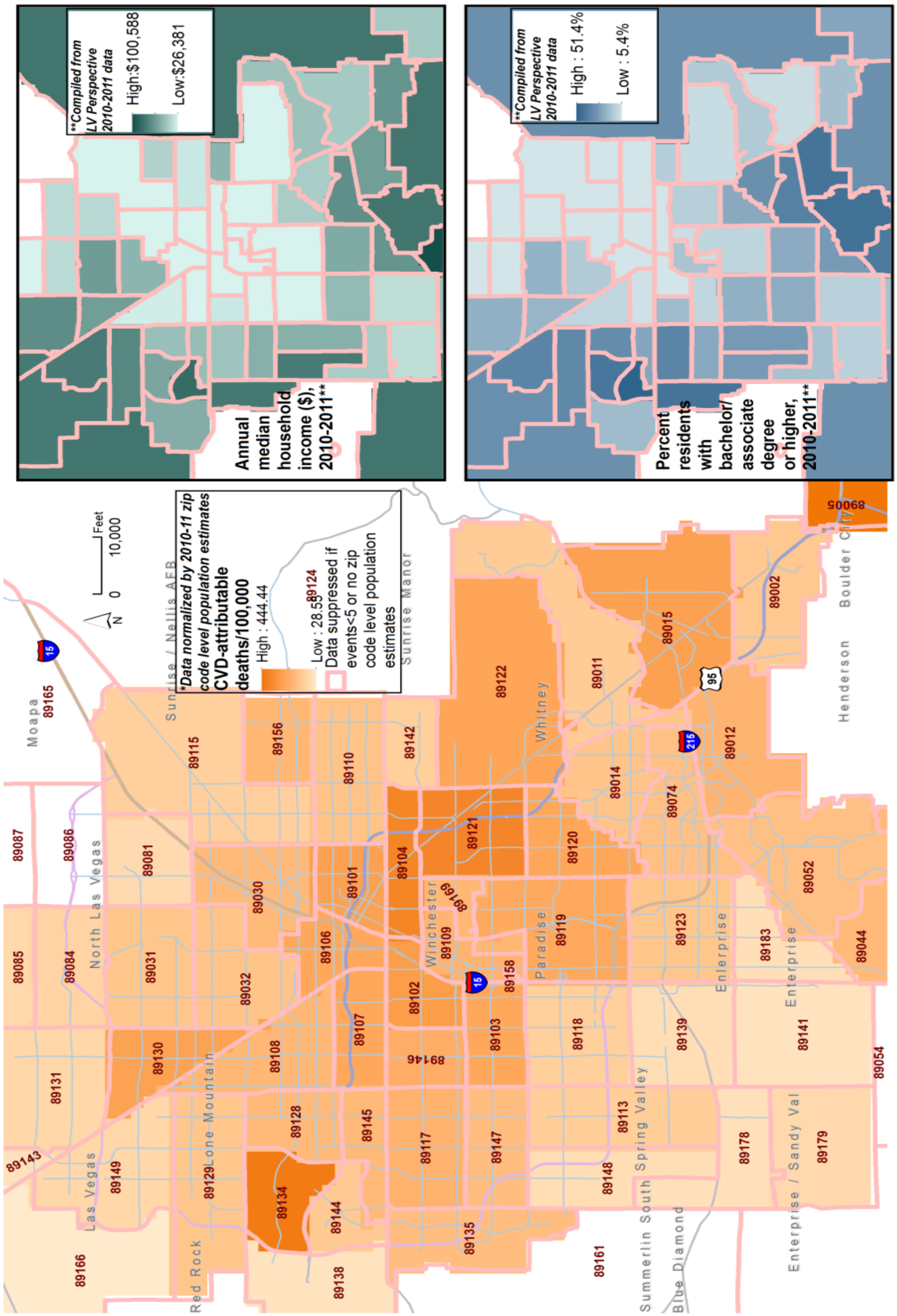
Map 8 – Prevalence of obesity by residential zip code, Clark County-NV, 2005-2010

Map 9 – Prevalence of hypertension by residential zip code, Clark County-NV, 2005, 2007 & 2009 aggregated

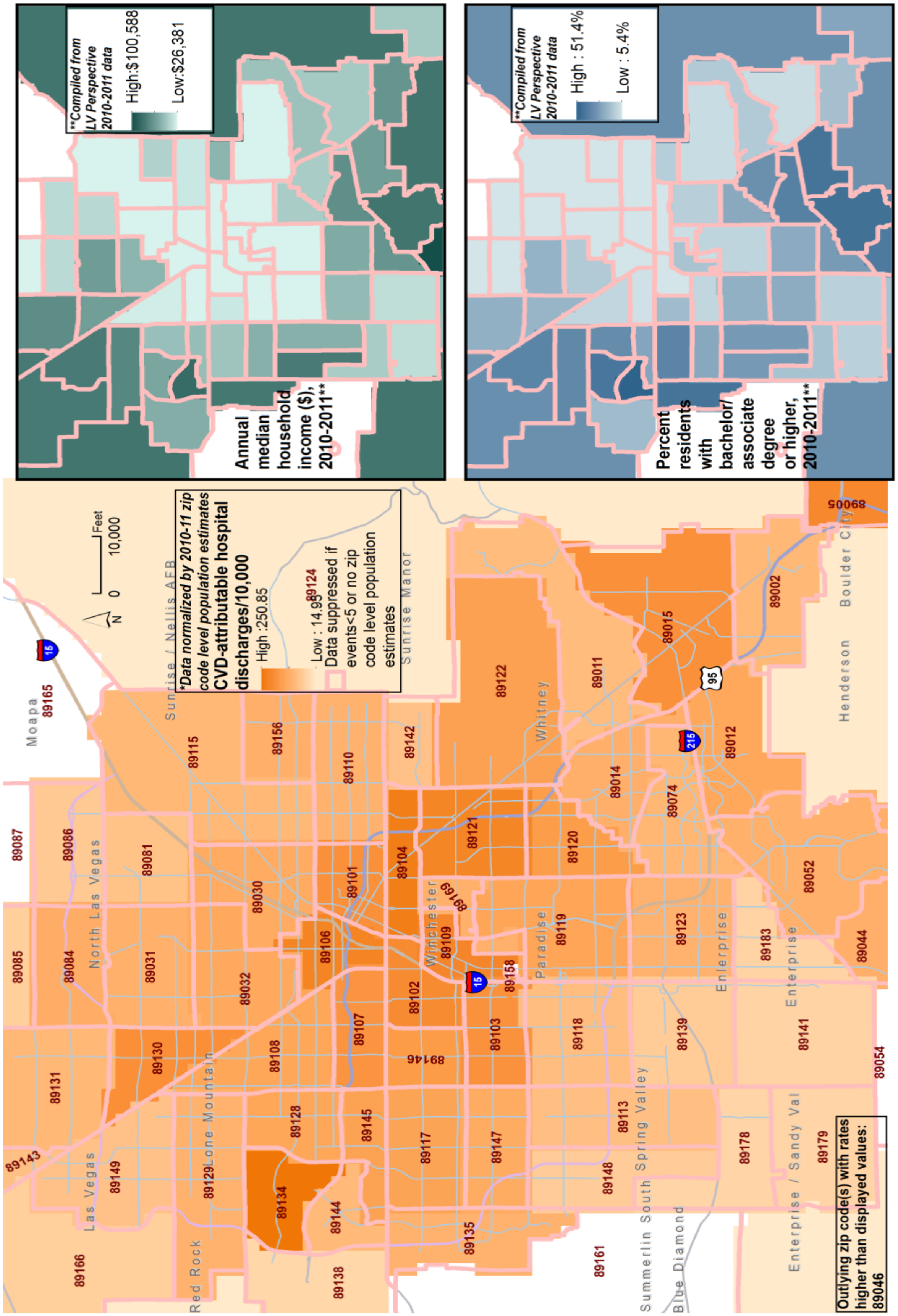
