Epidemiological Support for Strategic Planning for Reduction of Hypertension

Arkansas Department of Health

Lucy Im, Joyce Biddle, Abby Holt
Robert Delongchamp PhD, Gordon Reeve PhD

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EXECUTIVE SUMMARY

- Hypertension is a condition where one's blood pressure is higher than normal.
- Hypertension puts extra stress on the heart, other organs (kidneys, brain, eyes), and critical blood vessels.
- The 2009 BRFSS survey indicates that 749,742 (34.4%) of Arkansans ages 18 and older have self-reported hypertension.
- The 2007 ARCHES study indicates that 1,057,017 (48.3%) of Arkansans ages 18 and older have measured hypertension.
- The prevalence of hypertension for Arkansans varies considerably by race and sex:

	BRFSS	ARCHES
• All Arkansas (18 and older)	34.4%	48.3%
• White Males (non-Hispanic)	37.7%	50.2% (White males)
• Black Males (non-Hispanic)	41.8%	55.2% (Black males)
• Hispanic Males	14.8%	
• White Females (non-Hispanic)	32.2%	42.8% (White females)
• Black Females (non-Hispanic)	42.5%	63.5% (Black females)
• Hispanic Females	16.9%	

EXECUTIVE SUMMARY (cont'd)

- Hypertension plays a significant role in the development of ischemic heart disease, congestive heart failure, stroke, and chronic kidney disease.
- Deaths and hospitalizations associated with hypertension may be coded or attributed to hypertension directly, or to heart disease, congestive heart failure, stroke, or kidney disease.

EXECUTIVE SUMMARY (cont'd)

- The annual number of deaths and the death rates in Arkansas for hypertension or hypertension-associated conditions from 2006-2008 were:
  - Hypertension 587 (18.0 / 100,000)
  - Ischemic Heart Disease 4,982 (153.4 / 100,000)
  - Congestive Heart Failure 734 (21.9 / 100,000)
  - Stroke 1,826 (56.0 / 100,000)
  - Chronic Kidney Disease 198 (6.1 / 100,000)
- Arkansas death rates for most of these conditions from 2006-2008 were consistently higher than that for the corresponding U.S. death rates:
  - Hypertension no difference than US
  - Ischemic Heart Disease 20% higher than US
  - Congestive Heart Failure 24% higher than US
  - Stroke 33% higher than US
  - Chronic Kidney Disease 2% higher than US

EXECUTIVE SUMMARY (cont'd)

- The annual number of hospitalizations between 2007-2009 and the hospitalization rates for hypertension-associated conditions were:
  - Hypertension 3,108 (108.2 / 100,000)
  - Heart Disease 20,398 (709.9 / 100,000)
  - Congestive Heart Failure 118,77 (413.4 / 100,000)
  - Stroke 9,794 (340.9 / 100,000)
  - Chronic Kidney Disease 174 (6.1 / 100,000)
- Arkansas hospitalization rates for these conditions are consistently higher than the corresponding U.S. hospitalization rates from 2007-2009:
  - Hypertension 9.3% higher than US
  - Heart Disease 36.9% higher than US
  - Congestive Heart Failure 26.2% higher than US
  - Stroke 11.1% higher than US
  - Chronic Kidney Disease 17.6% higher than US

EXECUTIVE SUMMARY (cont'd)

- The medical costs directly attributed to hypertension are substantial.
  - Arkansas Medicaid costs were $170M in 2007
  - Arkansas Blue Cross Blue Shield billed charges for hypertension episodes were $193M in 2007

- For hypertension and the hypertension-associated diseases, the charges for hospital admissions in 2010 alone were enormous:

	Total	Attributable to Hypertension
Hypertension	$ 62.9 M	$ 62 M
Heart Disease	$ 901.1 M	$ 243 M
Congestive Heart Failure	$ 279.6 M	$ 127 M
Stroke	$ 237.3 M	$ 100 M
Chronic Kidney Disease	$ 4.3 M	$ 0.7 M
	Total Charges: $1.5 Billion	**Total Charges: $532M**

EXECUTIVE SUMMARY (cont'd)

- Trend data for the number of persons with hypertension show steady increases in prevalence in Arkansas.

	2009 Actual (BRFSS)	Projected 2020
• All Arkansas (18 and older)	34.4%	40.2%
• White Males (non-Hispanic)	37.7%	47.5%
• Black Males (non-Hispanic)	41.8%	52.5%
• White Females (non-Hispanic)	32.2%	35.9%
• Black Females (non-Hispanic)	42.5%	53.7%

- The public health task of reducing hypertension and its health consequences and costs will be a major challenge.

TECHNICAL NOTES

BRFSS

The Arkansas Behavioral Risk Factor Surveillance System (BRFSS) data were analyzed to assess hypertension prevalence, health behavior and self-management patterns among Arkansas adults. Arkansas BRFSS contracts with an outside agency to conduct the survey, using a Computer-Aided Telephone Interviewing System. Respondents are selected using a "Disproportionate Stratified Random Sampling" design using a two-stage process. First, a telephone number is randomly selected from listed and unlisted telephone numbers. Second, according to BRFSS protocol, when a residence is selected, a random household member (age 18 or older) is chosen for interview. A cell size of <10 were suppressed in the analysis.

The BRFSS covers a wide range of health behaviors including health care access, hypertension and cholesterol awareness, physical activity, and dietary consumption, providing estimates of the prevalence of these risk factors for health status and disease. BMI and smoking are asked every year while hypertension, physical activity and fruits and vegetable intake are asked on odd years. The most recent data related to hypertension, fruit and vegetable intake and physical activity were from year 2009, while the most recent smoking prevalence and BMI data were from year 2010. BRFSS data are not age-adjusted in this document.

ARCHES

Results from the Arkansas Cardiovascular Health Examination Survey (ARCHES) were used to examine hypertension risk factors, health behaviors, health care utilization and medication use. In addition to interviews, the survey also collected blood and urine samples, as well as measured data on blood pressure, height, weight and abdominal circumference. ARCHES was conducted on a representative sample of some 1400 adults across Arkansas between mid-2006 and early 2008.

TECHNICAL NOTES (cont'd)

CDC WONDER MORTALITY

Age-adjusted mortality rates from 1999 through 2008 were obtained from CDC WONDER Detailed Files for U.S. and Arkansas. International Classification of Diseases 10th Revision Codes were used, see Table 1. The U.S. 2000 projected population was used as the standard population. Age-specific mortality rates for Arkansas from 2004 through 2008 were also obtained from the CDC WONDER Detailed Files for Arkansas.

HOSPITAL DISCHARGE DATA SYSTEM

Hospitalization data was obtained from the Arkansas Center for Health Statistics Hospital Discharge System for years 2001 through 2010. These data contain discharge information for Arkansas hospitals only. Information from out-of-state hospitals is not collected. The ICD-9 Clinical Modification was used for determining primary diagnosis of hypertension and related diseases, see Table 1. Due to small numbers, Hispanics were not included. Charges are adjusted to 2010 dollars to account for inflation.

Table 1: ICD-9 CM and ICD-10 Classification of Disease Codes

Disease Name	ICD-10 Classification of Disease Code	ICD -9 Clinical Modification Disease Code
Hypertension	I10 - I15	401 - 405
Ischemic Heart Disease	I20 – I25	410 – 414, 429.2
Stroke	I60 – I69	430 - 438
Congestive Heart Failure	I50	428
Chronic Kidney Disease	N18	585

SECTION I: HYPERTENSION PREVALENCE

A. Self-Reported Hypertension Prevalence
B. Measured Hypertension Prevalence

A. SELF-REPORTED HYPERTENSION PREVALENCE

Self-Reported Hypertension Prevalence

Source: Behavioral Risk Factor Surveillance System (BRFSS)
A telephone survey with self-reported findings only

- Since the mid-1990s, self-reported adult prevalence of hypertension in Arkansas and in the U.S. has been on the rise, with Arkansas's prevalence consistently remaining above the U.S. prevalence.
- Between 1995 and 2009, the Arkansas hypertension prevalence rose from 26.7% to 34.4%, a 28.8% increase. This is similar to the 29.3% increase observed in the U.S. for the same time period.
- In 2009, the hypertension prevalence for adult males was higher than that for adult females in both the U.S. and Arkansas.
- In Arkansas, Black, non-Hispanics (42.2%) had the highest prevalence of hypertension, followed by White, non-Hispanics (34.8%) and Hispanics (15.6%). Hypertension prevalence in the U.S. follows the same racial/ethnic pattern (B: 38.3%, W: 29.2%, H: 18.4%).

Self-Reported Hypertension Prevalence (cont'd)

Source: Behavioral Risk Factor Surveillance System (BRFSS)
A telephone survey with self-reported findings only

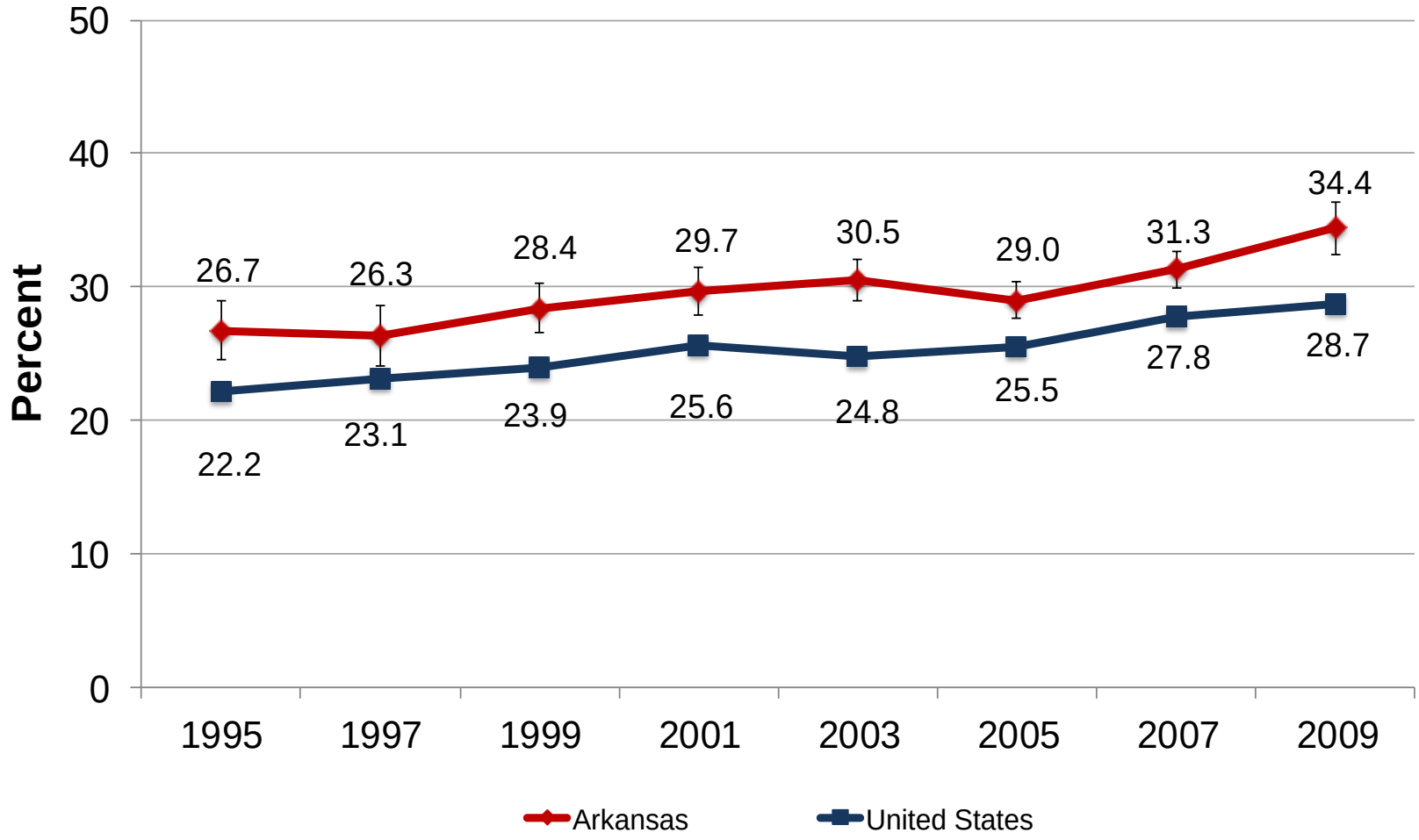
- Hypertension prevalence among males was high for Black males followed by White males. Hispanic males were significantly lower than Whites or Blacks.
- Among females, hypertension prevalence was significantly higher for Black females compared to White females and Hispanic females.
- Hypertension prevalence increases steadily as age increases, regardless of gender and race. Arkansas's age-specific prevalence is greater than the U.S. prevalence for every age-group except for ages 65 and older where they are equal.
- Arkansas Black males have a higher age-specific prevalence of hypertension compared to White males for ages 55 and older. Black females consistently have higher prevalence compared to White females for every age group.

Self-Reported Hypertension Prevalence (cont'd)

Source: Behavioral Risk Factor Surveillance System (BRFSS)
A telephone survey with self-reported findings only

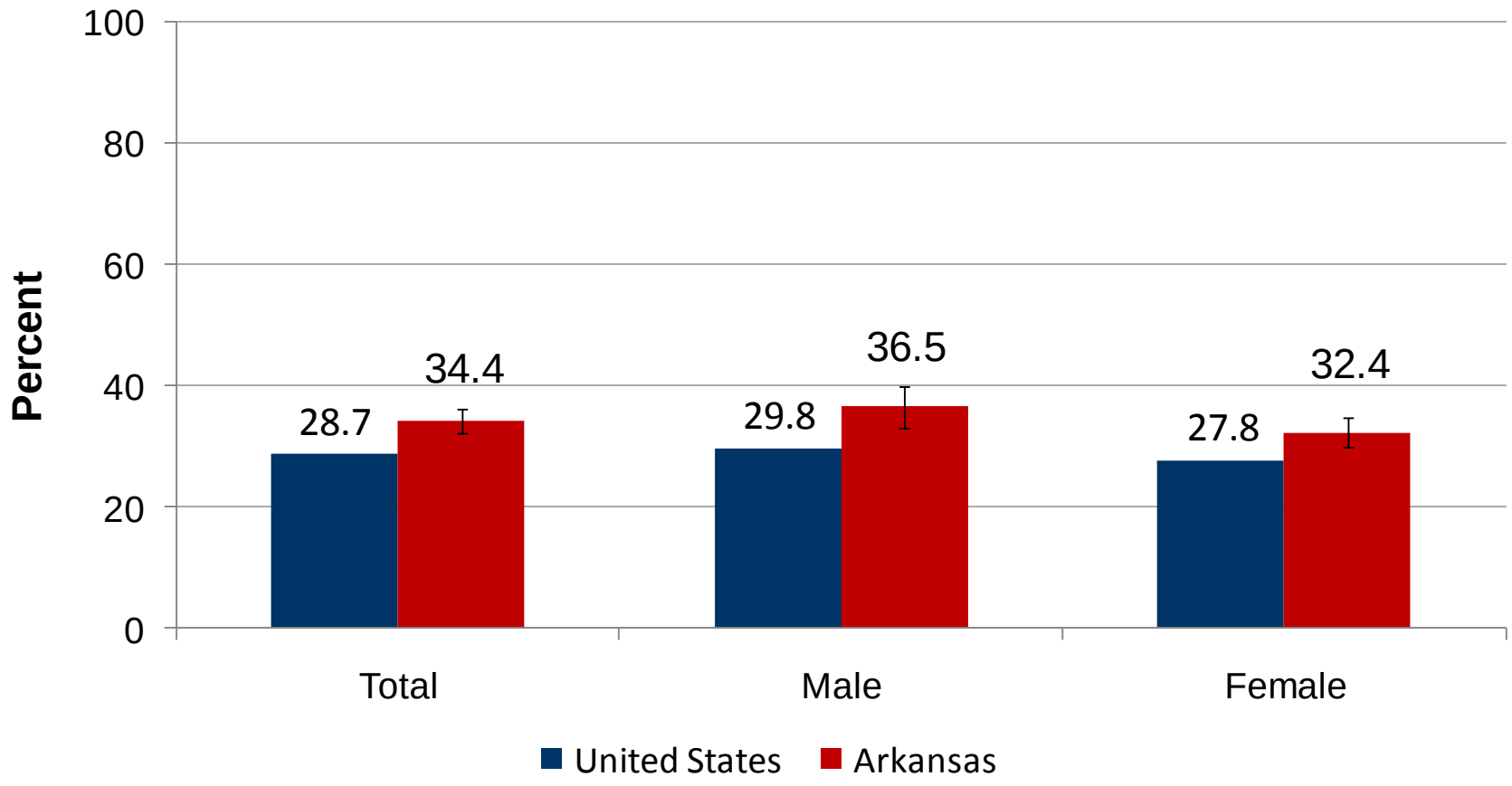
- Overall, hypertension prevalence decreases as income level and educational attainment increases.

Hypertension Prevalence among All Adults
BRFSS: Arkansas and United States, 1995-2009



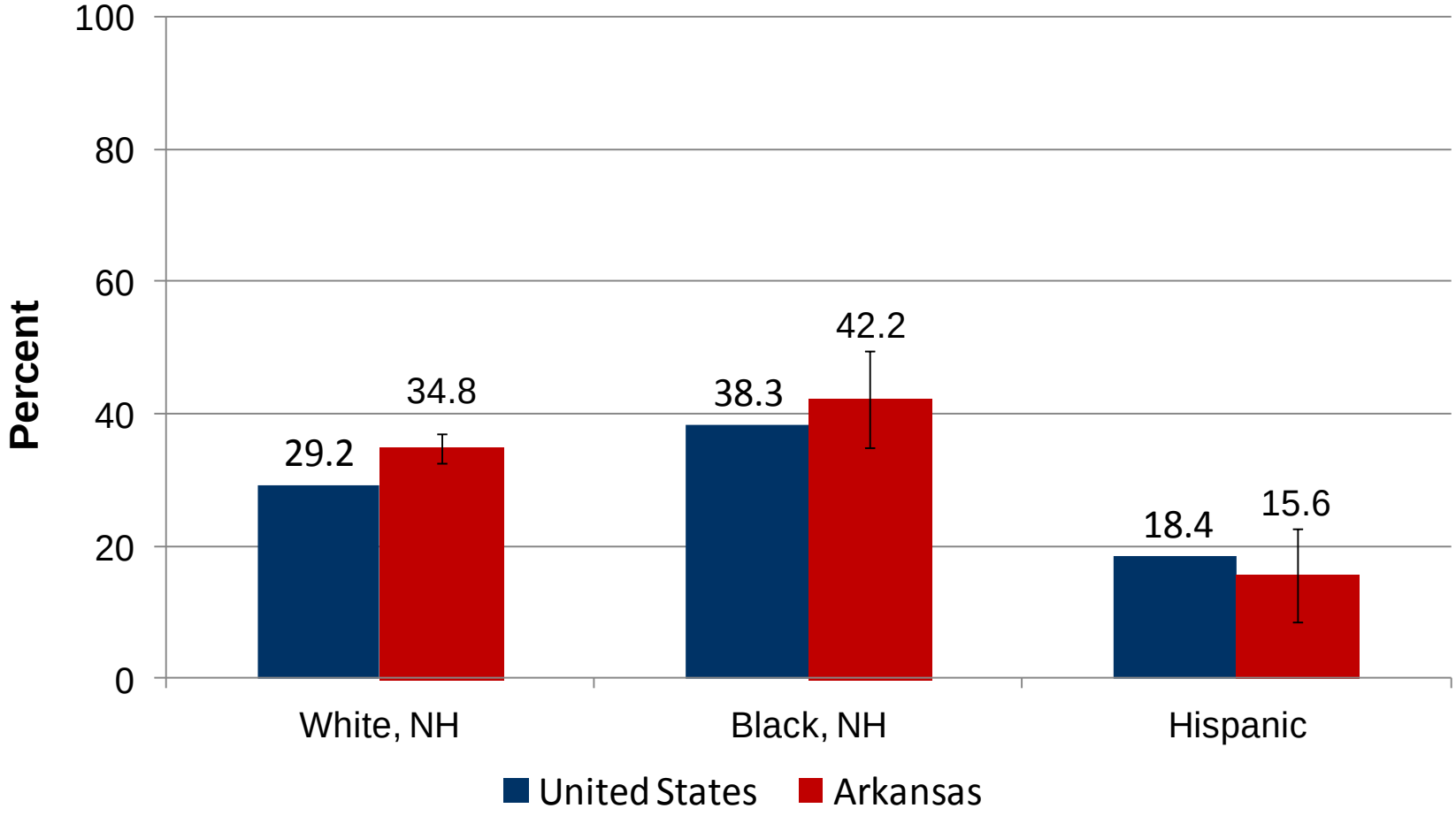
Source: Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention, 1995-2009.
Note: The U.S. data are a median percent of the states.
Question: Have you ever been told by a doctor, nurse, or other health professional that your blood pressure was high? (Includes persons ages 18 and older)

Hypertension Prevalence among Adults by Gender BRFSS: Arkansas and United States, 2009



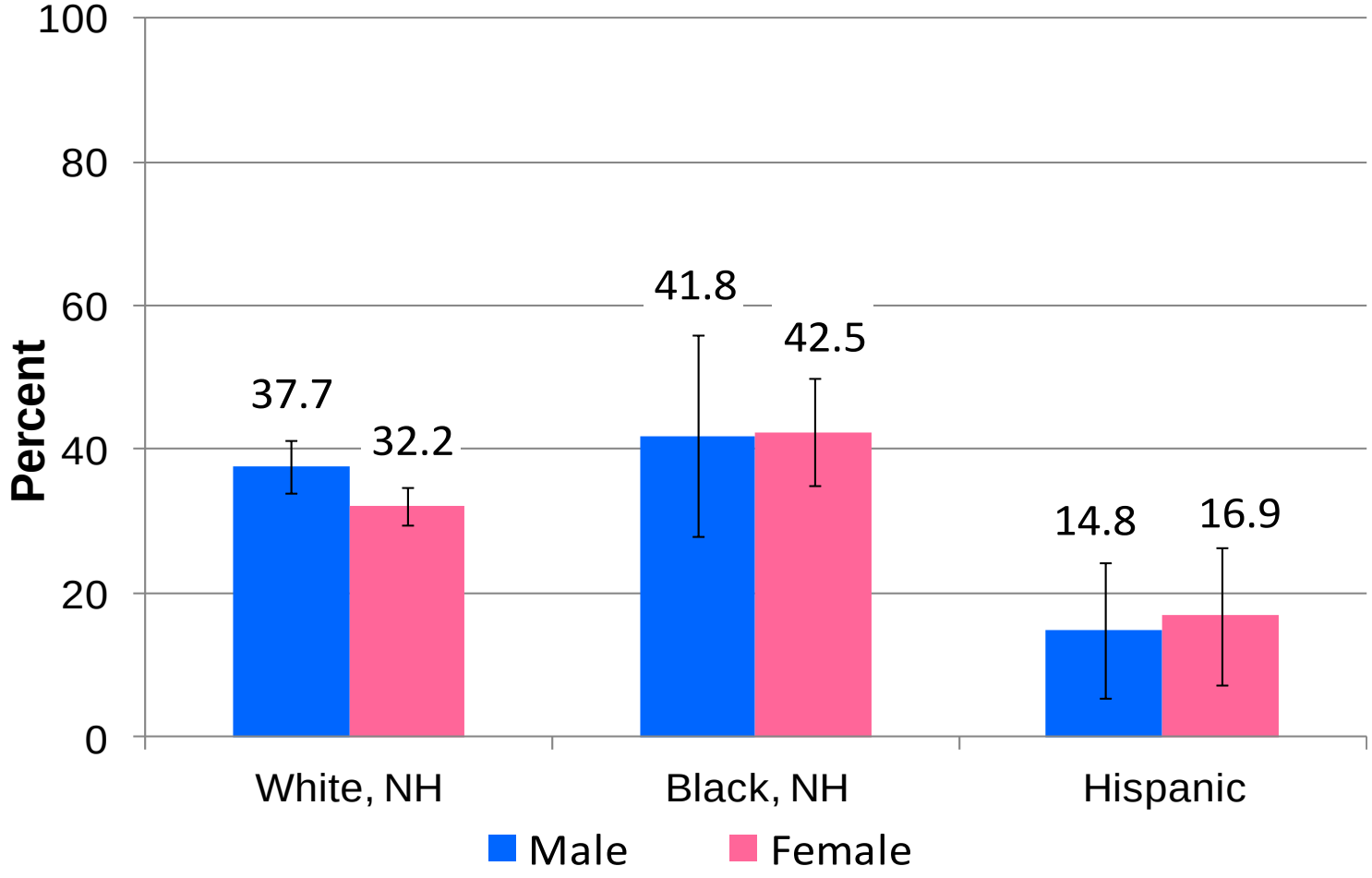
Source: Behavioral Risk Factor Surveillance System (BRFSS), Arkansas Health Statistics Branch, 2009, and BRFSS, CDC, 2009.
The U.S. data are a median percent of the states.
Question: Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure? (Includes persons ages 18 and older)