Map 10 – Prevalence of hypercholesterolemia by residential zip code, Clark County-NV, 2005, 2007 & 2009 aggregated

Map 11 – Prevalence of diabetes (excluding gestational diabetes) by residential zip code, Clark County-NV, 2005-2010

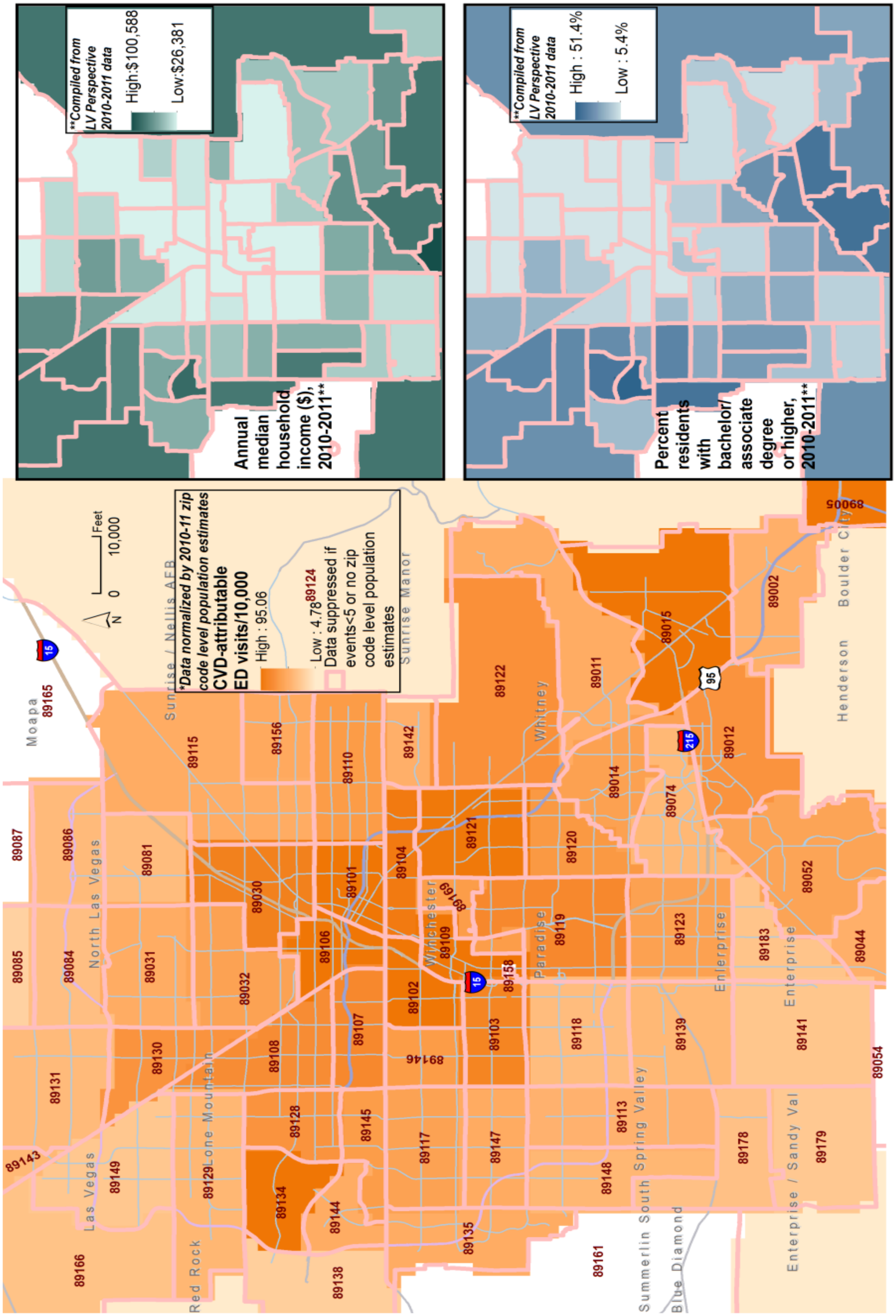
Map 1 – Cardiovascular disease-attributable death rates by residential zip code, Clark County-NV, 2010-2011*



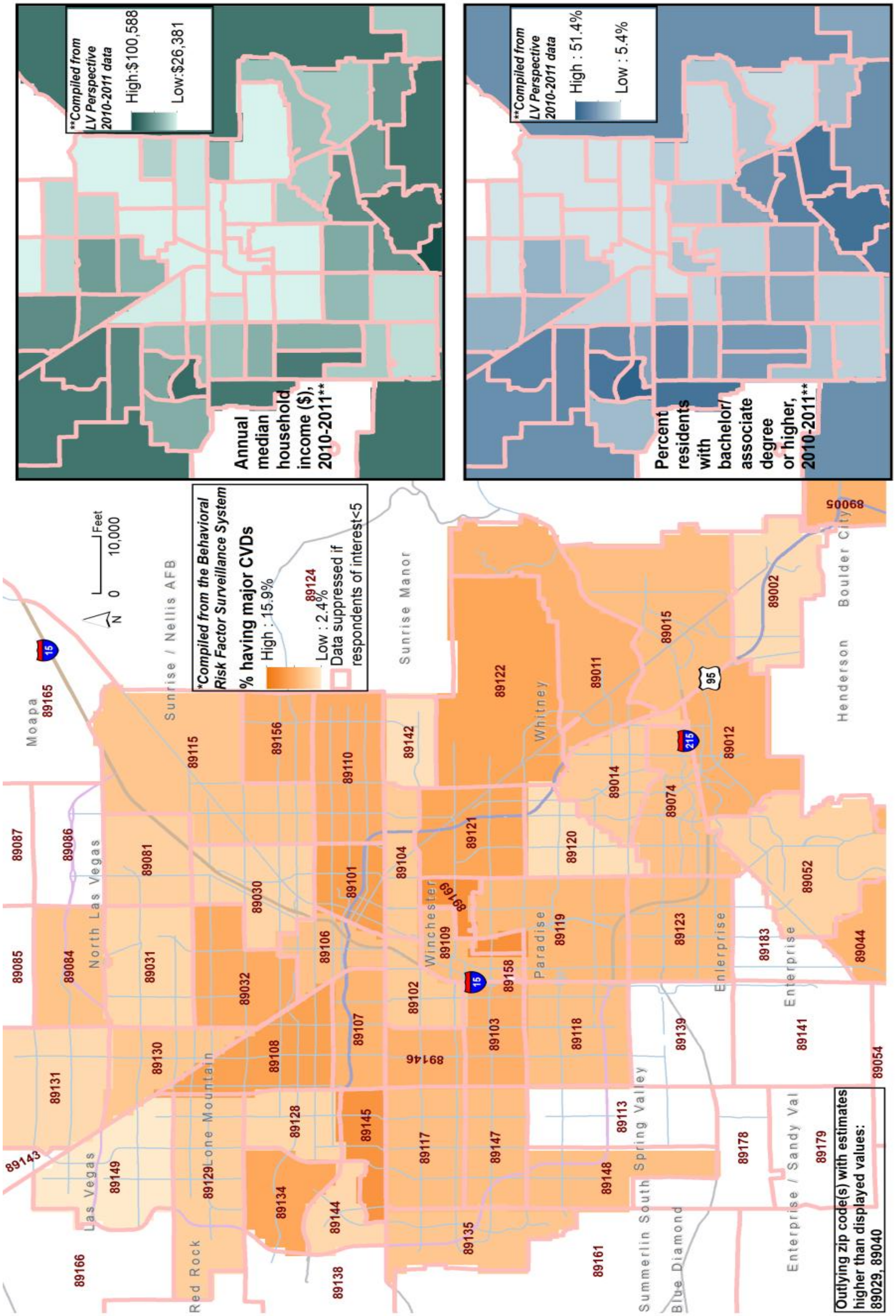
Map 2 – Cardiovascular disease-attributable hospitalization rates by residential