Hypertension Prevalence among Adults By Race/Ethnicity BRFSS: Arkansas and United States, 2009



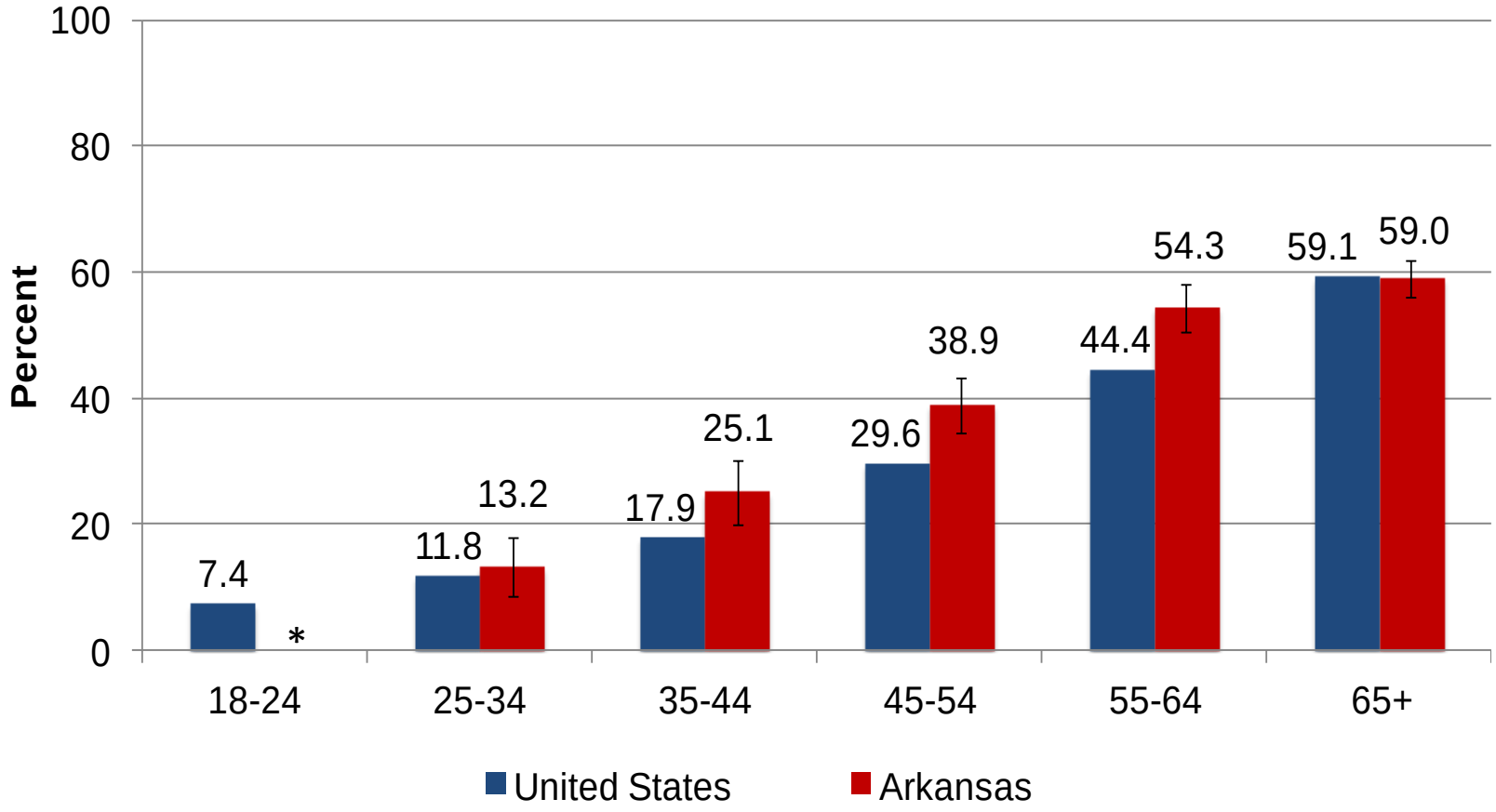
Source: Behavioral Risk Factor Surveillance System (BRFSS), Arkansas Health Statistics Branch, 2009, and BRFSS, CDC, 2009.
Notes: The U.S. data are a median percent of the states.
Question: Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure? (Includes persons ages 18 and older)

Hypertension Prevalence among Adults By Race/Ethnicity and Gender BRFSS: Arkansas, 2009



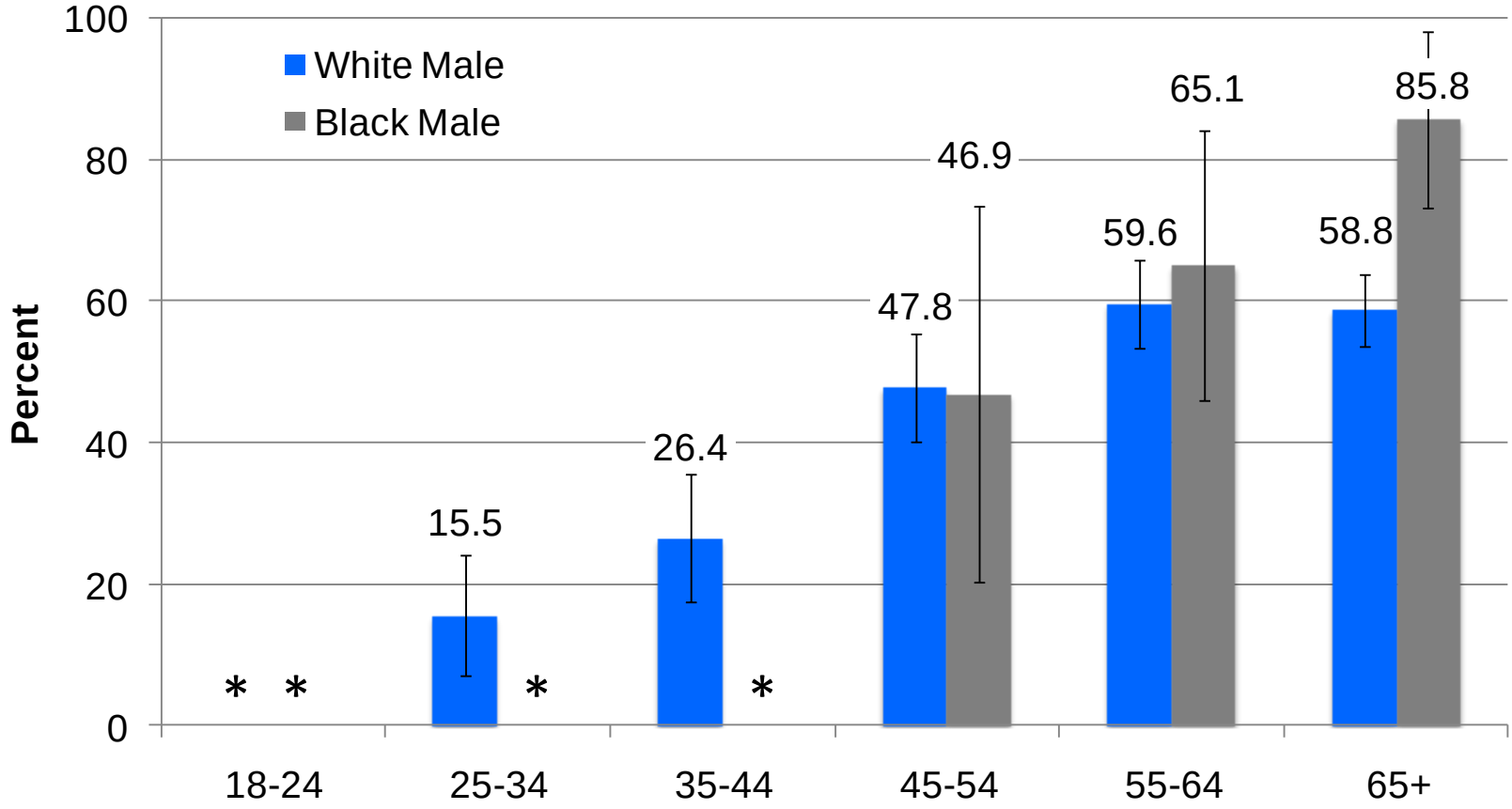
Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2009.
Question: Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure? (Includes persons ages 18 and older)

Hypertension Prevalence among All Adults By Age Group BRFSS: Arkansas and United States, 2009



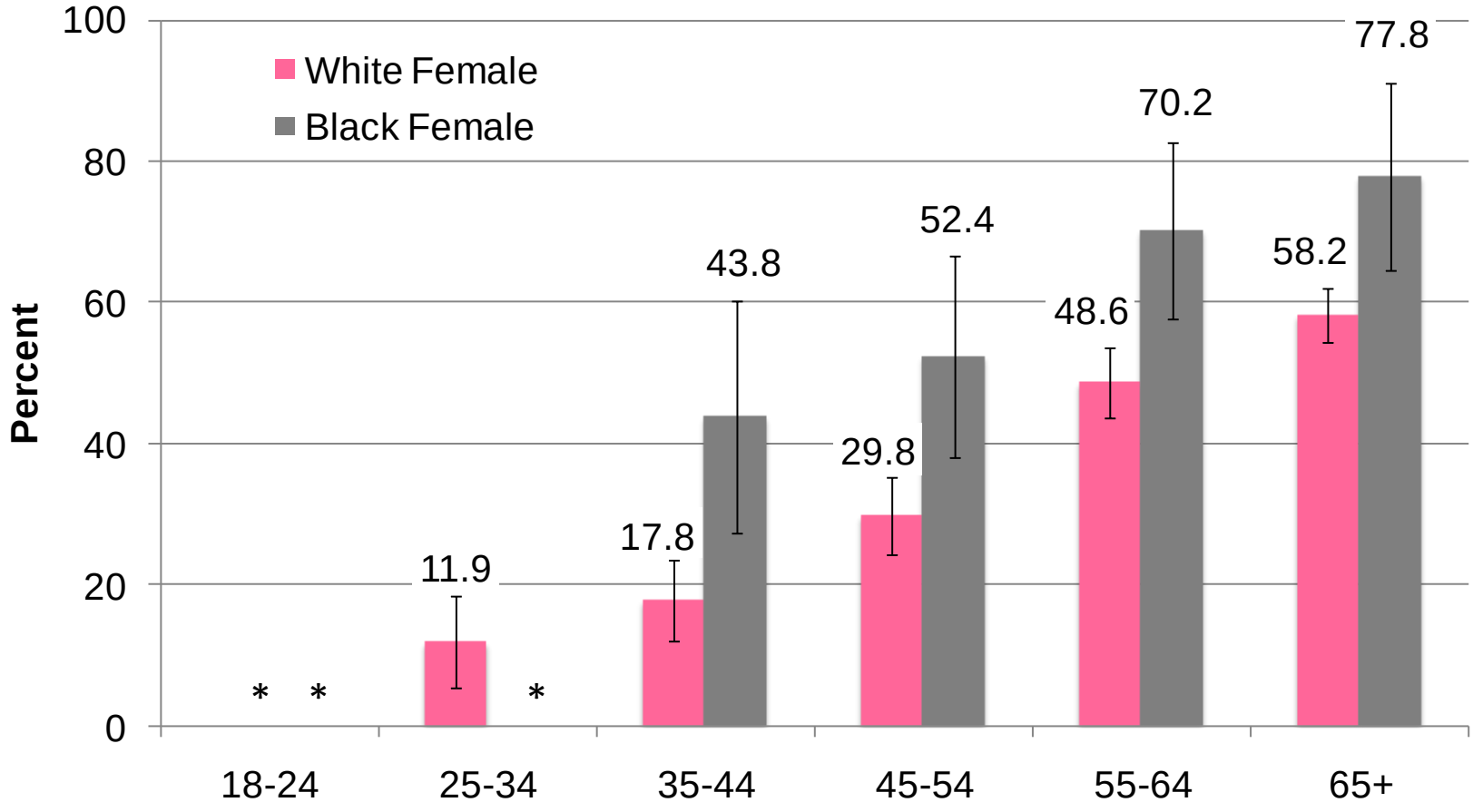
Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2009, and BRFSS, CDC, 2009.
Note: Asterisk (*) denotes categories where data are omitted due to sample size less than 10. The U.S. data are a median percent of the states.
Question: Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure? (Includes persons ages 18 and older)

Hypertension Prevalence among Male Adults By Age Group BRFSS: Arkansas, 2009



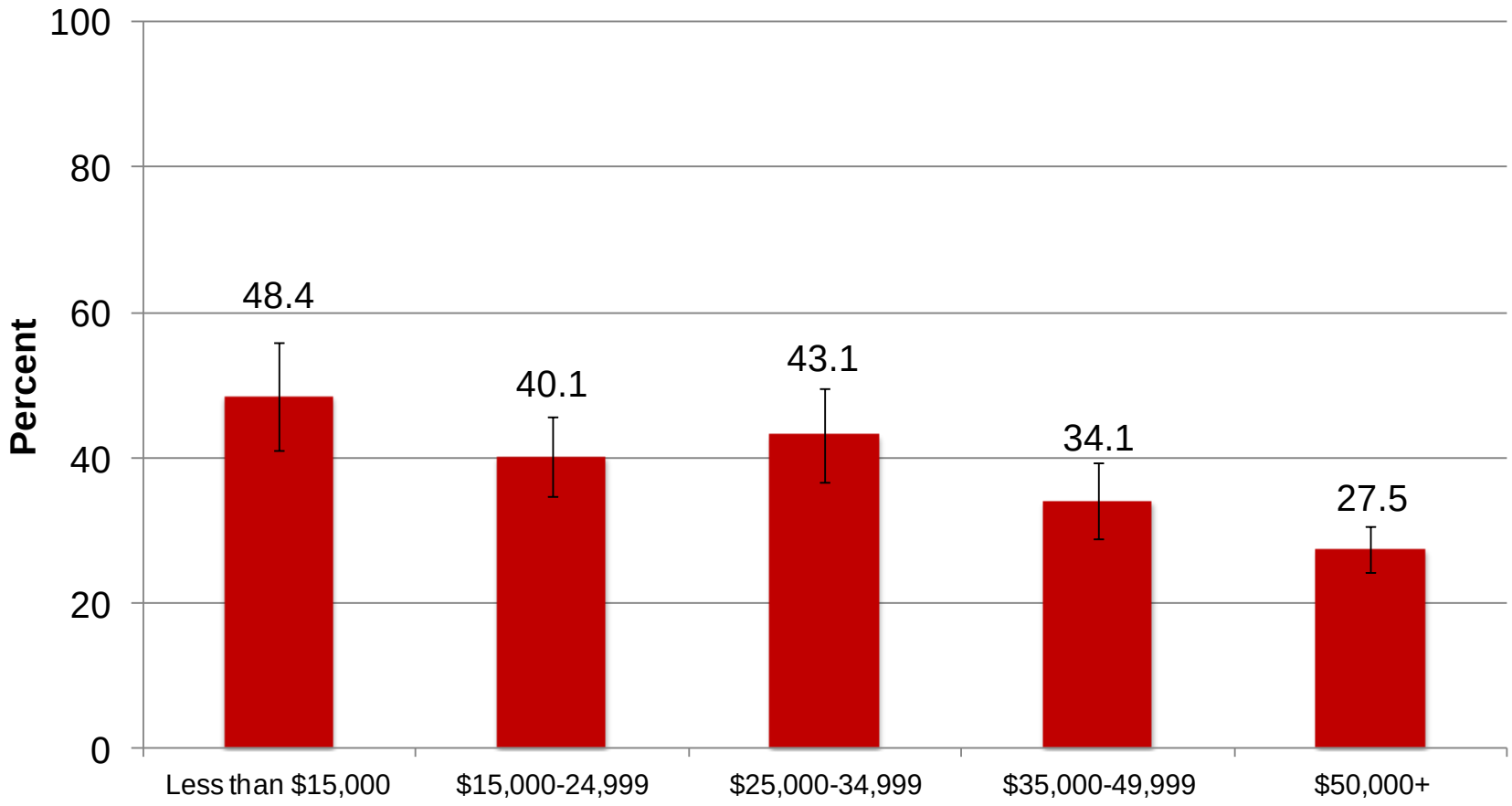
Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2009.
Note: Asterisk (*) denotes categories where data are omitted due to sample size less than 10. Hispanics are included in Whites and Blacks.
Question: Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure? (Includes persons ages 18 and older)

Hypertension Prevalence among Female Adults By Age Group BRFSS: Arkansas, 2009



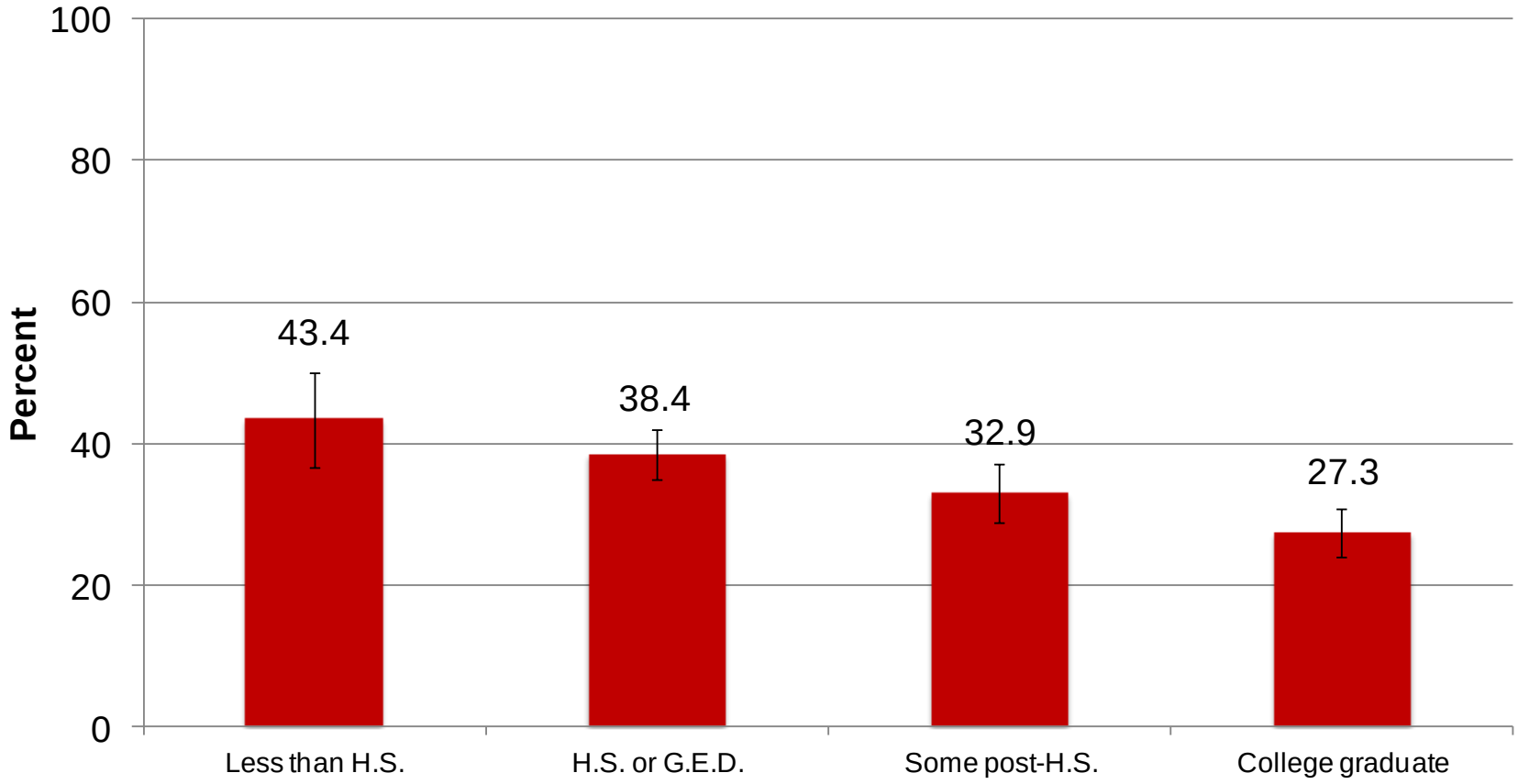
Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2009.
Note: Asterisk (*) denotes categories where data are omitted due to sample size less than 10. Hispanics are included in Whites and Blacks.
Question: Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure? (Includes persons ages 18 and older)

Hypertension Prevalence among All Adults By Income BRFSS: Arkansas, 2009



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2009.
Question: Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure? (Includes persons ages 18 and older)

Hypertension Prevalence among All Adults By Educational Attainment BRFSS: Arkansas, 2009



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2009.
Question: Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure? (Includes persons ages 18 and older)

B. MEASURED HYPERTENSION PREVALENCE

Measured Hypertension Prevalence & Awareness

Source: Arkansas Cardiovascular Health Examination Survey (ARCHES)
A survey with actual clinical measurements

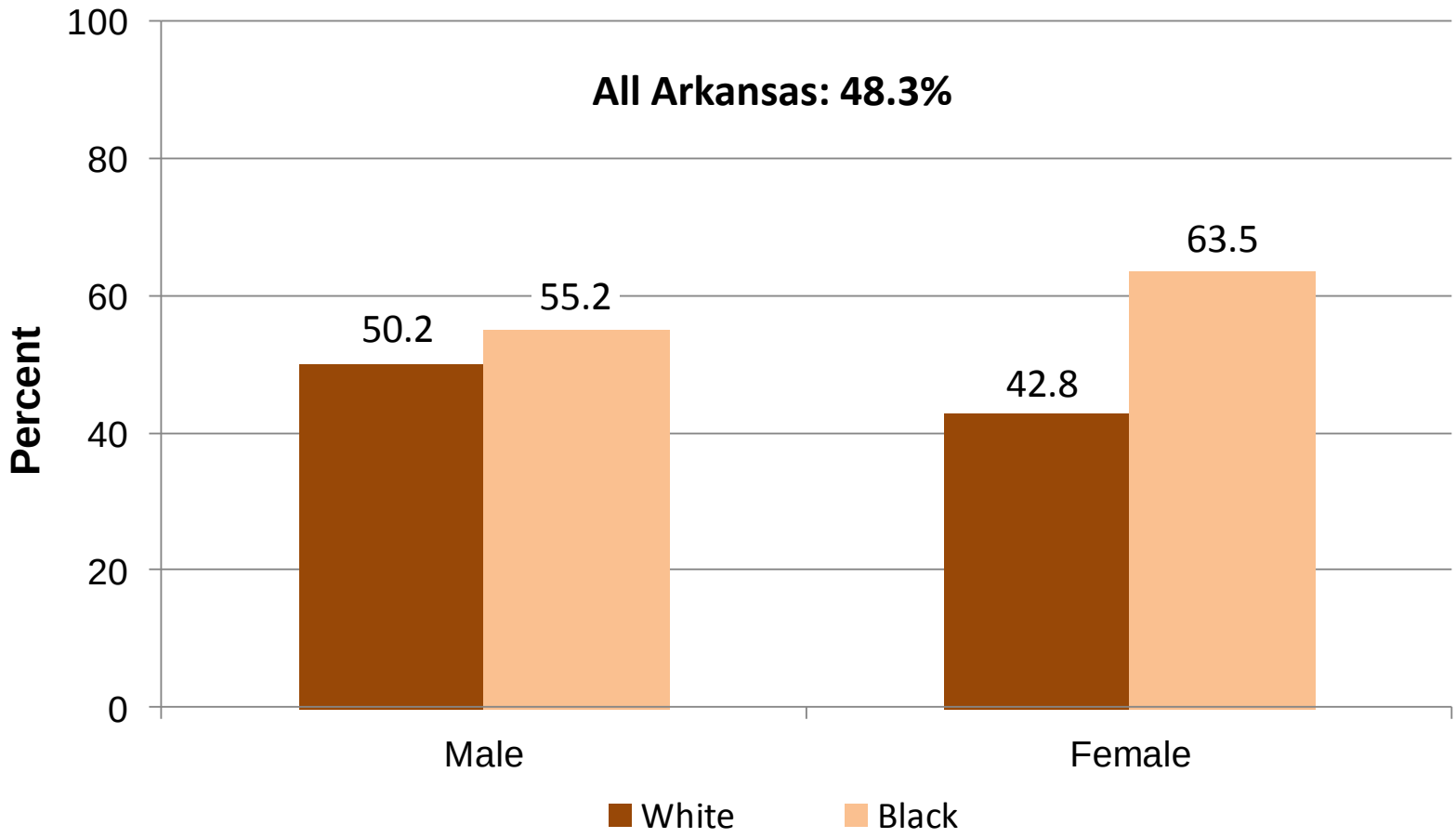
- Approximately one-half (48.3%) of Arkansas adults had high blood pressure.
- Black males (55.2%) and Black females (63.5%) had higher prevalence of hypertension compared to their White counterparts (White males 50.2%, Whites females 42.8%).
- A quarter (25.0%) of hypertensive adults had not been diagnosed by a physician or other health professional. Black adults (16.6%) were less likely to be aware of their hypertensive status compared to White adults (26.8%).
- The percent of undiagnosed hypertension was greatest among younger adults ages 18-59, particularly among males.