zip code, Clark County-NV, 2010-2011*



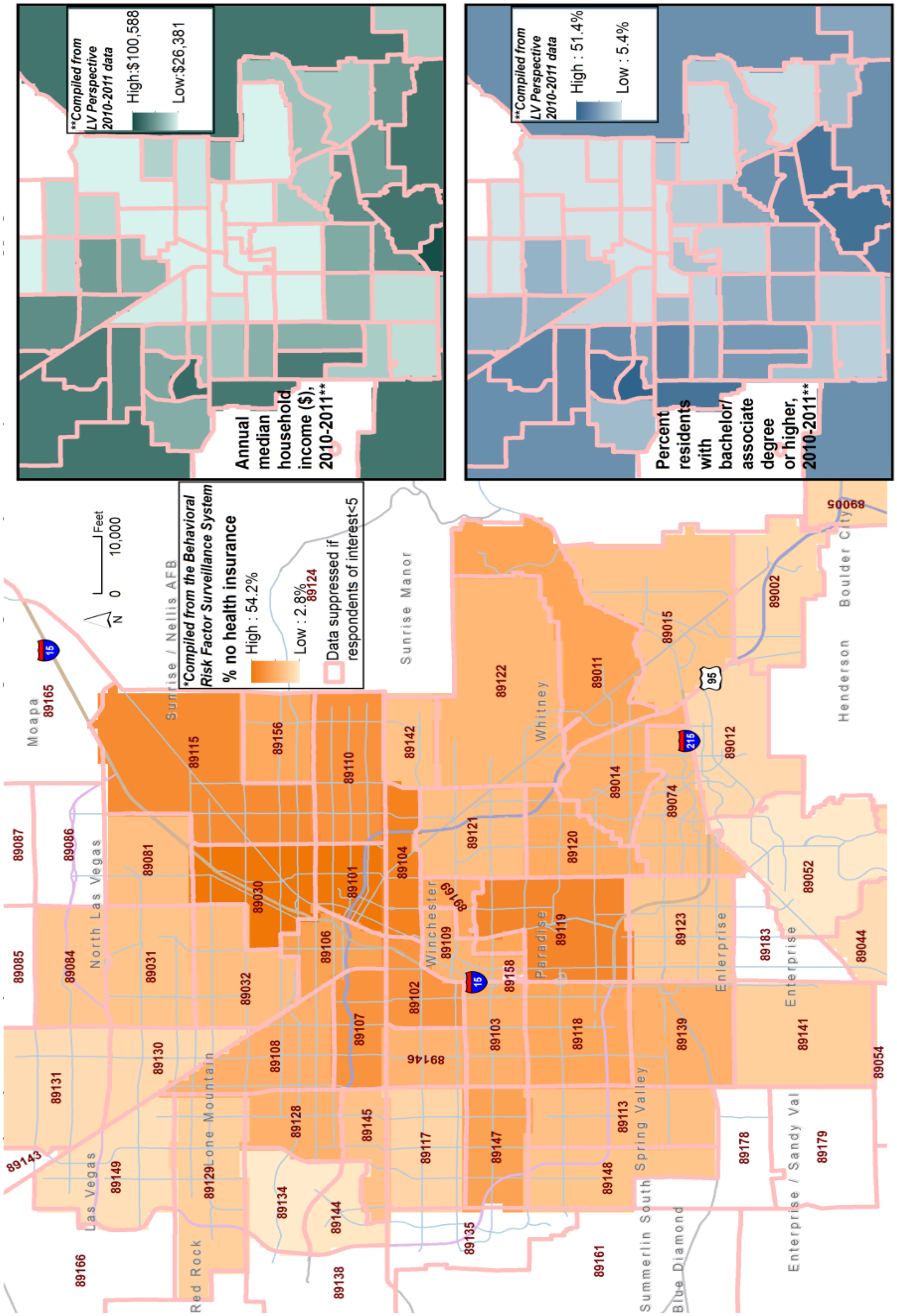
Map 3 – Cardiovascular disease-attributable emergency department (ED) visit rates by residential zip code, Clark County-NV, 2010-2011*



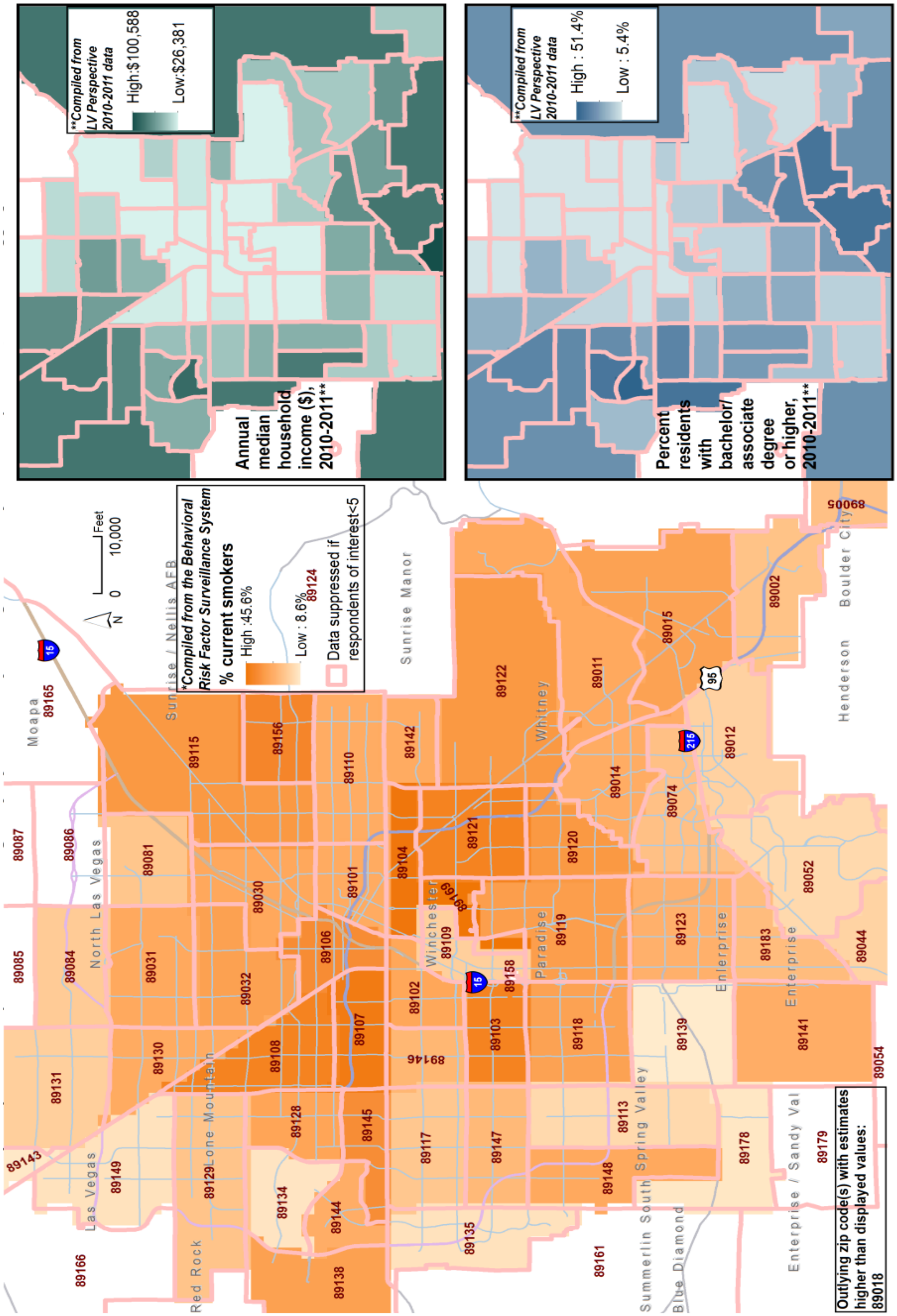