Measured Hypertension Prevalence & Awareness

Source: Arkansas Cardiovascular Health Examination Survey (ARCHES)
A survey with actual clinical measurements.

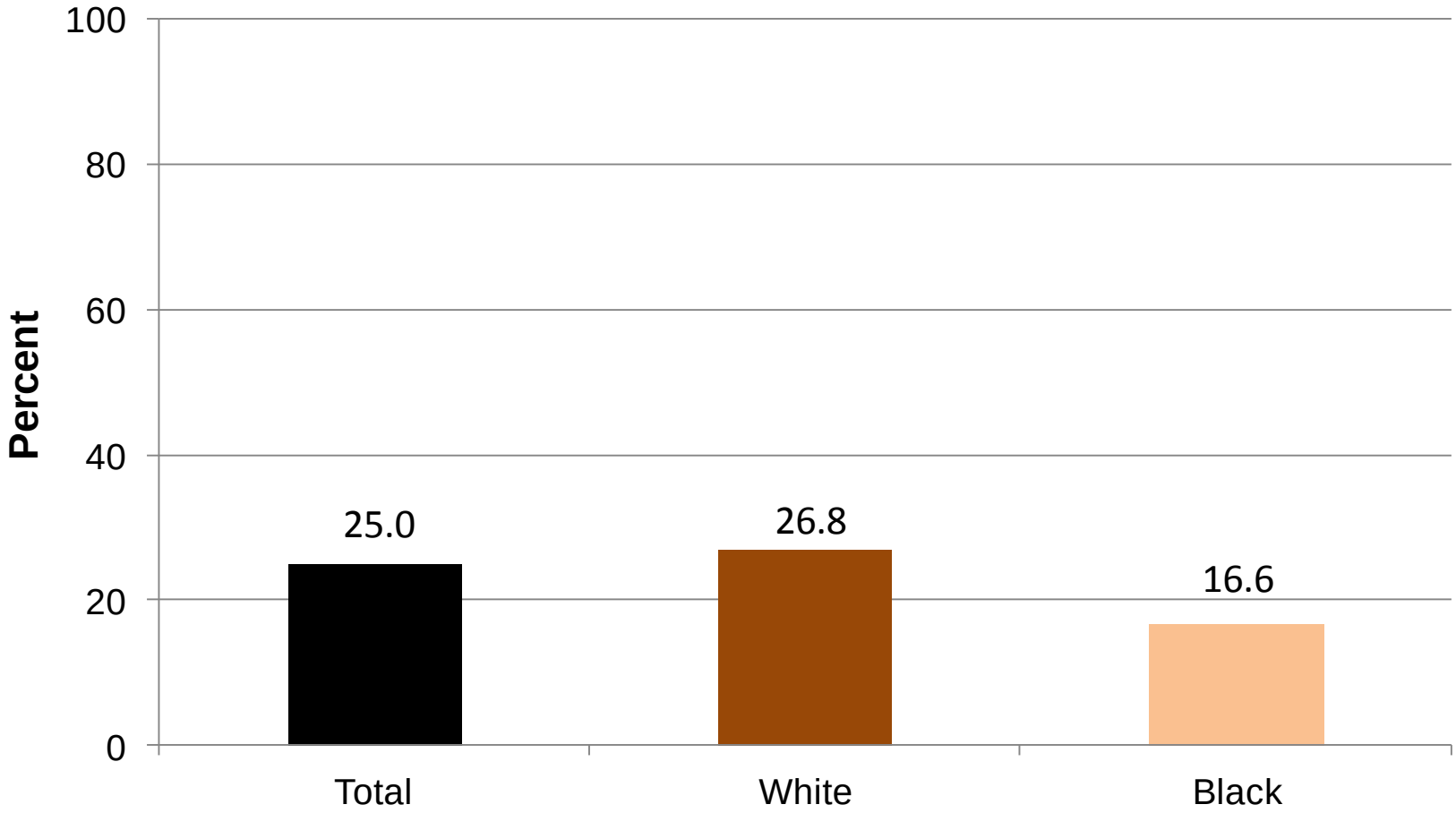
- In comparison to the 2007 BRFSS self-reported hypertension prevalence estimates for all Arkansans and race and gender groups, the ARCHES estimates were consistently 43-64% greater.
- For all age groups examined, ARCHES hypertension estimates were 26-82% higher than the BRFSS self-reported hypertension estimates.

Measured Hypertension Prevalence among Adults By Race and Gender ARCHES: Arkansas, 2007



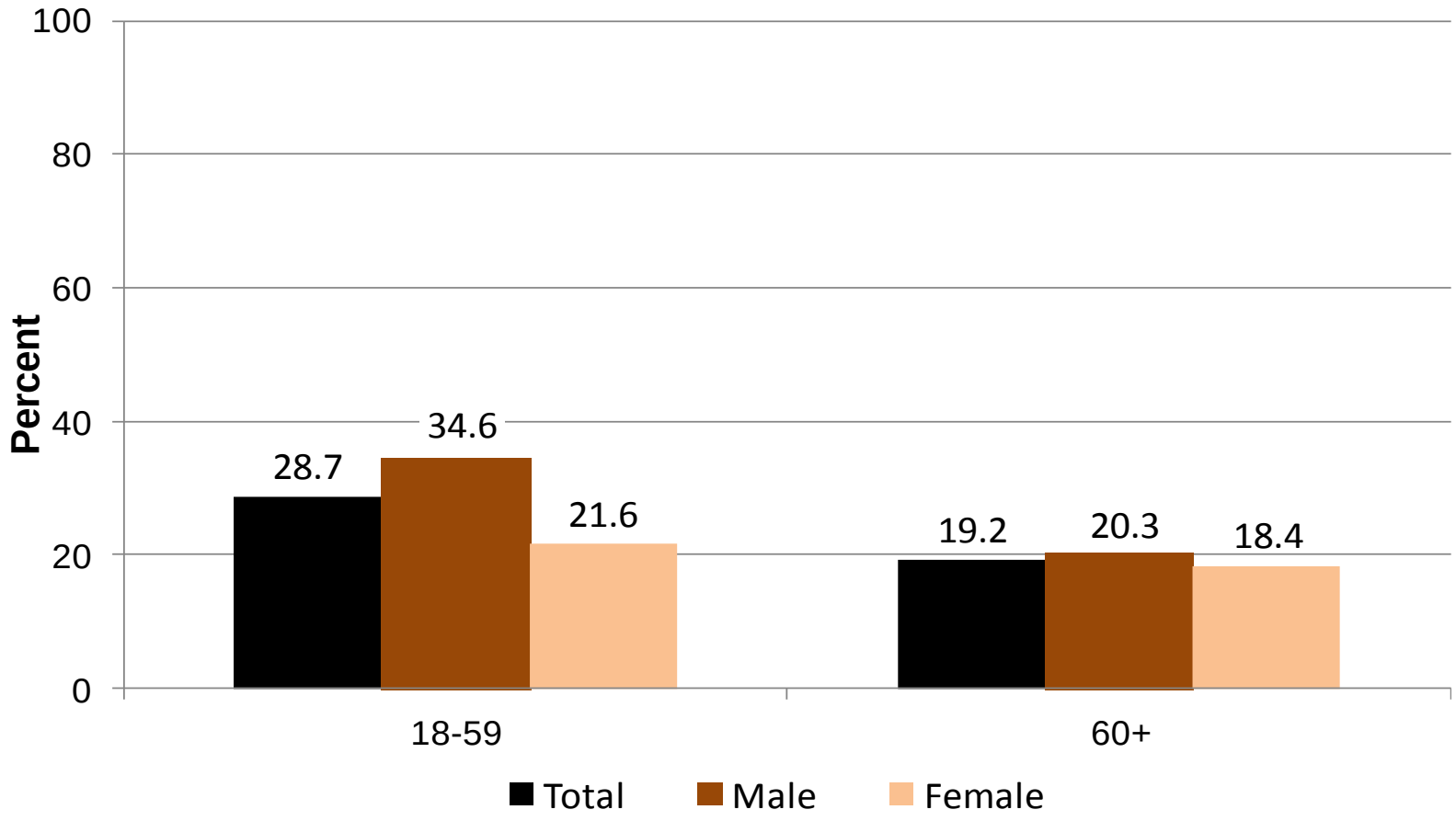
Source: Arkansas Cardiovascular Health Examination Survey (ARCHES), 2007.
Note: Hypertension is defined as having a systolic blood pressure ≥ 140 mm Hg OR diastolic blood pressure ≥ 90 mm Hg OR currently taking medication to lower high blood pressure. Includes adults ages 18 and older.

Undiagnosed Hypertensive Adults
By Race
ARCHES: Arkansas, 2007



Source: Arkansas Cardiovascular Health Examination Survey (ARCHES), 2007.
Note: Hypertension is defined as having a systolic blood pressure ≥ 140 mm Hg OR diastolic blood pressure ≥ 90 mm Hg OR currently taking medication to lower high blood pressure. Awareness of hypertension is defined as an affirmative response to the question "Have you ever been told by a doctor or health professional that you had hypertension, also called high blood pressure?". Includes adults ages 18 and older.

Undiagnosed Hypertensive Adults By Gender and Age Group ARCHES: Arkansas, 2007



Source: Arkansas Cardiovascular Health Examination Survey (ARCHES), 2007.
Note: Hypertension is defined as having a systolic blood pressure ≥ 140 mm Hg OR diastolic blood pressure ≥ 90 mm Hg OR currently taking medication to lower high blood pressure. Awareness of hypertension is defined as an affirmative response to the question "Have you ever been told by a doctor or health professional that you had hypertension, also called high blood pressure?". Includes adults ages 18 and older.

Comparison of Blood Pressure Measures Arkansas and United States, 2007

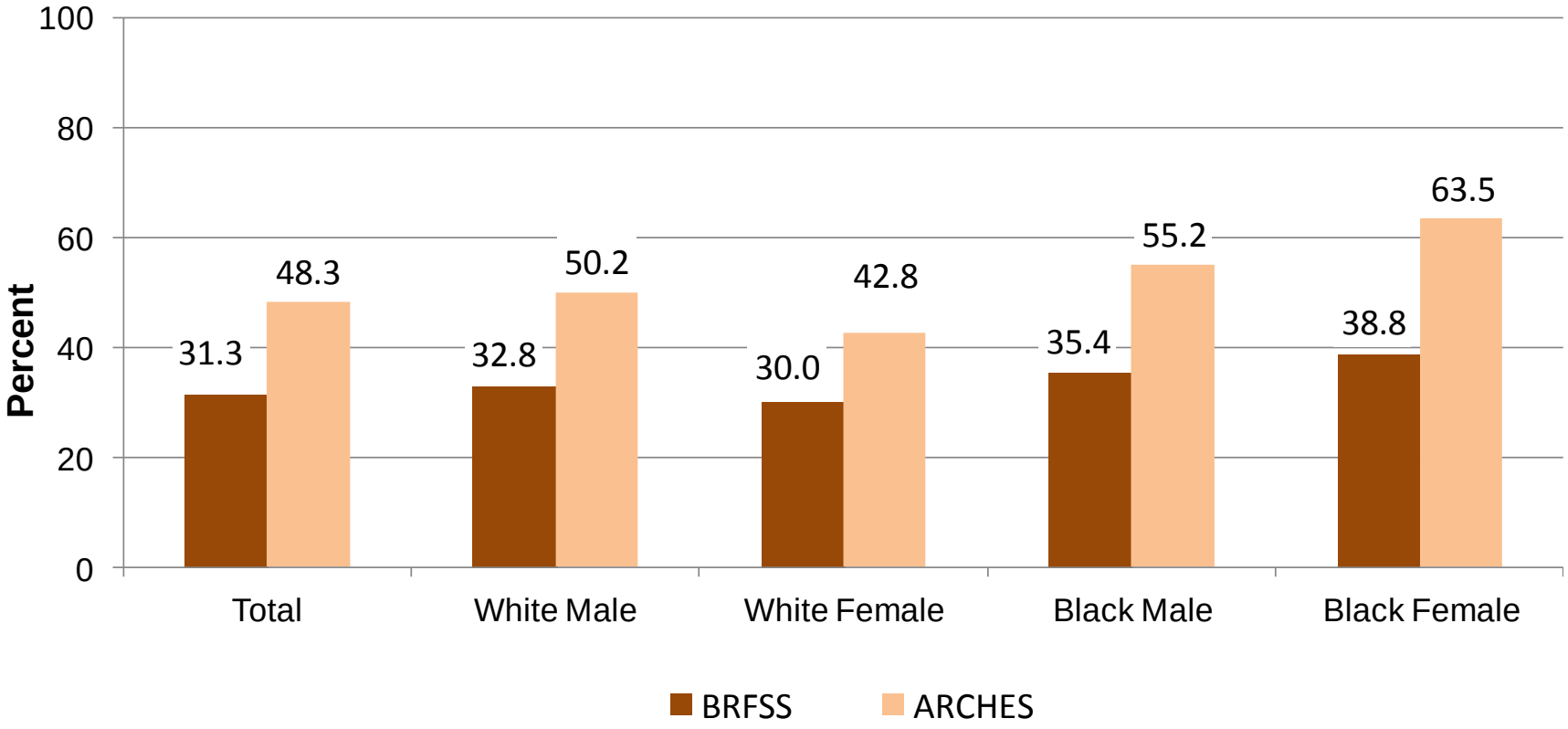
ARCHES and NHANES data

Blood Pressure Measure	ARCHES Weighted & Unadjusted Mean % (95% C.I.)	ARCHES Weighted & Age-adjusted Mean % (95% C.I.)	NHANES Weighted & Age-adjusted Mean % (95% C.I.)
Prevalence[1]	48.3 (44.3-52.2)	42.8 (38.4-47.2)	29.0 (27.6-30.5)
Awareness	75.0 (70.2-79.8)	72.6 (66.5-78.8)	80.7 (78.1-83.0)
Treatment[1]	66.8 (61.5-72.0)	62.1 (55.4-68.8)	72.5 (70.1-74.8)
Treated and controlled	59.4 (53.8-65.0)	60.4 (53.4-67.5)	69.1 (65.7-72.3)
Aware and controlled[1]	39.6 (34.4-44.7)	37.5 (31.4-43.5)	50.1 (46.8-53.5)

[1] Statistically significant difference between age-adjusted ARCHES and NHANES data.

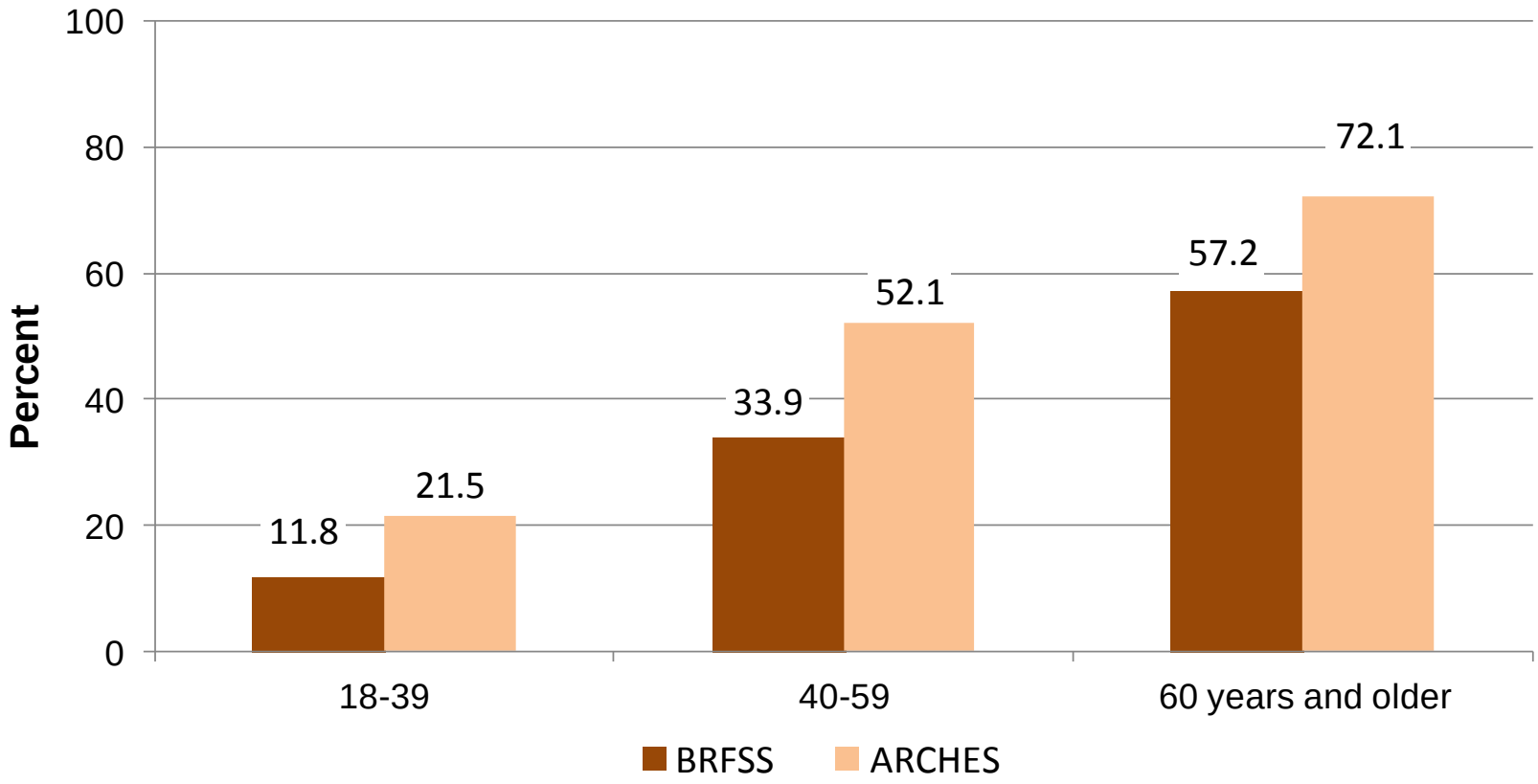
Sources: Arkansas Cardiovascular Health Examination Survey (ARCHES) data – unpublished data, Namvar et al., under review. National Health and Nutrition Examination Survey (NHANES) data – Egan, B.M., Zhao, Y.Z., Axon, R.N. (2010). US trends in prevalence, awareness, treatment, and control of hypertension, *JAMA, 303* (20): 2043-2050.

Hypertension Prevalence among Adults By Race and Gender BRFSS v. ARCHES, Arkansas, 2007



Sources: (1) Behavioral Risk Factor Surveillance System (BRFSS), Arkansas Health Statistics Branch, 2007, (2) Arkansas Cardiovascular Health Examination Survey (ARCHES), 2007.
Notes: Hypertension is defined in the ARCHES study as having a systolic blood pressure ≥ 140 mm Hg OR diastolic blood pressure ≥ 90 mm Hg OR currently taking medication to lower high blood pressure. Includes adults ages 18 and older.
BRFSS Question: Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?"

Hypertension Prevalence among All Adults By Age Group BRFSS v. ARCHES, Arkansas, 2007



Sources: (1) Behavioral Risk Factor Surveillance System (BRFSS), Arkansas Health Statistics Branch, 2007, (2) Arkansas Cardiovascular Health Examination Survey (ARCHES), 2007.
Notes: Hypertension is defined in the ARCHES study as having a systolic blood pressure ≥ 140 mm Hg OR diastolic blood pressure ≥ 90 mm Hg OR currently taking medication to lower high blood pressure. Includes adults ages 18 and older.
BRFSS Question: Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?"

SECTION II: HYPERTENSION TREATMENT & CONTROL

A. Self-Reported Actions and Medical Advice to Control Hypertension
B. Measured Hypertension Treatment & Control

A. SELF-REPORTED ACTIONS AND MEDICAL ADVICE TO CONTROL HYPERTENSION

Self-Reported Actions & Medical Advice to Control Hypertension

Source: Behavioral Risk Factor Surveillance System (BRFSS)

- In 2009, 64.0% to 82.8% of self-reporting hypertensive Arkansas adults reported currently taking action to control their high blood pressure.
- However, only 56.6%-69.3% of self-reporting hypertensives reported having been advised by a physician or health professional to change eating habits or to reduce sodium or alcohol intake. This may indicate that persons with high blood pressure may be receiving or adhering to health messages from another source besides health professionals.
- The percent of self-reporting hypertensives exercising or taking medication was lower than the percent of hypertensives who were advised by a health professional to take either of these actions to control their high blood pressure.

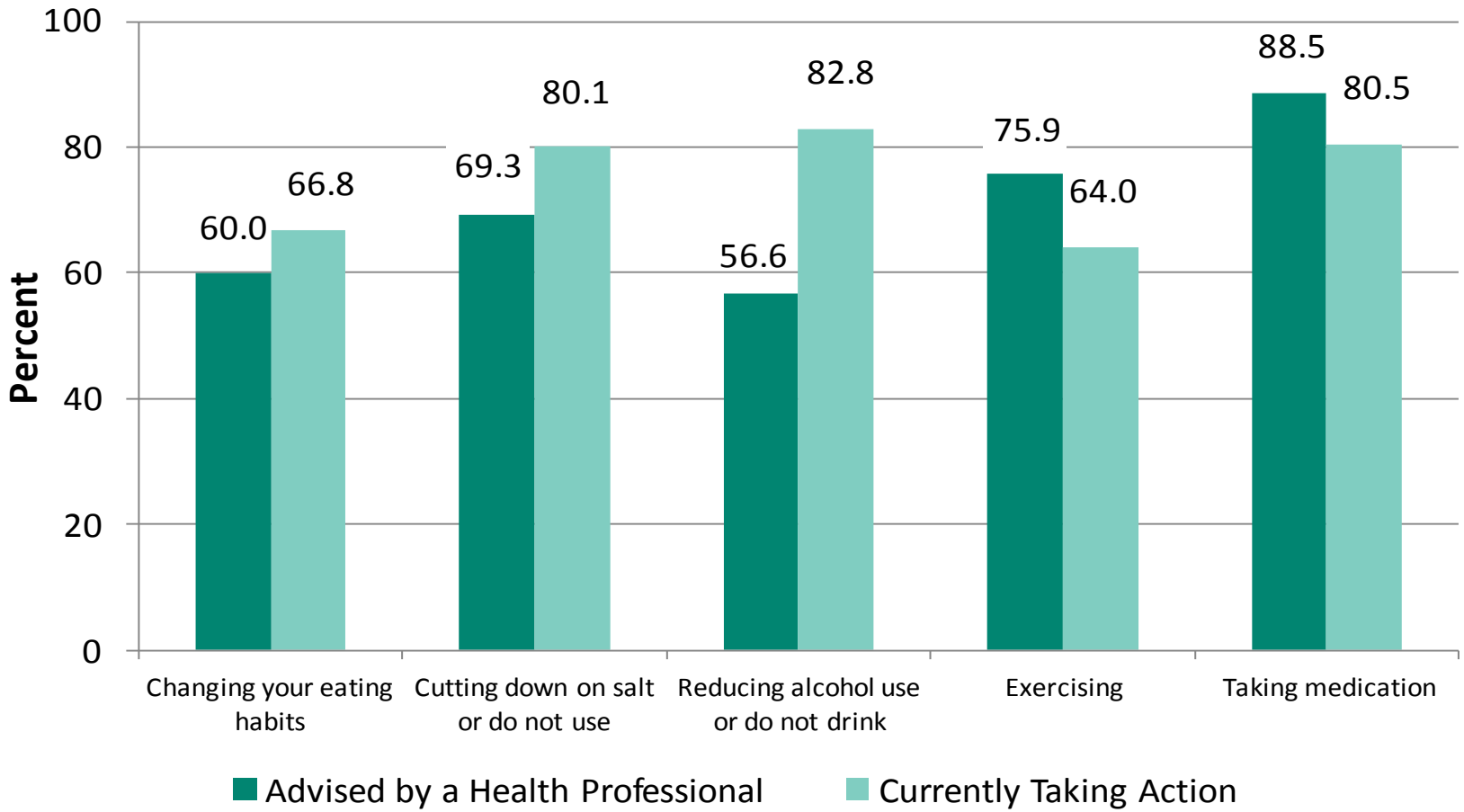
Self-Reported Actions & Medical Advice to Control Hypertension

Source: Behavioral Risk Factor Surveillance System (BRFSS)

- The pattern for taking action among all Arkansans self-reporting hypertension was fairly consistent for each race and gender group, where Black females had the highest percent, followed by Black males, White females, and White males. The exception was for Black males for exercise and taking medication.

Actions to Control Hypertension

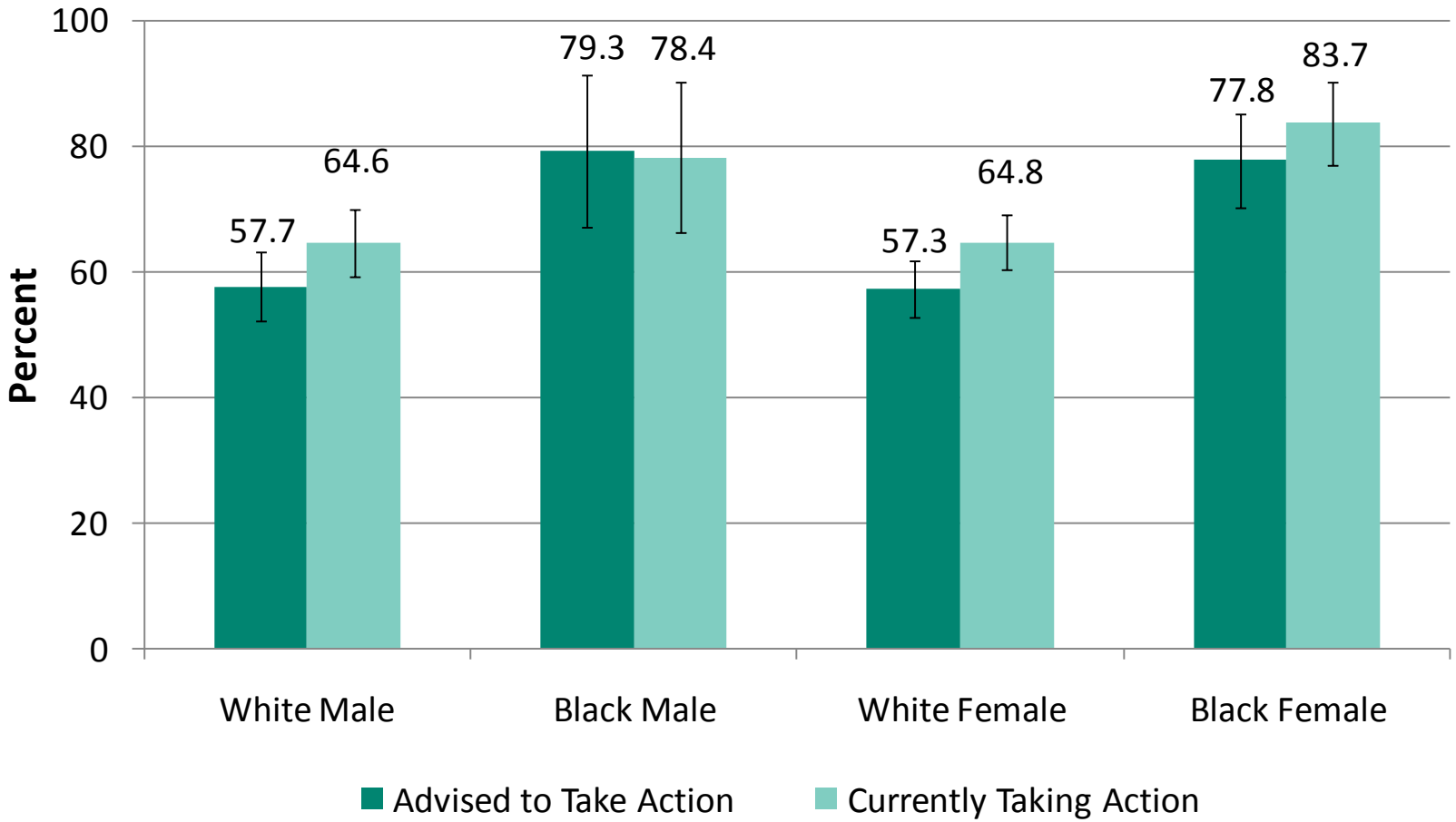
Advised by a Health Professional v. Current Actions to Control Hypertension Among Hypertensive Adults, Arkansas, 2009



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2009.
Question: Has a doctor or other health professional ever advised you to do any of the following to help lower or control your high blood pressure? Are you now doing any of the following to help lower or control your high blood pressure? (among those who answered 'yes' to the question "Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?". Includes persons ages 18 and older.)

Changing Your Eating Habits

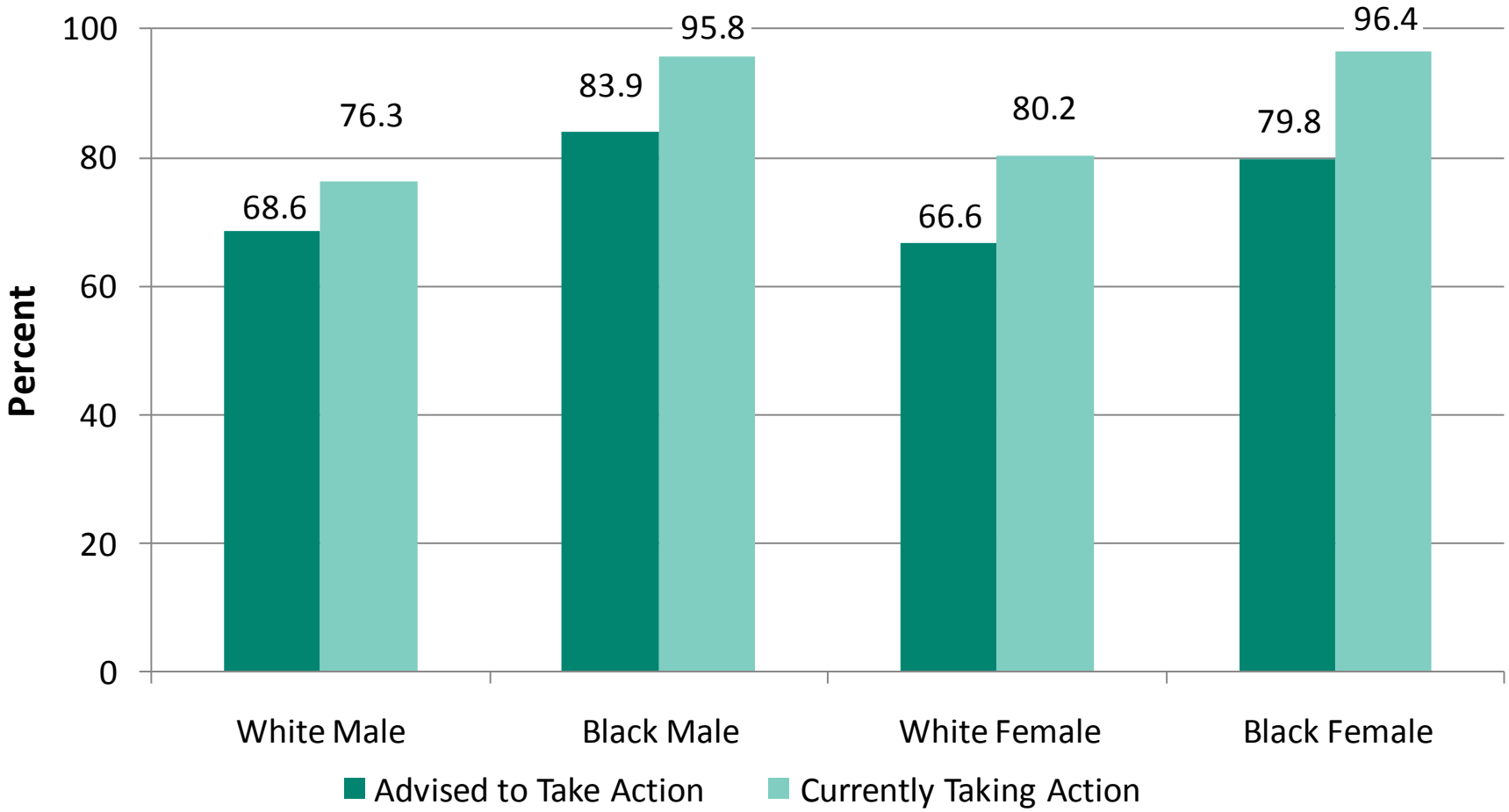
Advised by a Health Professional v. Current Actions to Control Hypertension Among Hypertensive Adults, by Race and Gender, Arkansas, 2009



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2009.
Question: Has a doctor or other health professional ever advised you to change your eating habits to help lower or control your high blood pressure? Are you changing your eating habits to help lower or control your high blood pressure? (among those who answered 'yes' to the question "Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?". Includes persons ages 18 and older.)
Note: Hispanics are included in Whites and Blacks.

Cutting Down or Not Using Salt

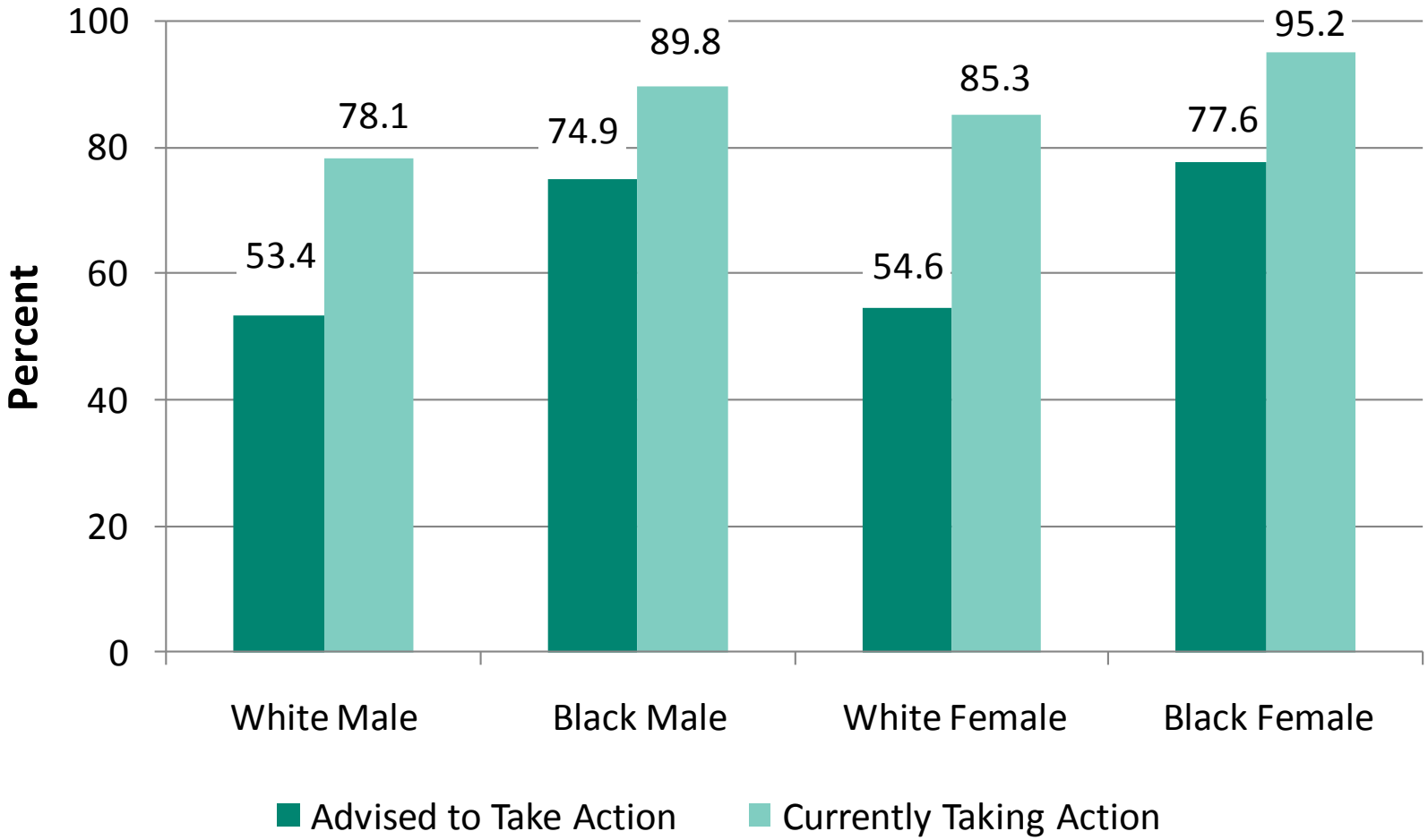
Advised by a Health Professional v. Current Actions to Control Hypertension Among Hypertensive Adults, by Race and Gender, Arkansas, 2009



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2009.
Question: Has a doctor or other health professional ever advised you to cut down on salt to help lower or control high blood pressure? Are you cutting down on salt to help lower or control your high blood pressure? (among those who answered 'yes' to the question "Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?". Includes persons ages 18 and older.)
Note: Hispanics are included in Whites and Blacks.

Reducing Alcohol Use or Not Drinking Alcohol

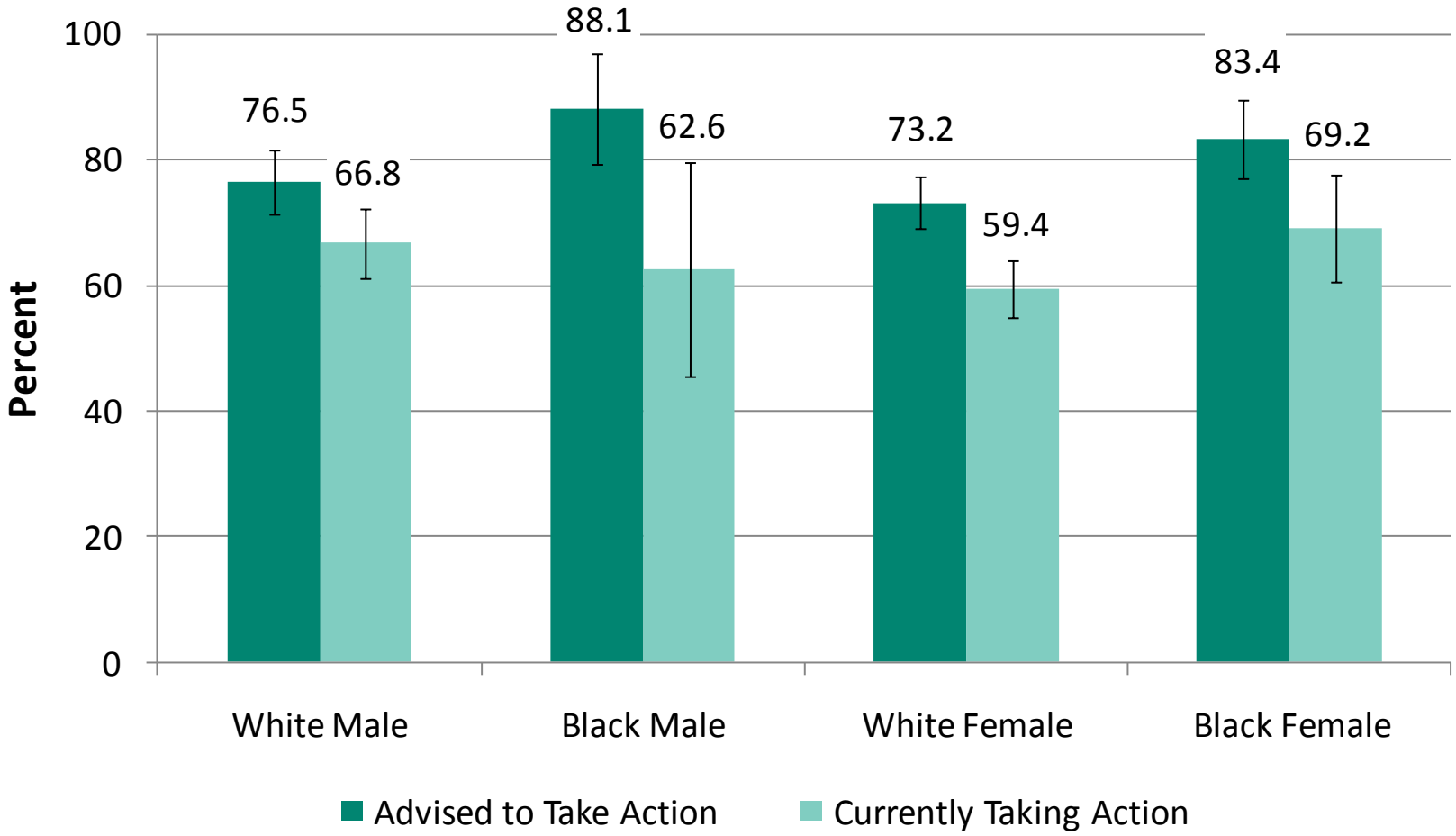
Advised by a Health Professional v. Current Actions to Control Hypertension Among Hypertensive Adults, by Race and Gender, Arkansas, 2009



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2009.
Question: Has a doctor or other health professional ever advised you to reduce alcohol use to help lower or control high blood pressure? Are you reducing alcohol use to help lower or control your high blood pressure? (among those who answered 'yes' to the question "Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?". Includes persons ages 18 and older.)
Note: Hispanics are included in Whites and Blacks.

Exercising

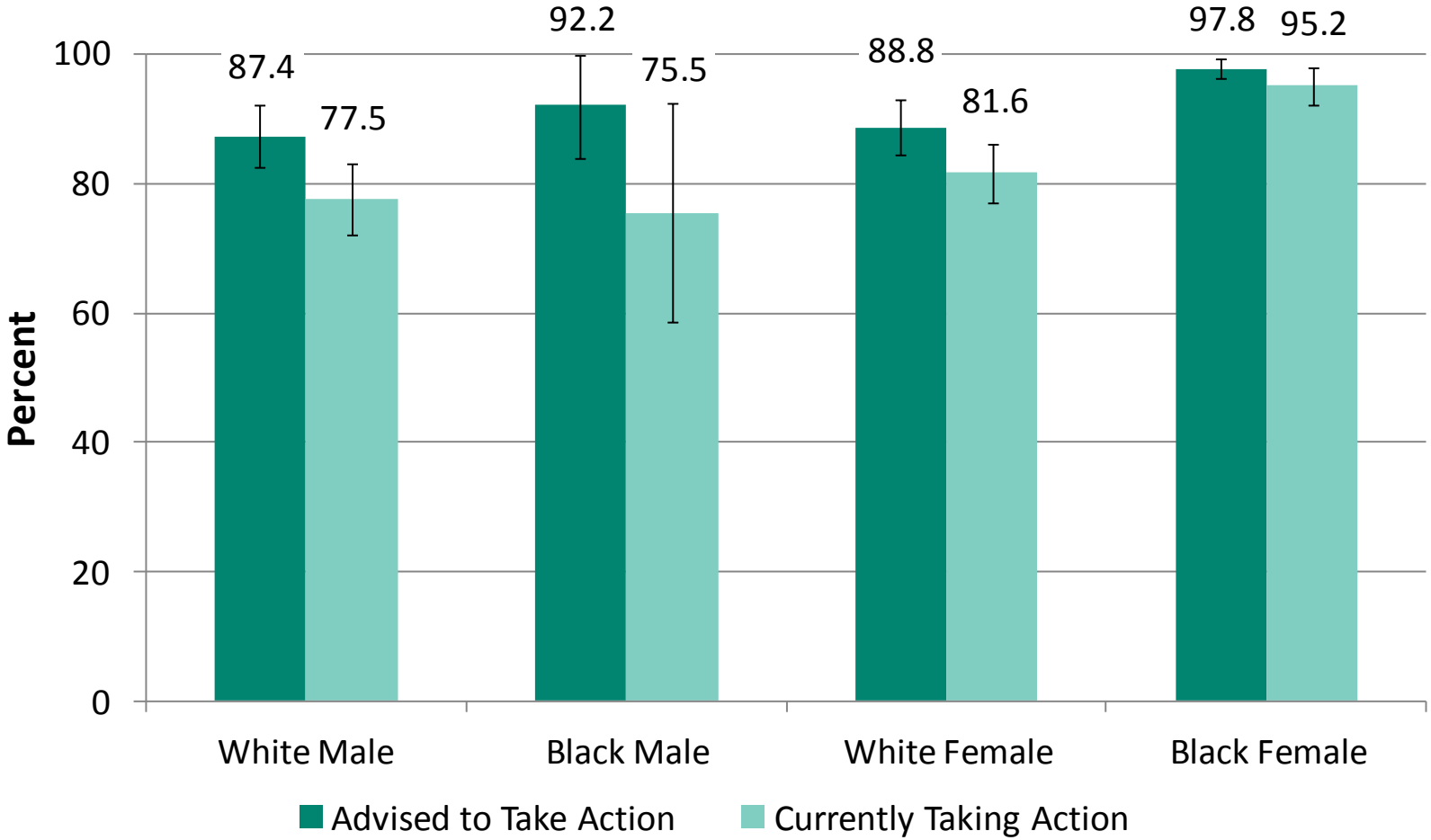
Advised by a Health Professional v. Current Actions to Control Hypertension Among Hypertensive Adults, by Race and Gender, Arkansas, 2009



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2009.
Question: Has a doctor or other health professional ever advised you to exercise to help lower or control high blood pressure? Are you exercising to help lower or control your high blood pressure? (among those who answered 'yes' to the question "Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?". Includes persons ages 18 and older.)
Note: Hispanics are included in Whites and Blacks.

Taking Medication

Advised by a Health Professional v. Current Actions to Control Hypertension Among Hypertensive Adults, by Race and Gender, Arkansas, 2009



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2009.
Question: Has a doctor or other health professional ever advised you to take medication to help lower or control high blood pressure? Are you currently taking medicine for your high blood pressure? (among those who answered 'yes' to the question "Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?". Includes persons ages 18 and older.)
Note: Hispanics are included in Whites and Blacks.