Map 4 – Prevalence of cardiovascular disease (any occurrence of heart attack / angina / stroke) by residential zip code, Clark County-NV, 2005-2010*



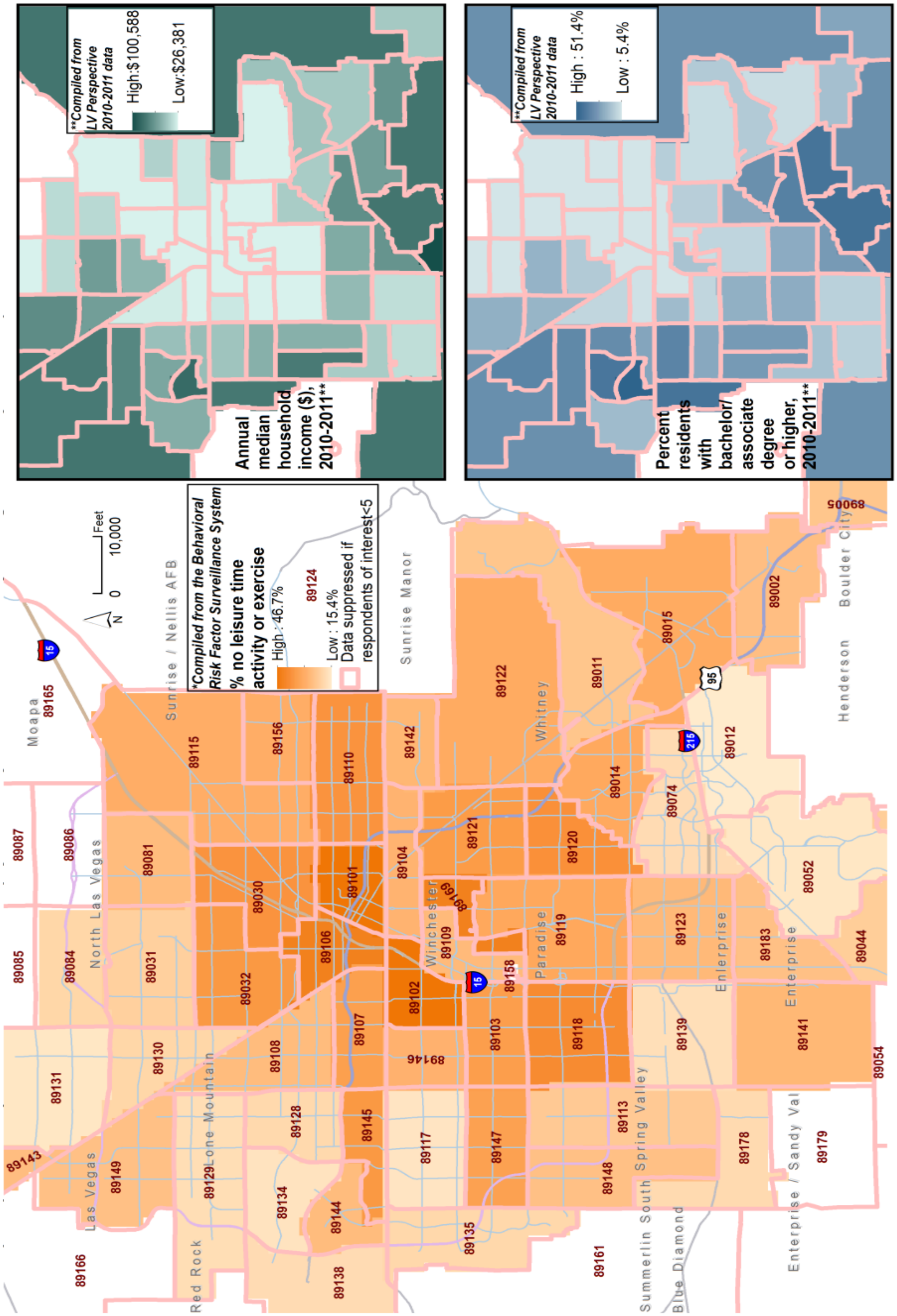
Map 5 – Percent no health insurance by residential zip code, Clark County-NV, 2005-2010*