B. MEASURED HYPERTENSION TREATMENT & CONTROL

Measured Hypertension Treatment & Control

Source: Arkansas Cardiovascular Health Examination Survey (ARCHES)

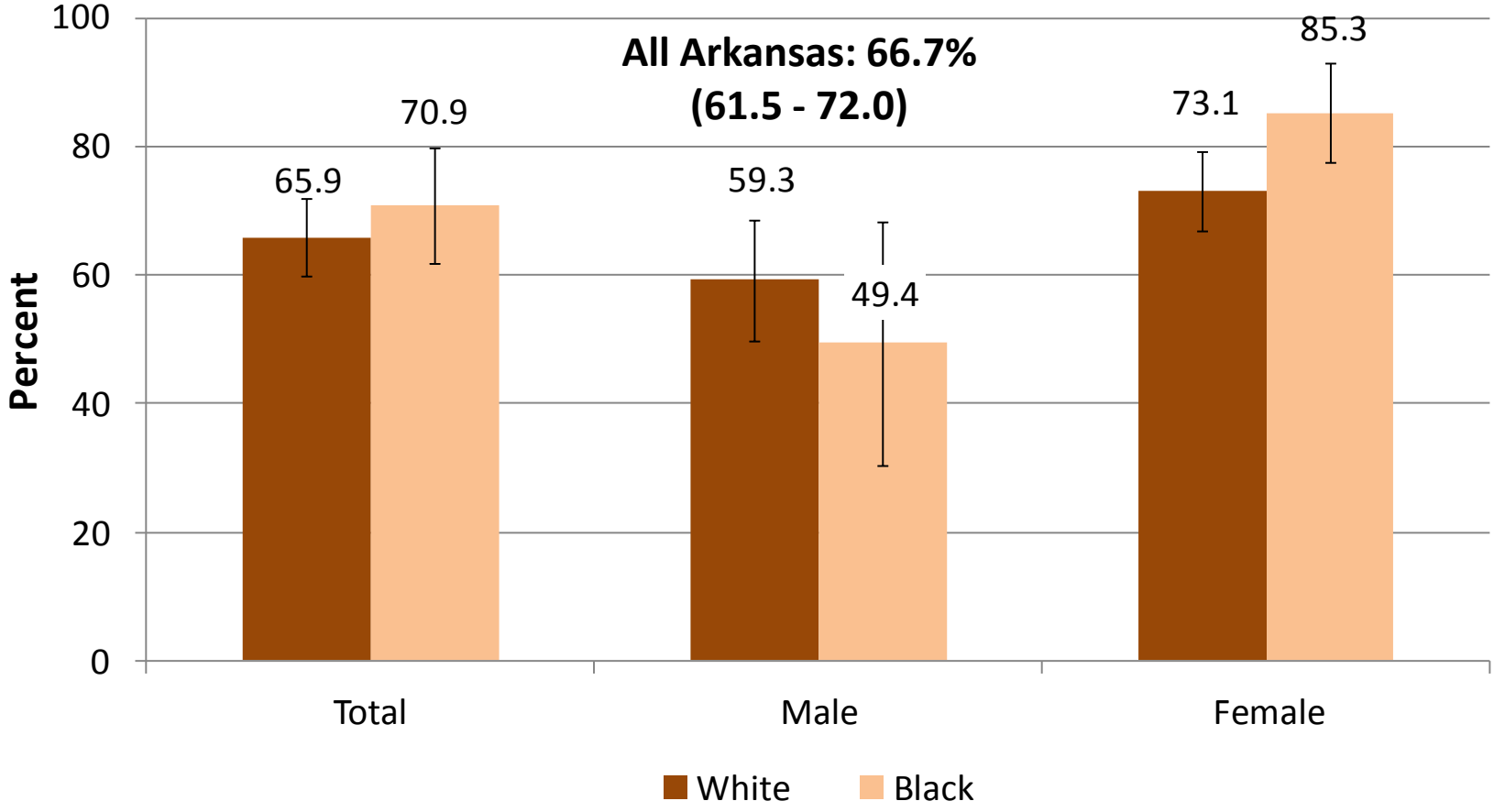
- In Arkansas, 66.7% of hypertensive adults were taking antihypertensive medication.
  - A greater percent of White males (59.3%) were taking prescribed medication compared to Black males (49.4%). Among females, Black females had the highest percent (85.3%).
  - Younger hypertensive adults (59.1%) were less likely to be on medicine to reduce high blood pressure, particularly among males (47.4%).
- In contrast, controlled hypertension among those treated was greatest among adults ages 18-59 (62.8%).
  - Males ages 60 years and older taking treatment were the least likely have controlled hypertension (48.5%).
  - White males taking antihypertensive medication (51.6%) were least likely to have their blood pressure under control. Black males (69.5%) had the highest percent of controlled hypertension among those treated.

Measured Hypertension Treatment & Control (cont'd)

Source: Arkansas Cardiovascular Health Examination Survey (ARCHES)

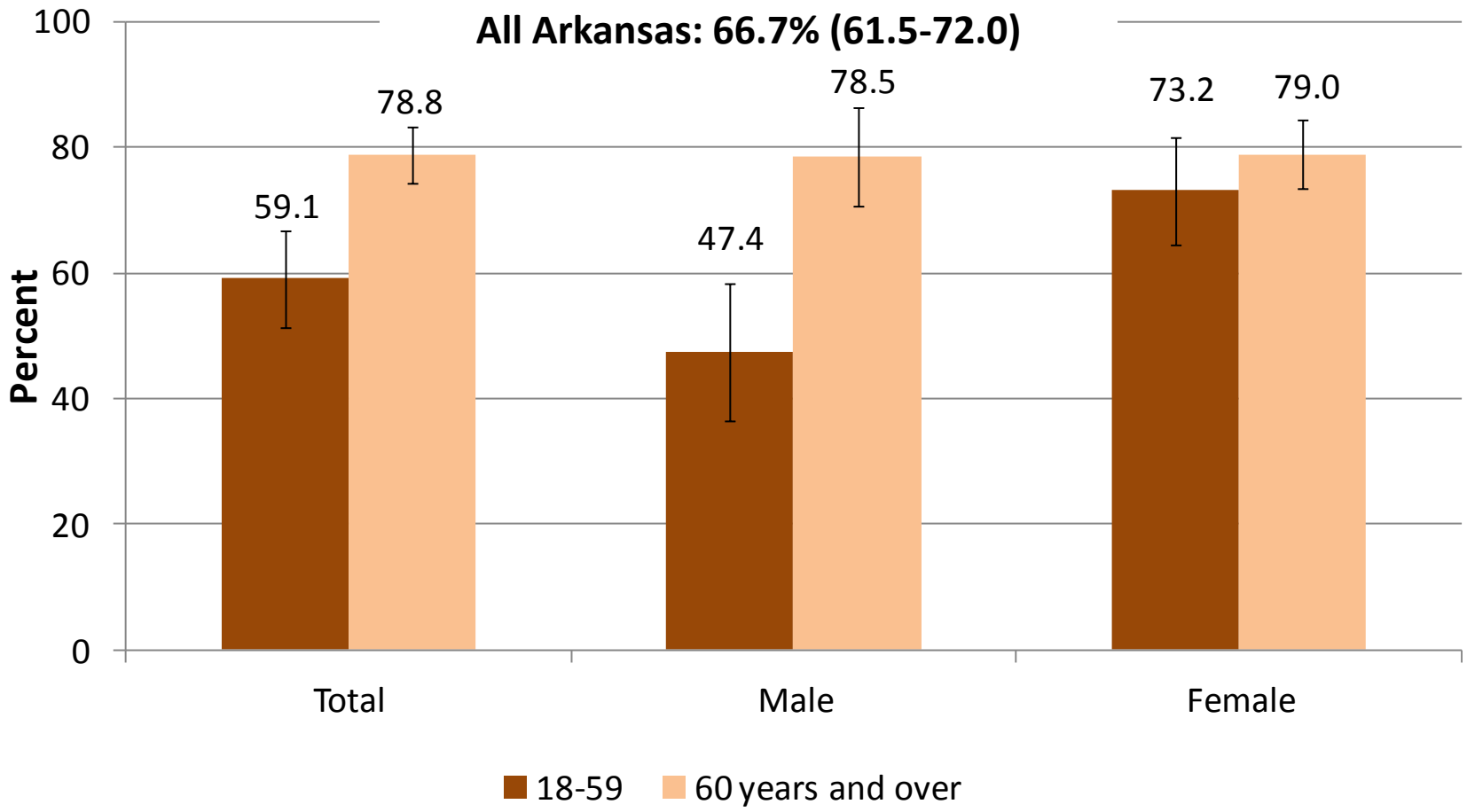
- Among all hypertensive adults, 39.4% had their high blood pressure under control.
  - Control was lower among males (Whites – 30.6%, Blacks – 34.3%) compared to females (Whites – 47.3%, Blacks – 49.4%).
  - Hypertensive adults ages 60 years and older (43.0%) also achieved a higher percent of control compared to younger adults ages 18-59 (37.1%).

Treatment with Antihypertensive Medication Among Hypertensive Adults, by Race and Gender ARCHES: Arkansas, 2007



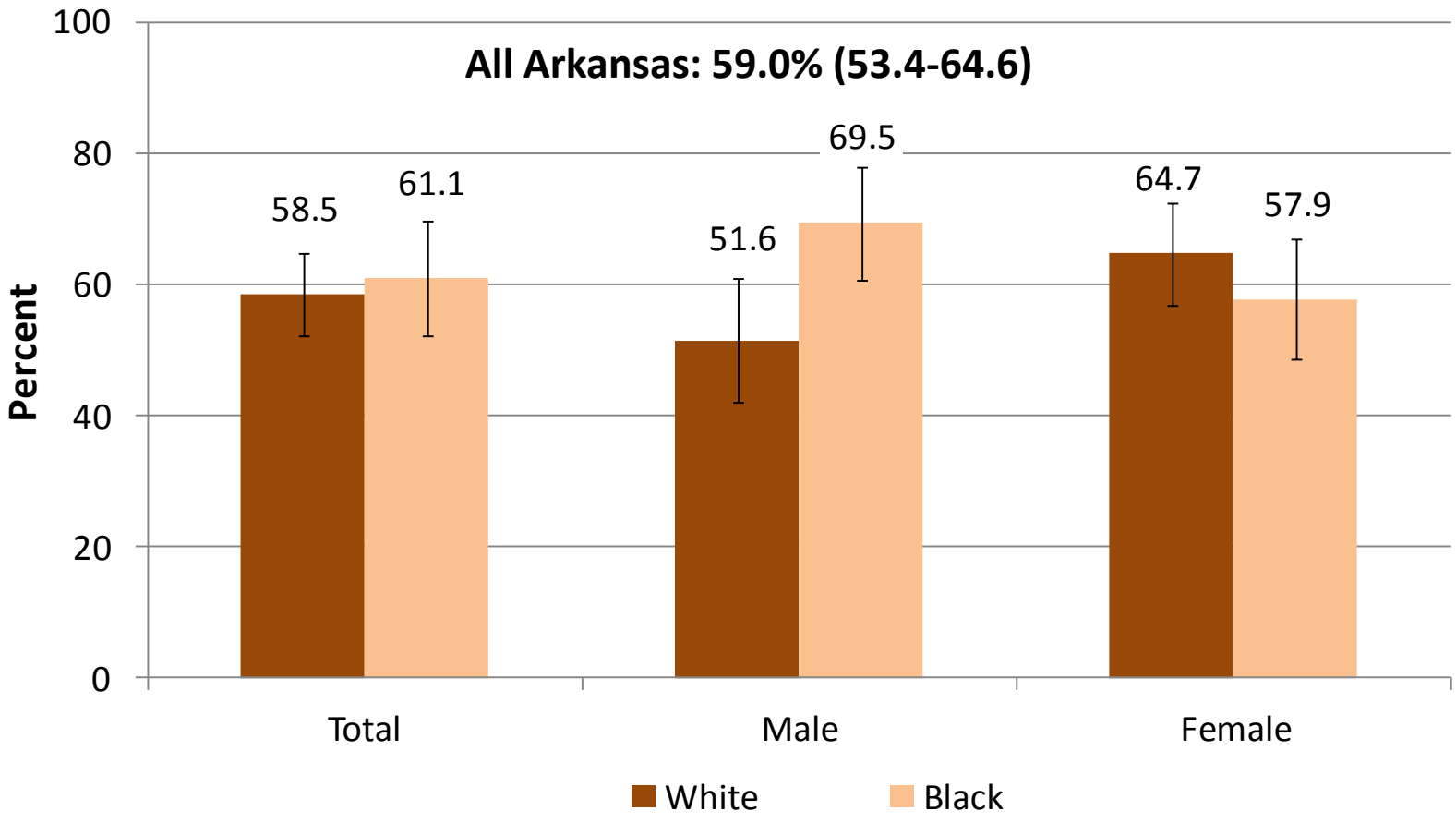
Source: Arkansas Cardiovascular Health Examination Survey, 2007.
Note: Hypertension is defined as having a systolic blood pressure ≥ 140 mm Hg OR diastolic blood pressure ≥ 90 mm Hg OR currently taking medication to lower high blood pressure. Treatment with antihypertensive medication is defined as answering "yes" to the following questions: "Because of your high blood pressure/hypertension, have you ever been told to take prescribed medicine?"; and "Are you now following this advice to take prescribed medicine?". Includes adults ages 18 and older.

Treatment with Antihypertensive Medication Among Hypertensive Adults, by Age Group and Gender ARCHES: Arkansas, 2007



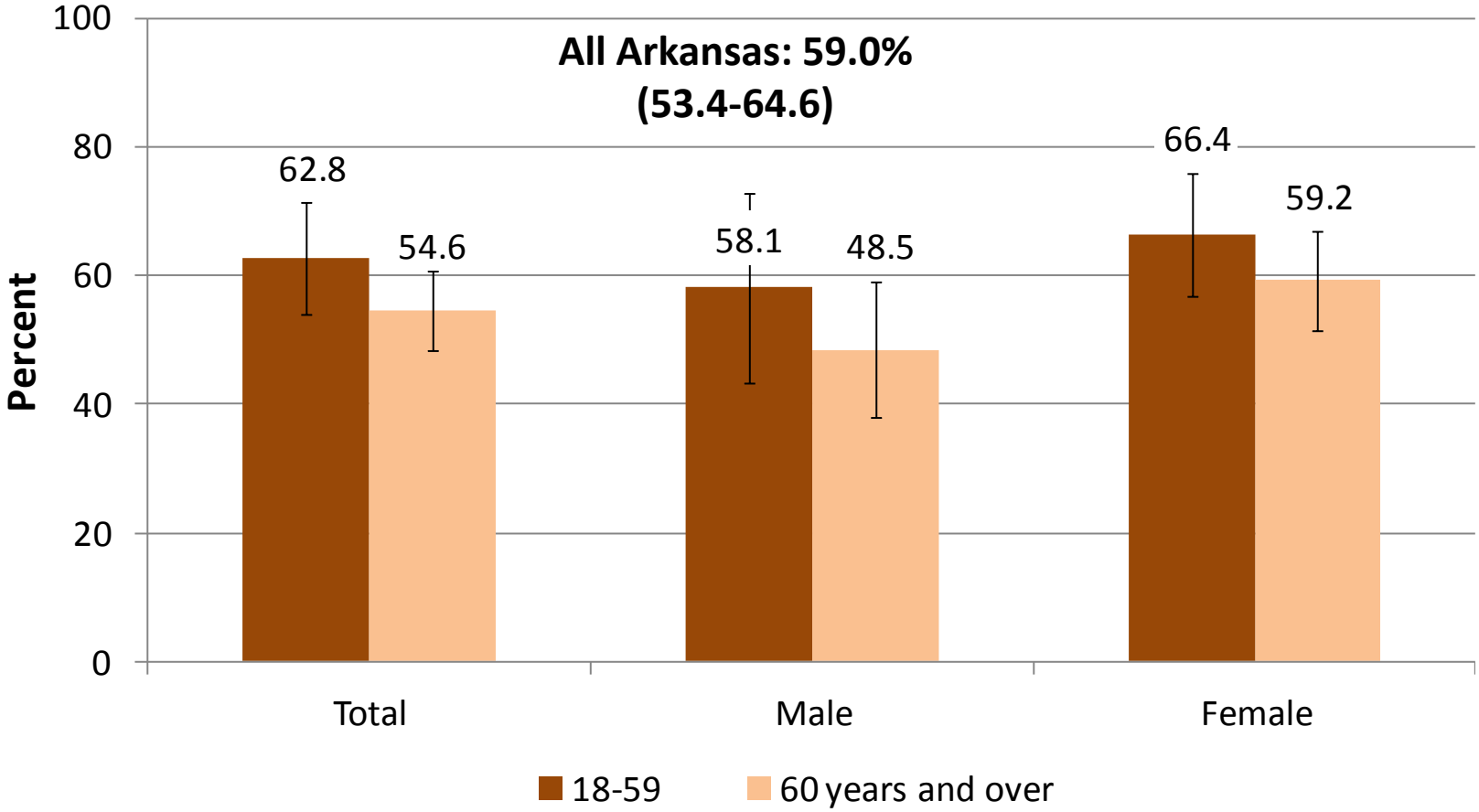
Source: Arkansas Cardiovascular Health Examination Survey, 2007.
Note: Hypertension is defined as having a systolic blood pressure ≥ 140 mm Hg OR diastolic blood pressure ≥ 90 mm Hg OR currently taking medication to lower high blood pressure. Treatment with antihypertensive medication is defined as answering "yes" to the following questions: "Because of your high blood pressure/hypertension, have you ever been told to take prescribed medicine?"; and "Are you now following this advice to take prescribed medicine?". Includes adults ages 18 and older.

Controlled Hypertension among Treated Hypertensive Adults By Race and Gender ARCHES: Arkansas, 2007



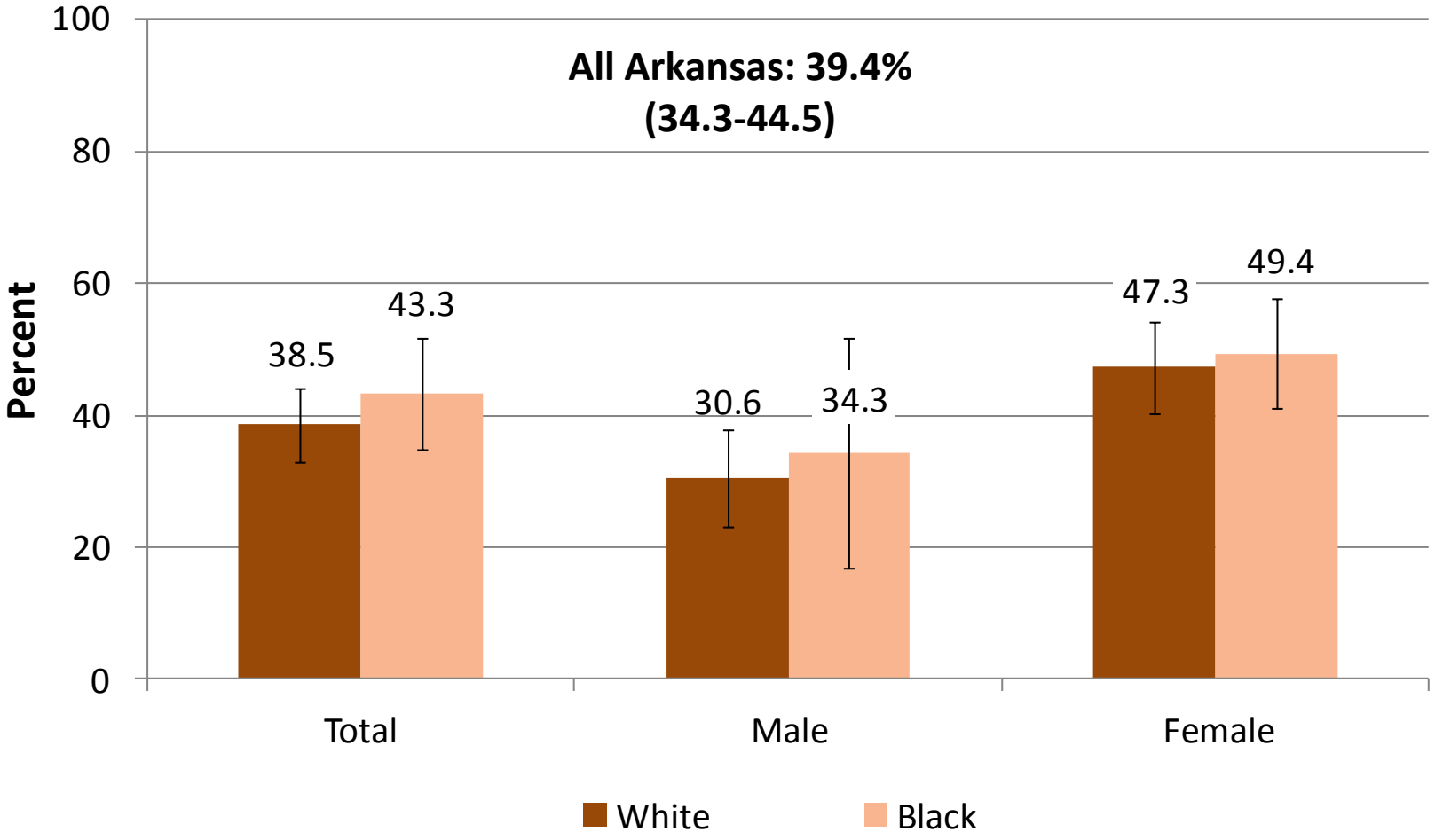
Source: Arkansas Cardiovascular Health Examination Survey, 2007.
Note: Hypertension is defined as having a systolic blood pressure ≥ 140 mm Hg OR diastolic blood pressure ≥ 90 mm Hg OR currently taking medication to lower high blood pressure. Treatment with antihypertensive medication is defined as answering "yes" to the following questions: "Because of your high blood pressure/hypertension, have you ever been told to take prescribed medicine?"; and "Are you now following this advice to take prescribed medicine?". Controlled treated hypertension is defined as having a systolic blood pressure <140 mmHg and diastolic blood pressure <90 mmHg among those currently taking medication to lower blood pressure. Includes adults ages 18 and older.

Controlled Hypertension among Treated Hypertensive Adults By Age Group and Gender ARCHES: Arkansas, 2007



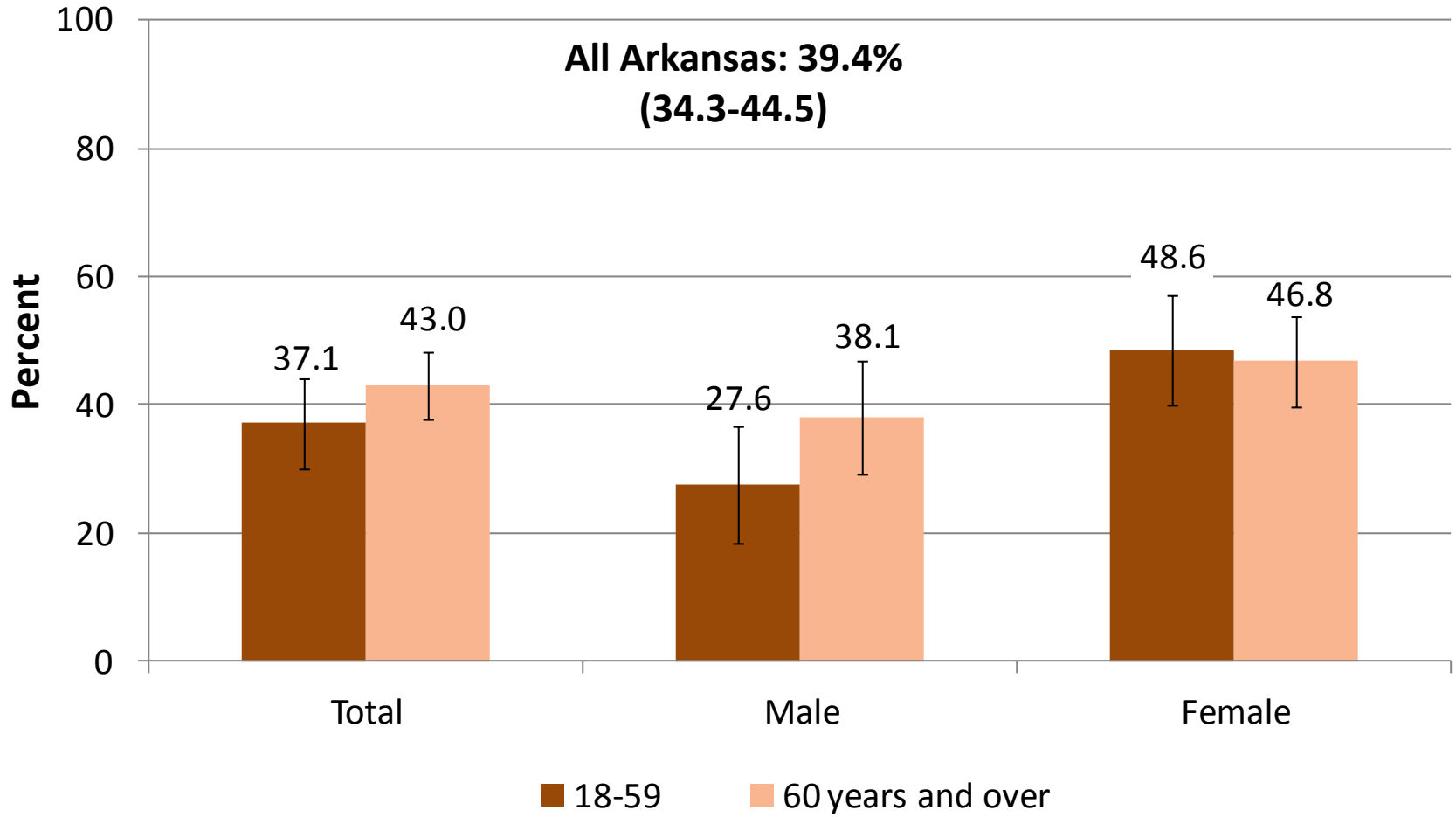
Source: Arkansas Cardiovascular Health Examination Survey, 2007.
Note: Hypertension is defined as having a systolic blood pressure ≥ 140 mm Hg OR diastolic blood pressure ≥ 90 mm Hg OR currently taking medication to lower high blood pressure. Treatment with antihypertensive medication is defined as answering "yes" to the following questions: "Because of your high blood pressure/hypertension, have you ever been told to take prescribed medicine?"; and "Are you now following this advice to take prescribed medicine?". Controlled treated hypertension is defined as having a systolic blood pressure <140 mmHg and diastolic blood pressure <90 mmHg among those currently taking medication to lower blood pressure. Includes adults ages 18 and older.

Controlled Hypertension among All Hypertensive Adults By Race and Gender ARCHES: Arkansas, 2007



Source: Arkansas Cardiovascular Health Examination Survey, 2007.
Note: Hypertension is defined as having a systolic blood pressure ≥ 140 mm Hg OR diastolic blood pressure ≥ 90 mm Hg OR currently taking medication to lower high blood pressure. Controlled hypertension is defined as having a systolic blood pressure <140 mmHg and diastolic blood pressure <90 mmHg. Includes adults ages 18 and older.

Controlled Hypertension among All Hypertensive Adults By Age Group and Gender ARCHES: Arkansas, 2007



Source: Arkansas Cardiovascular Health Examination Survey, 2007.
Note: Hypertension is defined as having a systolic blood pressure ≥ 140 mm Hg OR diastolic blood pressure ≥ 90 mm Hg OR currently taking medication to lower high blood pressure. Controlled hypertension is defined as having a systolic blood pressure <140 mmHg and diastolic blood pressure <90 mmHg. Includes adults ages 18 and older.

SECTION III: RISK FACTORS FOR HYPERTENSION

A. Current Smoking Prevalence
B. Overweight and Obesity Prevalence
C. Inadequate Fruits and Vegetables Intake Prevalence
D. Physical Inactivity Prevalence
E. Average Daily Sodium Intake
F. Average Daily Potassium Intake

Risk Factors for Hypertension

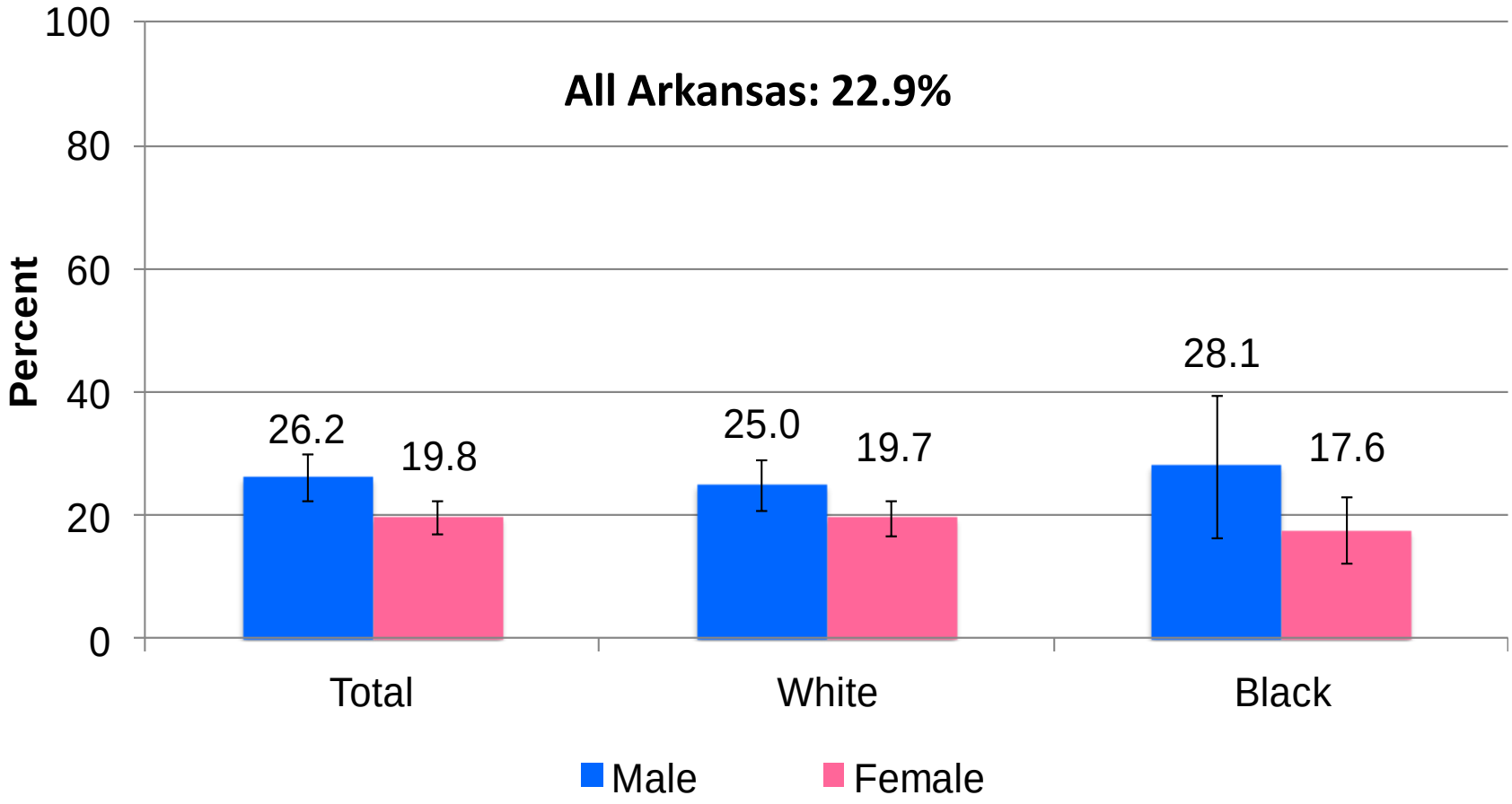
- In 2010, almost a quarter (22.9%) of Arkansans ages 18 and older reported being a current smoker. The prevalence was greatest among Black males (28.1%), followed by White males (25.0%), White females (19.7%), and Black females (17.6%).
- About two-thirds of Arkansas adults (67.2%) reported being overweight or obese. Among males, Black males (76.3%) had a higher prevalence compared to White males (72.1%). Among females, Black females (86.8%) had a higher prevalence compared to White females (60.2%).
- Regardless of race or gender, the vast majority of Arkansas adults (range: 74.8% - 91.3%) do not consume the recommended five or more fruits and vegetables per day.

Risk Factors for Hypertension

- Black females (68.6%) were the least likely to follow the physical activity recommendation of 30+ minutes of moderate physical activity five or more days per week, or vigorous physical activity for 20+ minutes three or more days per week.
- White females (56.6%) and White males (47.9%) were also less likely to be in compliance with the recommendations, compared to Black males (36.6%).
- The Arkansas (3233 mg/day) and U.S. (3330 mg/day) average daily sodium intake was similar and both fell short of the recommendation to consume less than 2300 mg/day for the general population and less than 1500 mg/day for those at high risk.
- Likewise, the Arkansas (2856 mg/day) and U.S. (2509 mg/day) average daily potassium intake was lower than the 4700 mg/day or greater recommendation.

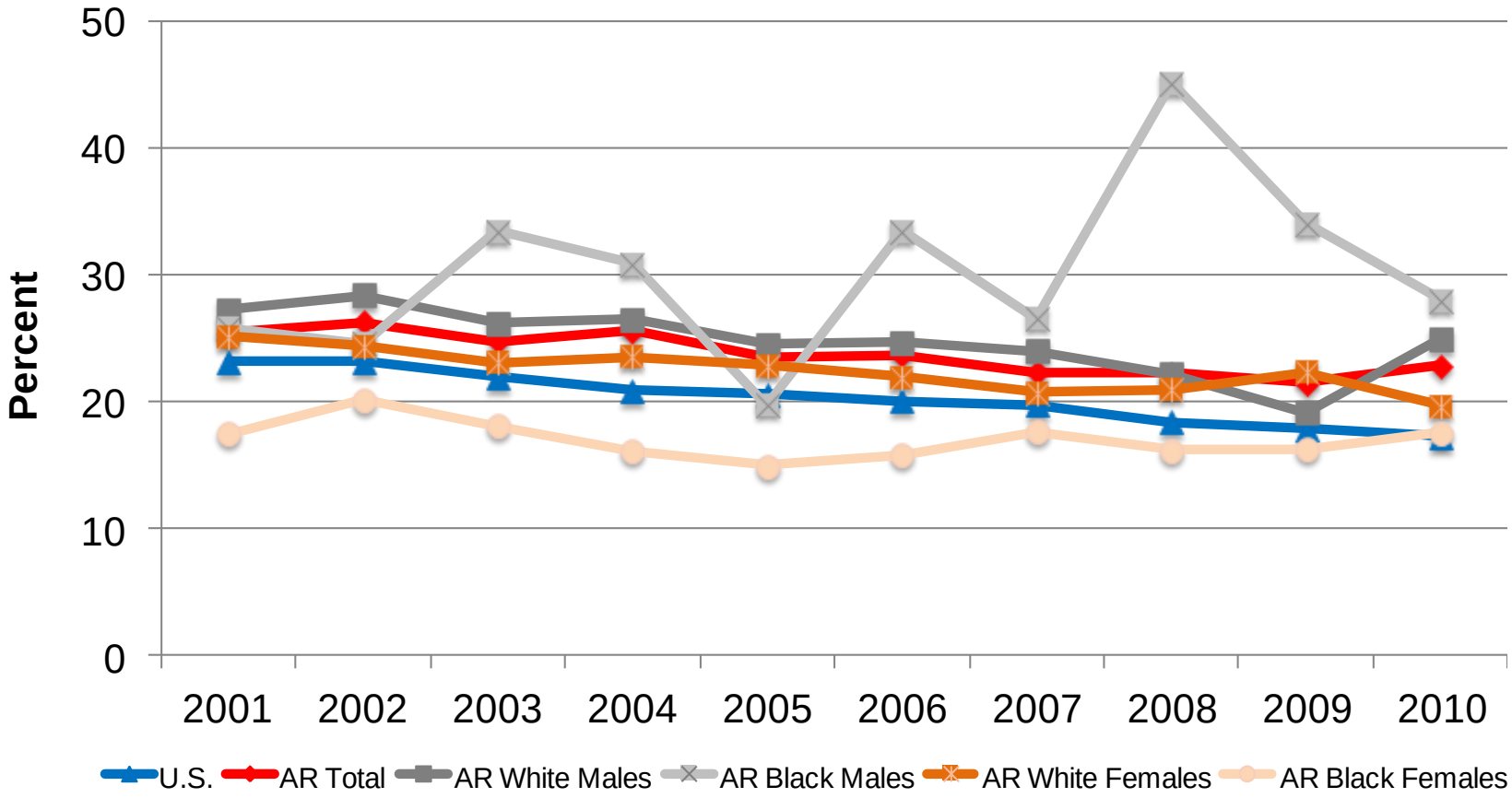
A. CURRENT SMOKING PREVALENCE

Current Smoking Prevalence among Adults By Race and Gender BRFSS: Arkansas, 2010



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2010.
Note: Hispanics are included in Whites and Blacks.
Question: "Have you smoked at least 100 cigarettes in your entire life?" and "Do you now smoke cigarettes every day, some days, or not at all?"
(Includes persons ages 18 and older)

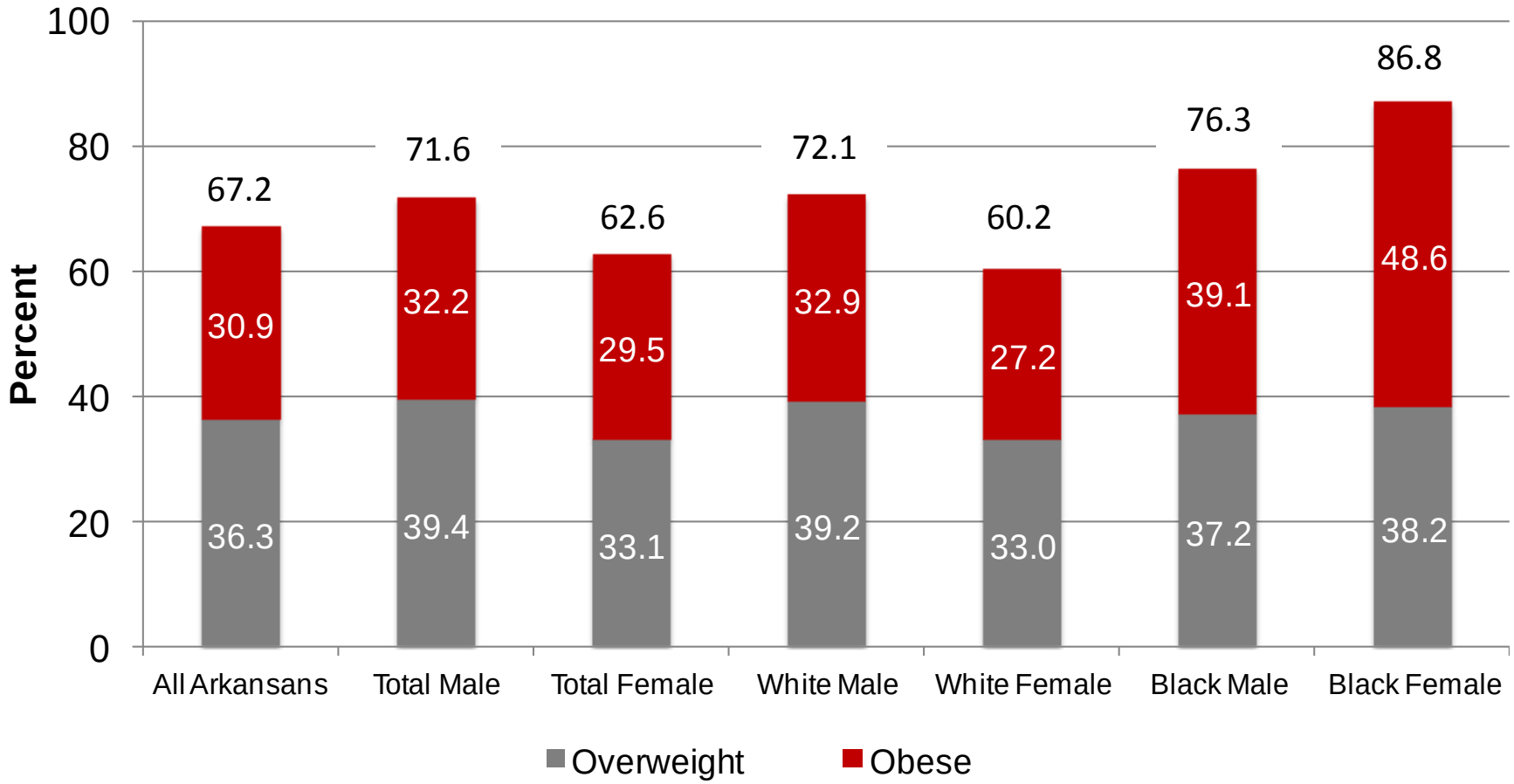
Current Smoking Prevalence Among Adults, By Race and Gender BRFSS: Arkansas, 2001-2010



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch: 2001-2010.
Note: Hispanics are included in Whites and Blacks.
Question: "Have you smoked at least 100 cigarettes in your entire life?" and "Do you now smoke cigarettes every day, some days, or not at all?"
(Includes persons ages 18 and older)

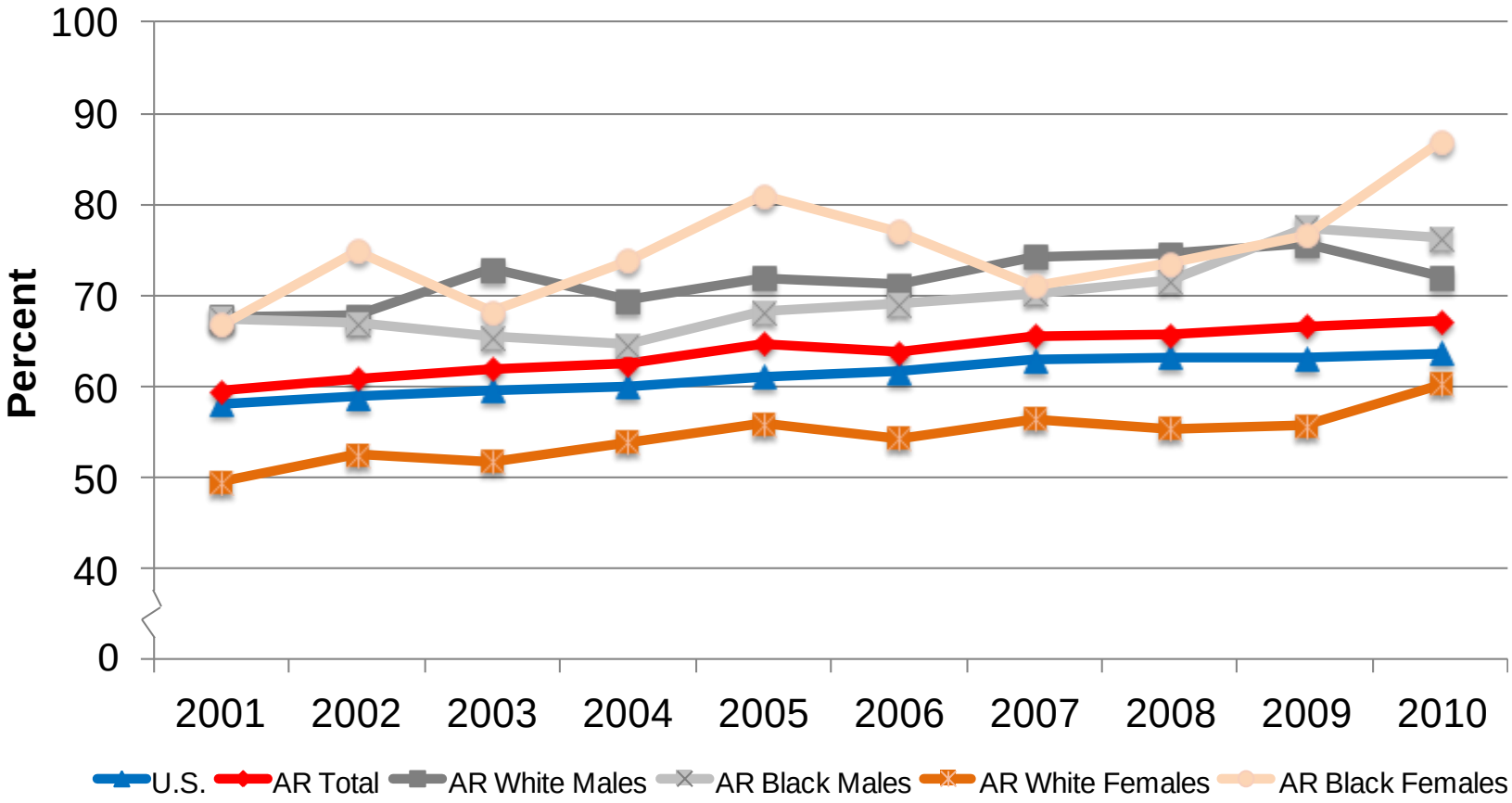
B. OVERWEIGHT AND OBESITY PREVALENCE

Overweight & Obesity Prevalence among Adults By Race and Gender BRFSS: Arkansas, 2010



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2010.
Note: Overweight is defined as having a body mass index (BMI) $\geq$ 25.0 and < 30.0 kg/m^2. Obese is defined as having a BMI $\geq$ 30.0 kg/m^2. Hispanics are included in Whites and Blacks.
Questions: "About how much do you weigh without shoes?" and "About how tall are you without shoes?" (Includes persons ages 18 and older)

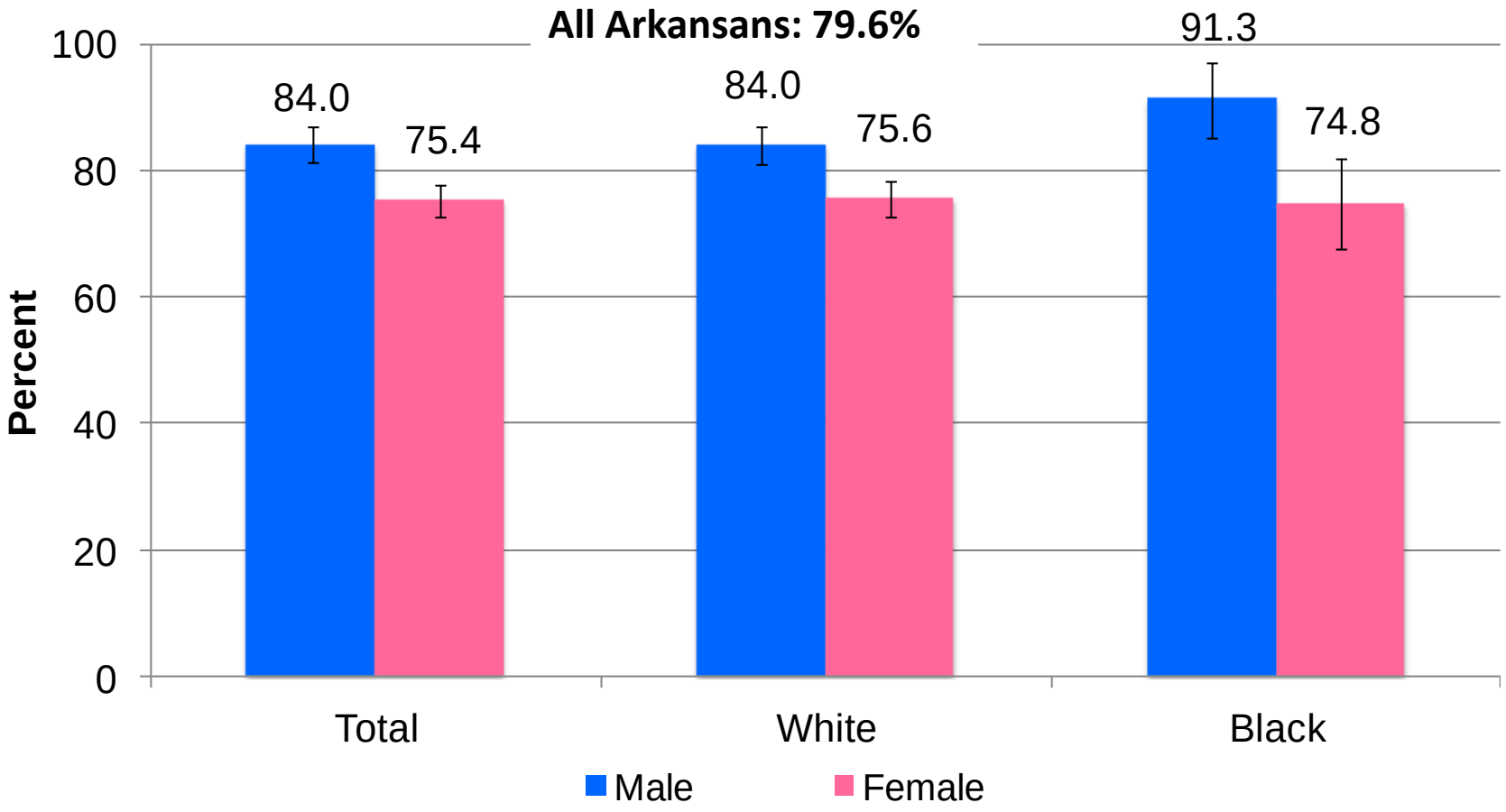
Overweight & Obesity Prevalence Among Adults, By Race and Gender BRFSS: Arkansas, 2001-2010