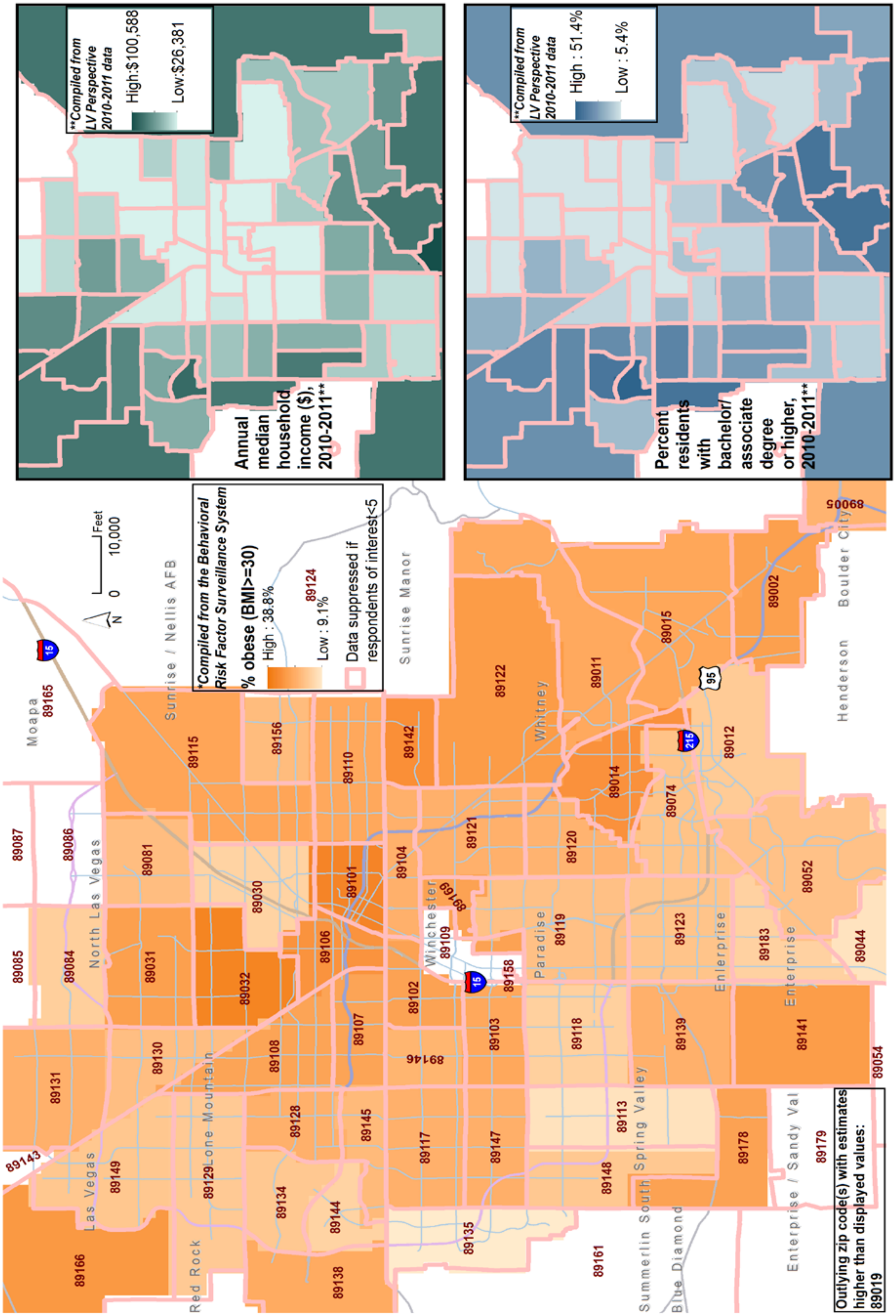
Map 6 – Prevalence of current smokers by residential zip code, Clark County-NV, 2005-2010*



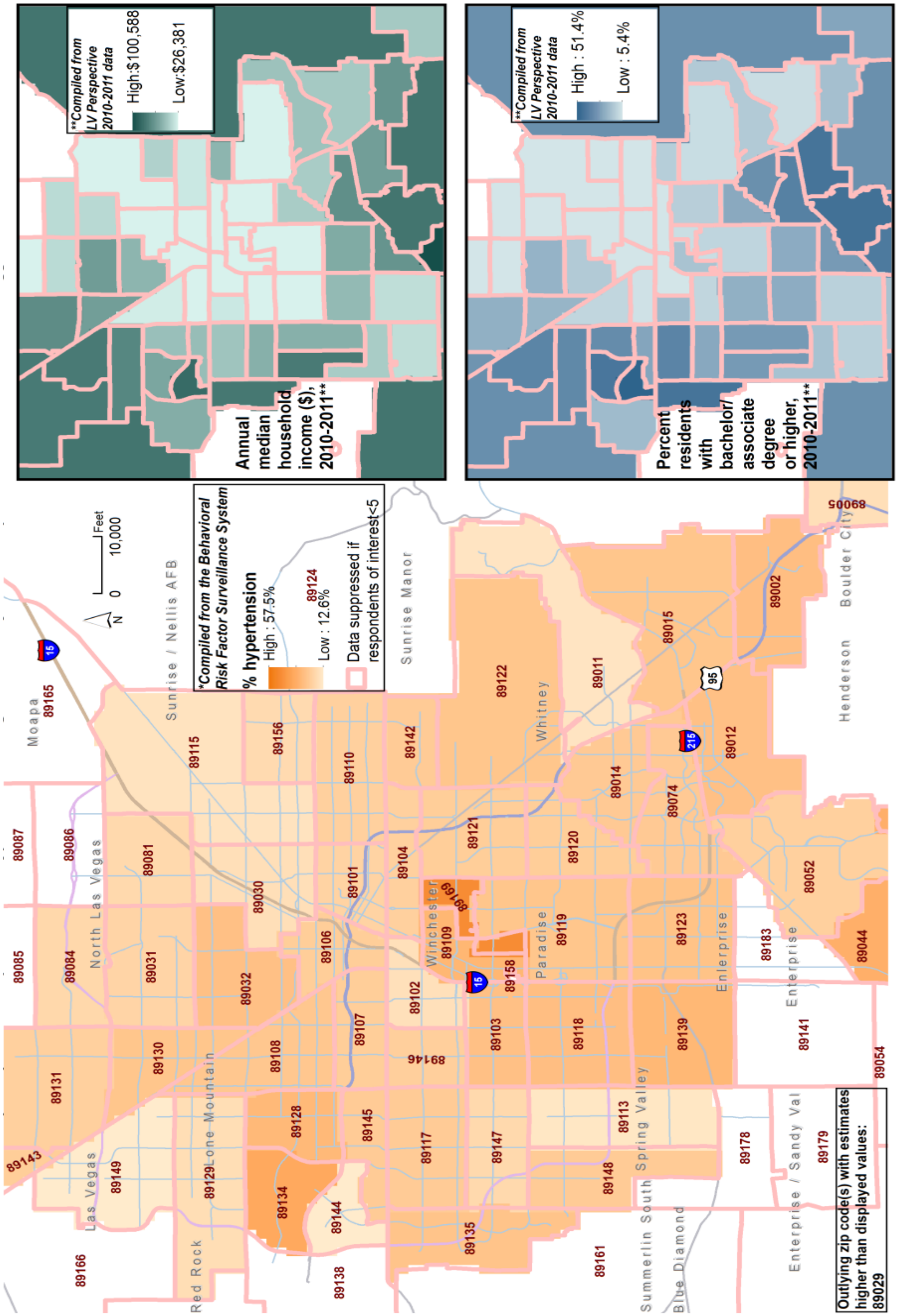
Map 7 – Prevalence of physical inactivity by residential