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2001-2010.
Note: Overweight is defined as having a body mass index (BMI) $\geq$ 25.0 and < 30.0 kg/m^2. Obese is defined as having a BMI $\geq$ 30.0 kg/m^2.
Questions: "About how much do you weigh without shoes?" and "About how tall are you without shoes?" (Includes persons ages 18 and older)

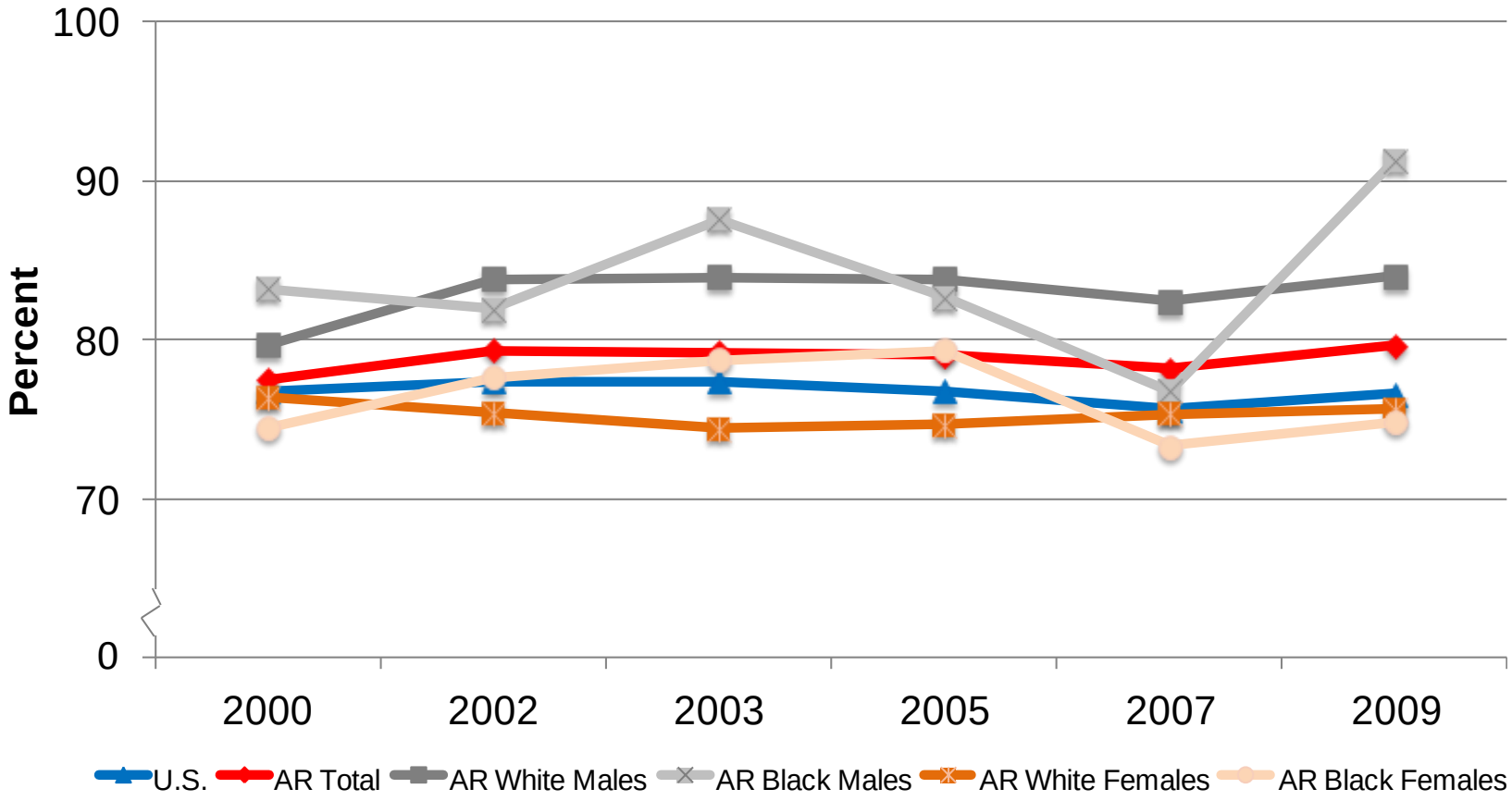
C. INADEQUATE FRUITS AND VEGETABLES INTAKE PREVALENCE

Inadequate Fruits & Vegetables Intake Prevalence Among Adults, By Race and Gender BRFSS: Arkansas, 2009



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2009.
Note: Hispanics are included in Whites and Blacks. Inadequate fruits and vegetables intake is defined as consumption of fruits and vegetables less than five times per day.
Question: "These next questions are about the foods you usually eat or drink. Please tell me how often you eat or drink each one …" (Includes persons ages 18 and older)

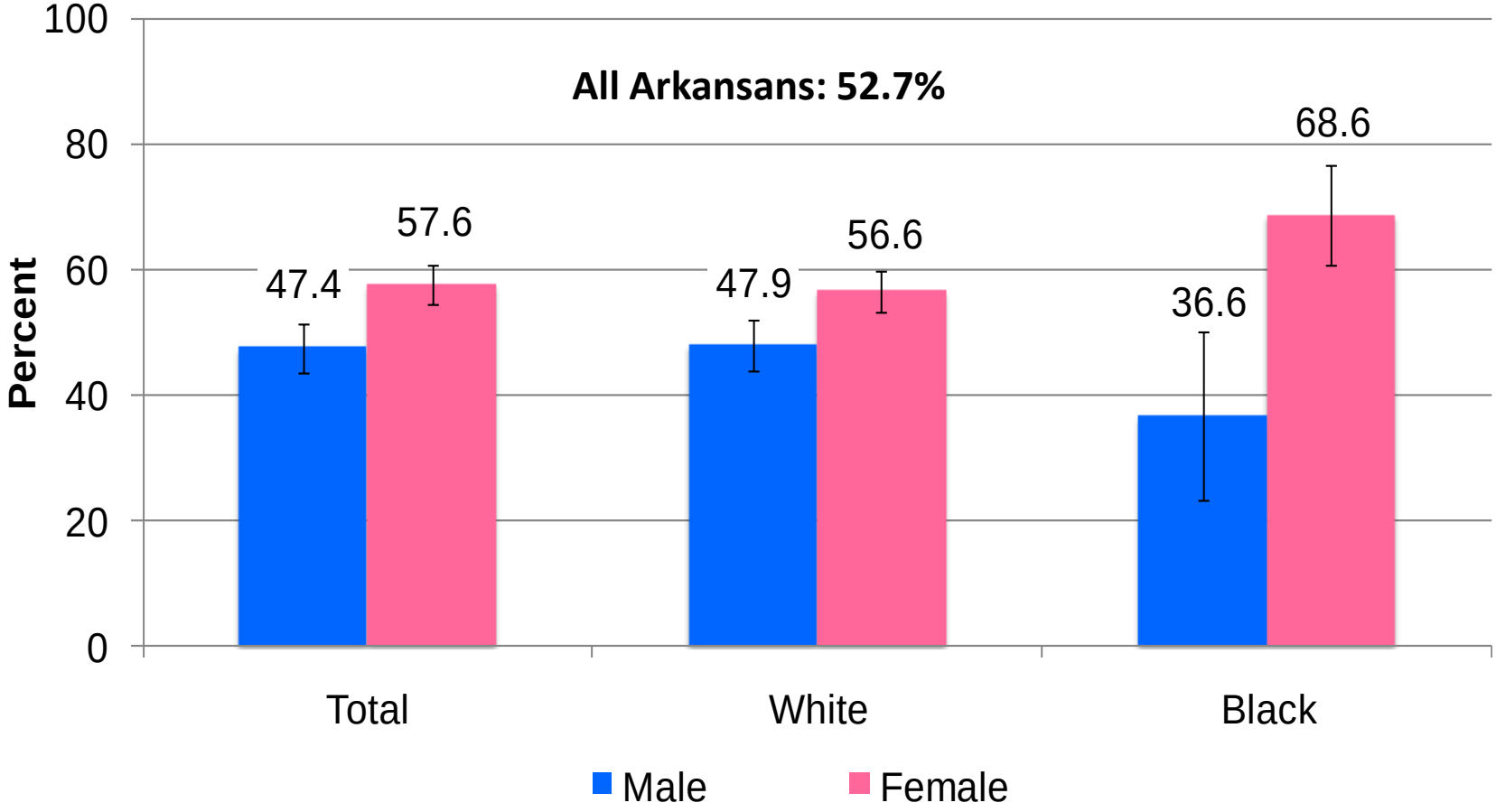
Inadequate Fruits & Vegetables Intake Prevalence Among Adults, By Race and Gender BRFSS: Arkansas, 2000-2009



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch: 2000-2009.
Note: Hispanics are included in Whites and Blacks. Inadequate fruits and vegetables intake is defined as consumption of fruits and vegetables less than five times per day. This module is asked on the following years in Arkansas: 2000, 2002, 2003, 2005, 2007, and 2009.
Question: "These next questions are about the foods you usually eat or drink. Please tell me how often you eat or drink each one …" (Includes persons ages 18 and older)

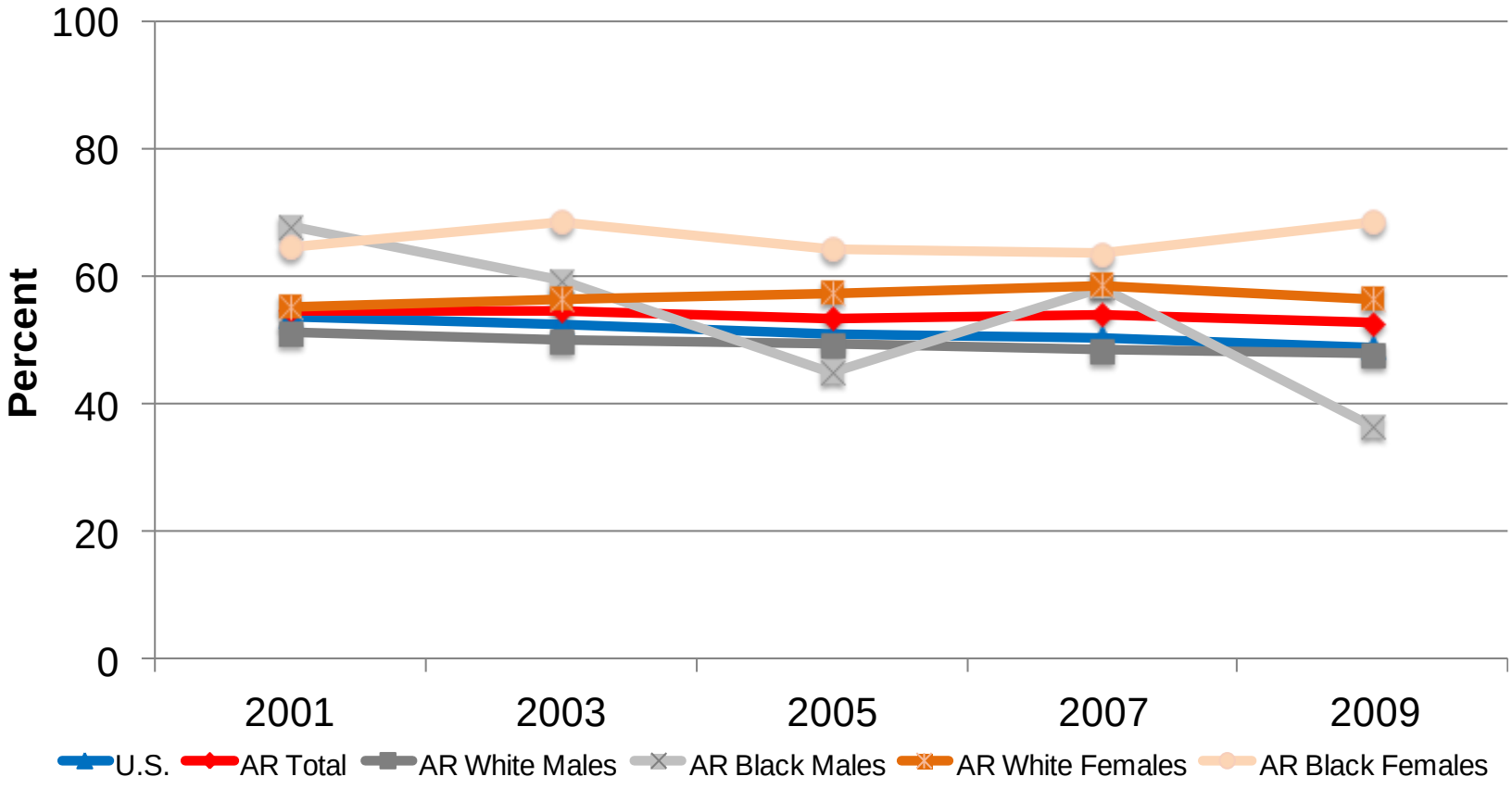
D. PHYSICAL INACTIVITY PREVALENCE

Physical Inactivity Prevalence Among Adults By Race and Gender BRFSS: Arkansas, 2009



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch, 2009.
Note: Hispanics are included in Whites and Blacks. Physical inactivity is defined as not meeting recommendations of 30 minutes or more of moderate physical activity five or more days per week, or vigorous physical activity for 20 minutes or more three or more days per week. Includes persons ages 18 and older.

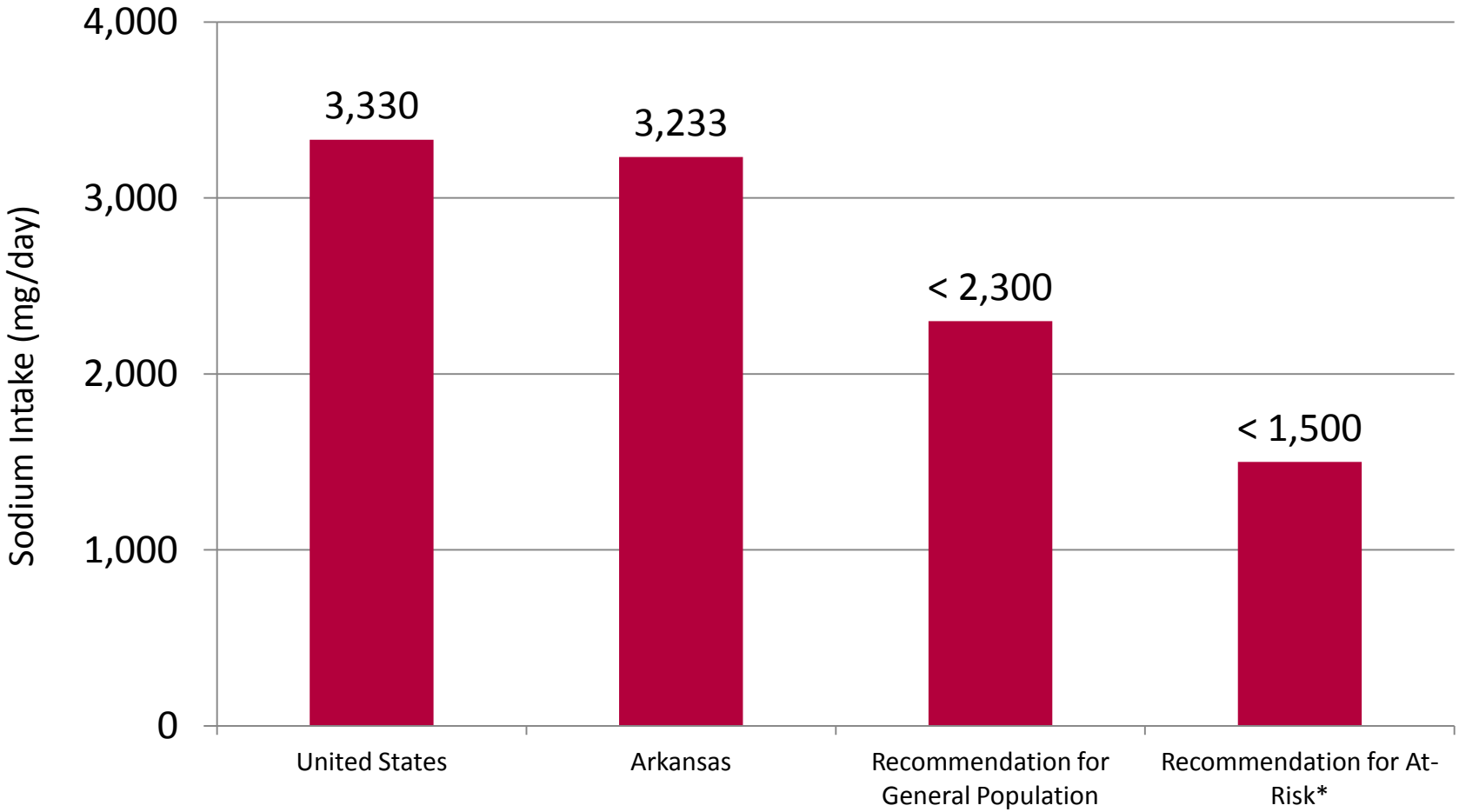
Physical Inactivity Prevalence Among Adults By Race and Gender BRFSS: Arkansas, 2000-2009



Source: Behavioral Risk Factor Surveillance System, Arkansas Health Statistics Branch.
Note: Hispanics are included among Whites and Blacks. Physical inactivity is defined as not meeting recommendations of 30 minutes or more of moderate physical activity five or more days per week, or vigorous physical activity for 20 minutes or more three or more days per week. This module was asked on odd years. Includes persons ages 18 and older

E. AVERAGE DAILY SODIUM INTAKE

Average Daily Sodium Intake Among Adults ARCHES, 2007 & NHANES, 2007-2008

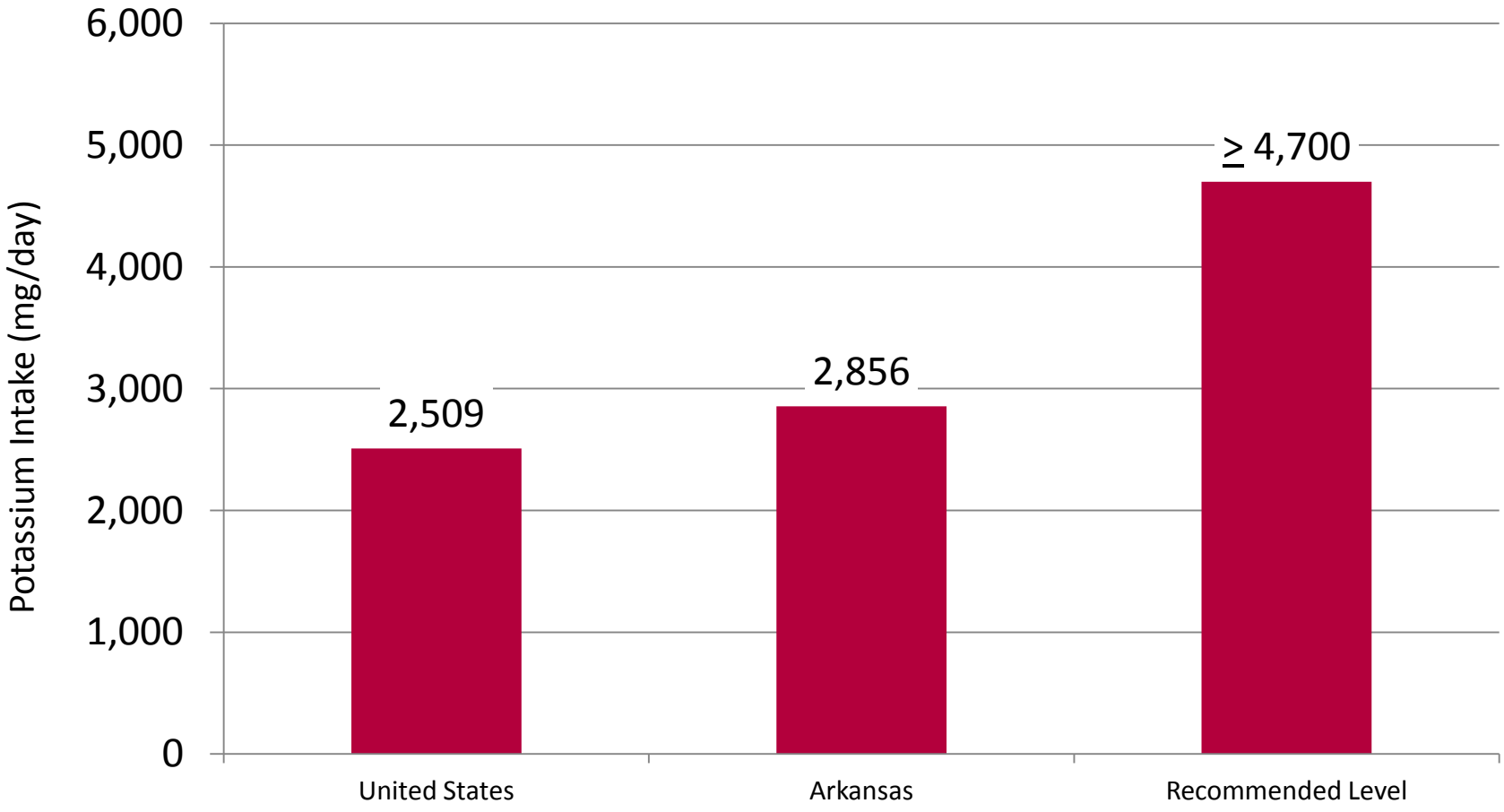


Sources: U.S. data – *What We Eat in America,* National Health and Nutrition Examination Survey (NHANES), 2007-2008 (among persons ages 2 and over); Arkansas data - Arkansas Cardiovascular Health Examination Survey (ARCHES), 2007 (among persons ages 18 and older); Recommendations - *Dietary Guidelines for Americans, 2010.*

* At-risk populations include Blacks, persons aged ≥ 51, and persons of any age with hypertension, diabetes, or chronic kidney disease.