zip code, Clark County-NV, 2005-2010*



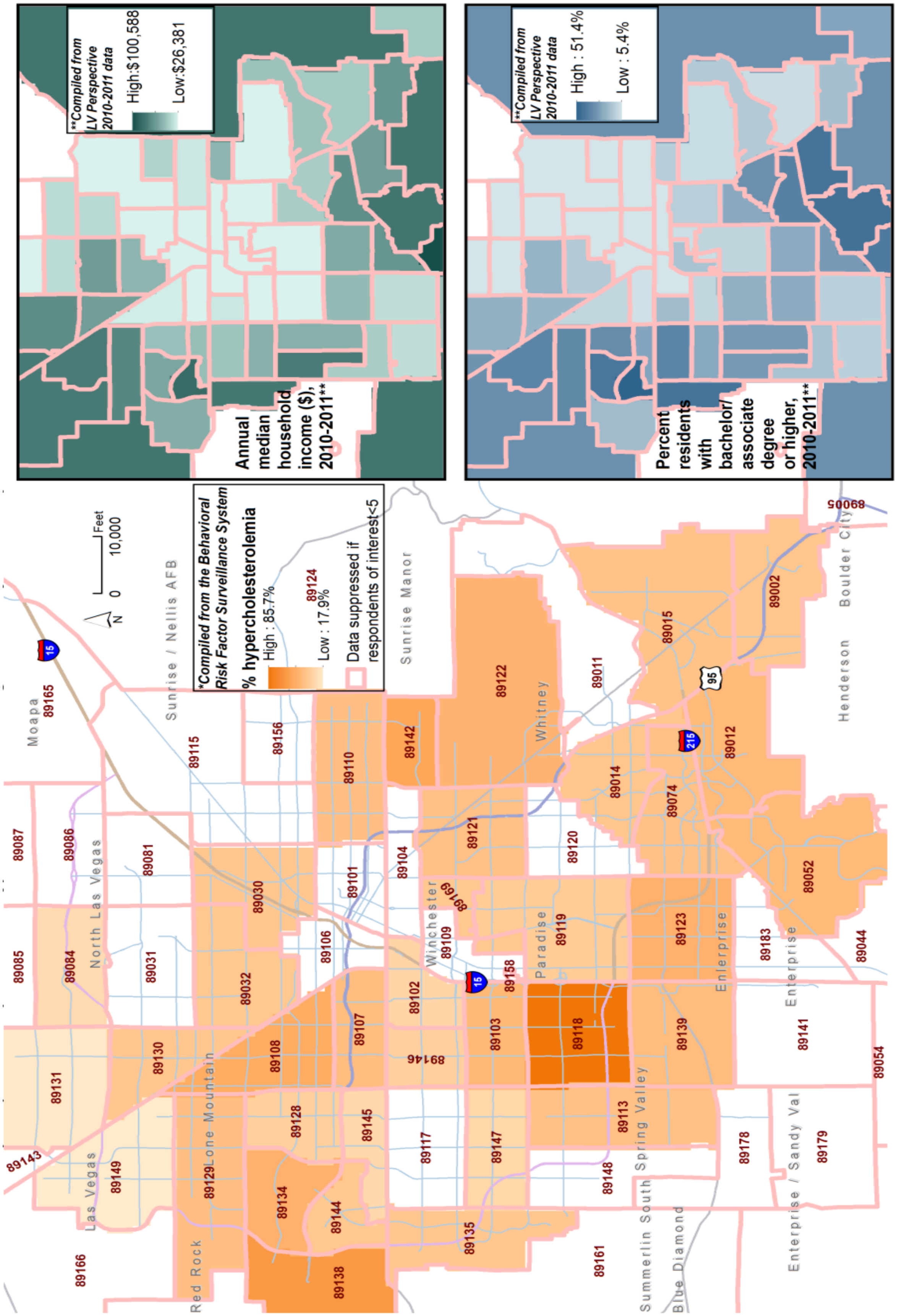
Map 8 – Prevalence of obesity by residential zip code, Clark County-NV, 2005-2010*



Map 9 – Prevalence of hypertension by residential zip code, Clark County-NV, 2005, 2007 & 2009 aggregated*



Map 10 – Prevalence of hyper-cholesterolemia by residential zip code, Clark County-NV, 2005, 2007 & 2009 aggregated*



Map 11 – Prevalence of diabetes (excluding gestational diabetes) by residential zip code, Clark County-NV, 2005-2010*