F. AVERAGE DAILY POTASSIUM INTAKE

Average Daily Potassium Intake Among Adults ARCHES, 2007 & NHANES, 2007-2008



Sources: U.S. data – *What We Eat in America,* National Health and Nutrition Examination Survey (NHANES), 2007-2008 (among persons ages 2 and over); Arkansas data - Arkansas Cardiovascular Health Examination Survey (ARCHES), 2007 (among persons ages 18 and older); Recommendations - *Dietary Guidelines for Americans, 2010.*

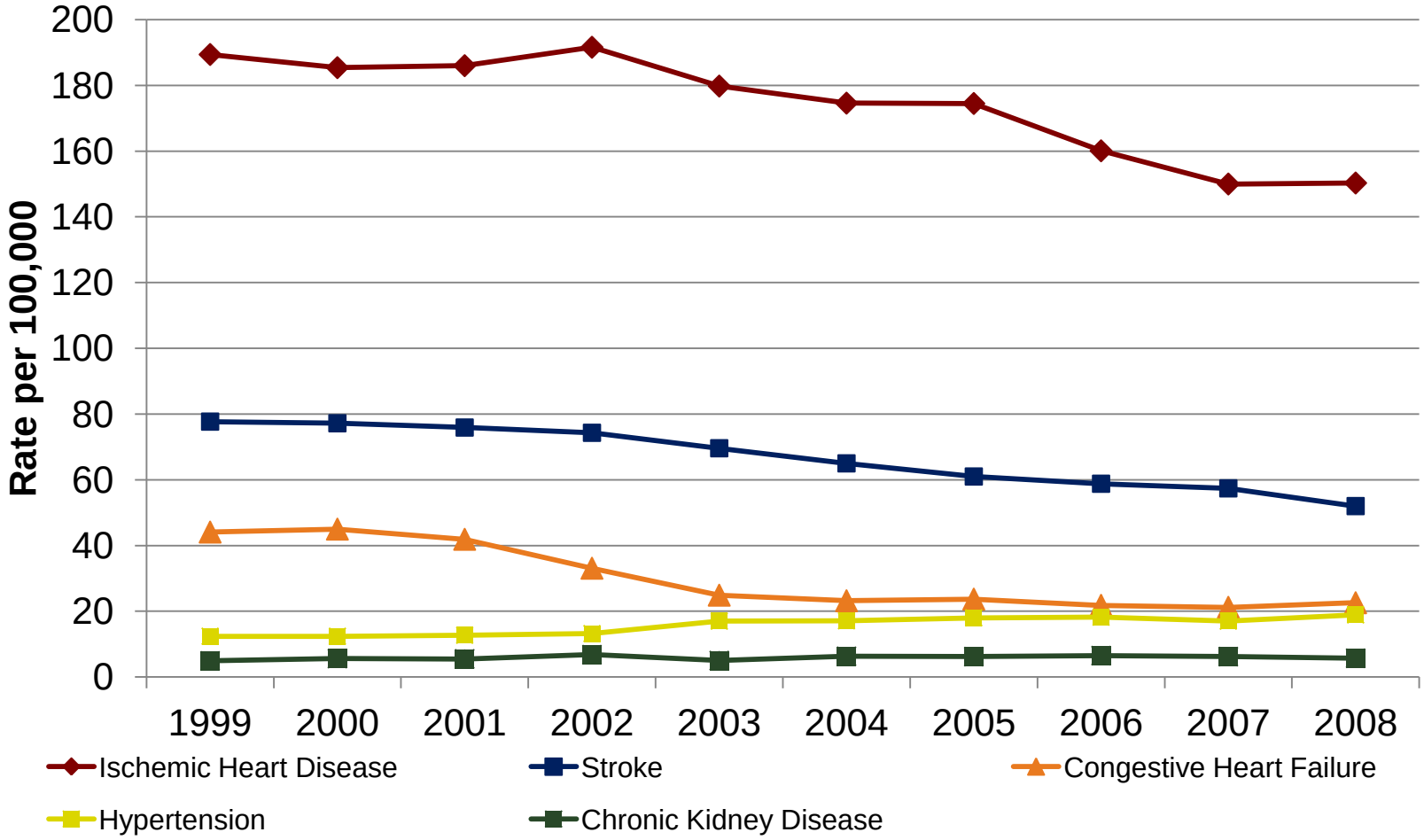
SECTION IV: DEATHS ASSOCIATED WITH HYPERTENSION

A. Hypertension
B. Ischemic Heart Disease
C. Stroke
D. Congestive Heart Failure
E. Chronic Kidney Disease

Overall Mortality

- Of the five diseases of interest in Arkansas, ischemic heart disease had the highest mortality rate, followed by stroke, congestive heart failure, hypertension, and chronic kidney disease.
- In 2008, the mortality rate for ischemic heart disease was 150.3 per 100,000, followed by stroke 52.0 per 100,000, congestive heart failure 22.6 per 100,000, hypertension 18.9 per 100,000, and chronic kidney disease 5.7 per 100,000.
- Hypertension mortality rates increased between 2002 – 2008. Ischemic heart disease, stroke, and congestive heart failure had a consistent decreasing trend from 1999-2008, while chronic kidney disease remained stable.
- From 2002 – 2008, hypertension mortality rates increased 43%.

Mortality Rates for Hypertension & Related Diseases Arkansas, 1999 - 2008



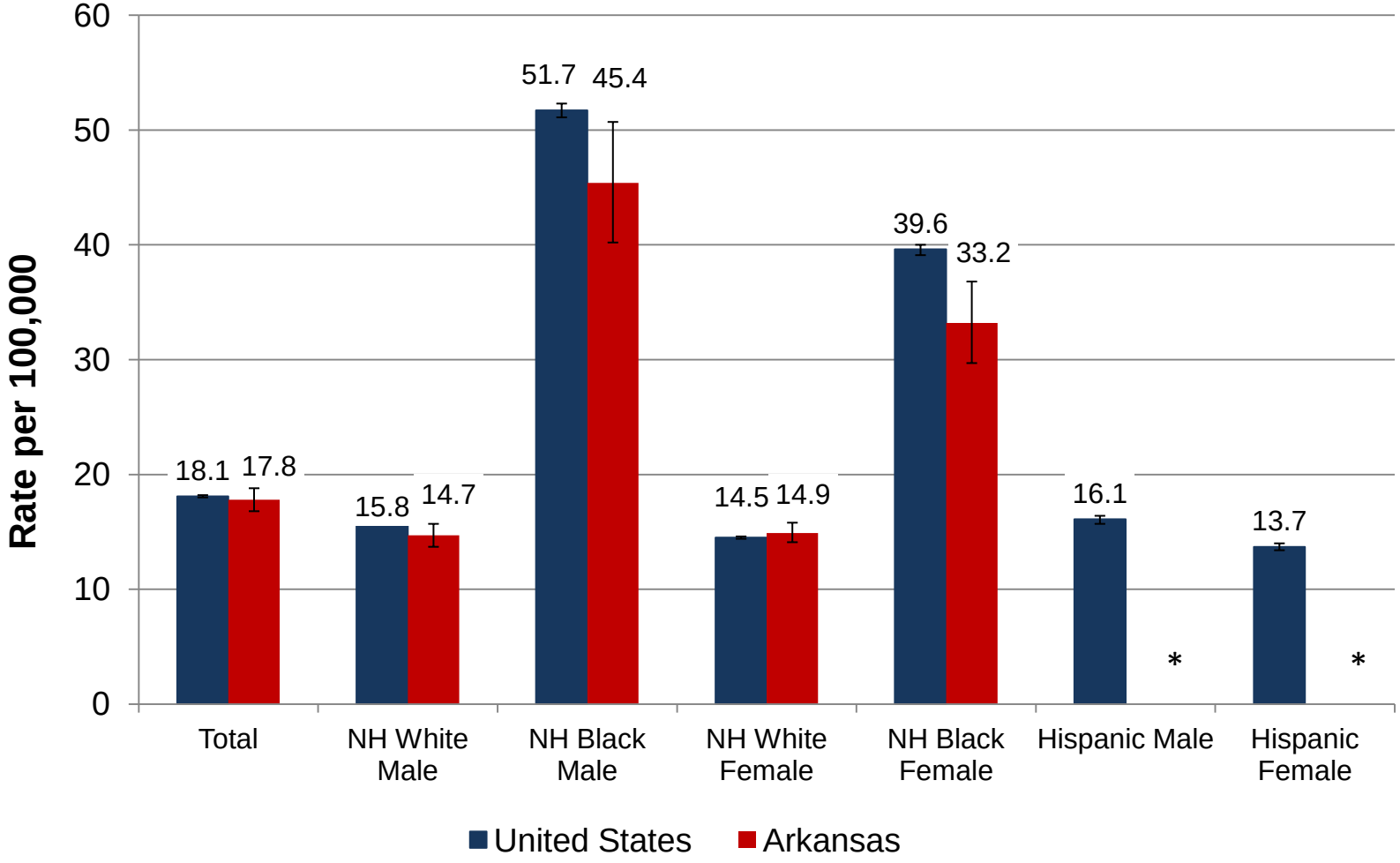
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

A. HYPERTENSION MORTALITY

Hypertension Mortality

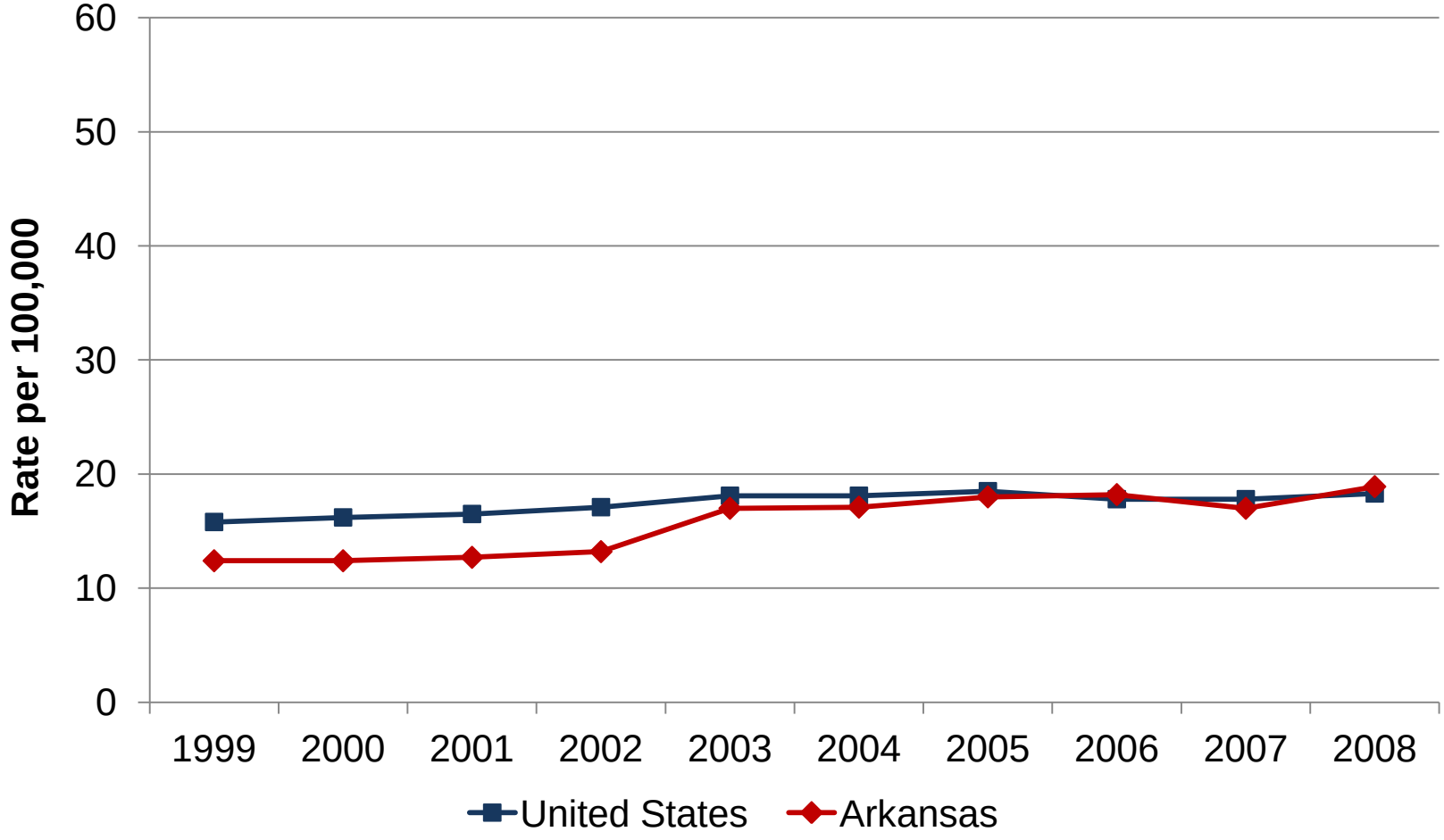
- Overall, hypertension mortality rates in Arkansas are equivalent with the rates in the U.S.
- Arkansas had lower rates from 1999 – 2002, then increased to the higher U.S. rate in 2003.
  - This increase was driven by White males and females. Black males and females tended to have lower hypertension mortality rates than that of Blacks in the U.S.
- The hypertension mortality rates steadily increased with age. Black males and females had consistently higher age-specific rates for every age-group than that of White males and females.
- Hispanics tend to have lower rates of hypertension morality in the U.S. when compared to other race/ethnic groups. However, there were too few hypertension deaths among Hispanic males and females to have statistically reliable rates in Arkansas.

Hypertension Mortality Rates By Gender and Race/Ethnicity Arkansas & United States, Combined 2004-2008



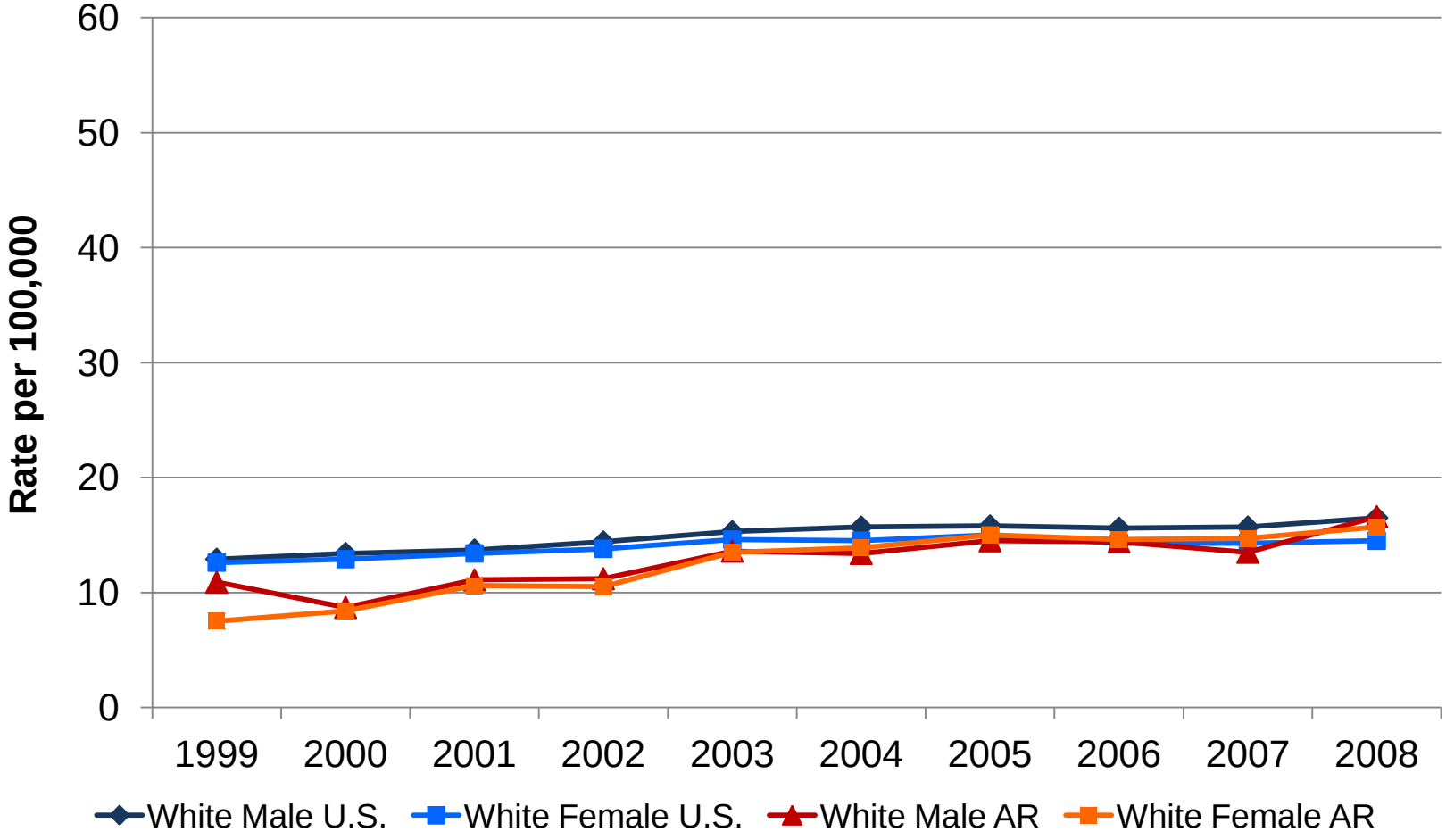
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.
*Rates are suppressed because of the low number of Hypertension deaths among Hispanics in Arkansas

Hypertension Mortality Rates
Arkansas and United States, 1999 - 2008



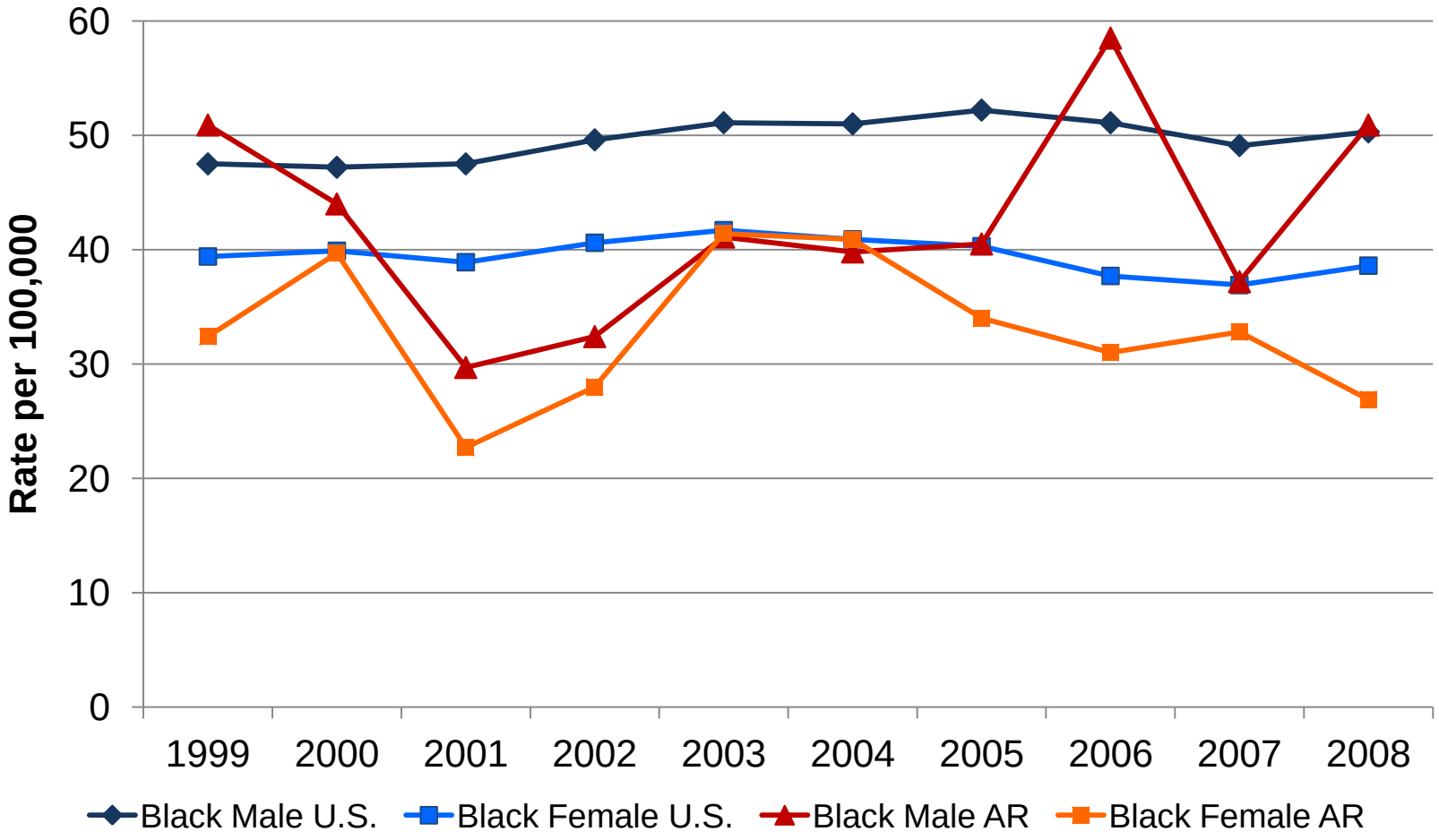
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Hypertension Mortality Rates Among White Males & Females Arkansas and United States, 1999 - 2008



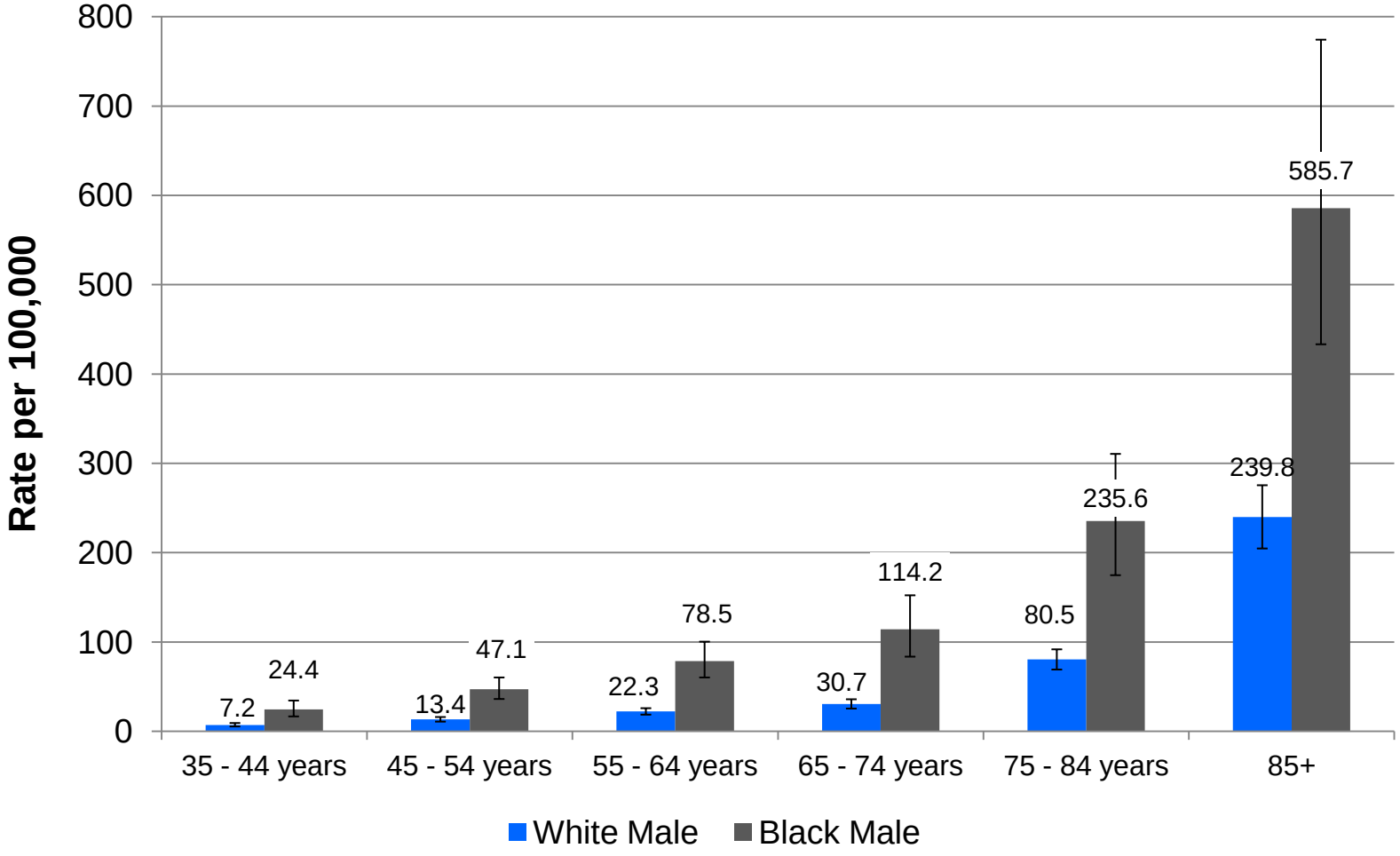
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Hypertension Mortality Rates Among Black Males & Females, Arkansas and United States, 1999 - 2008



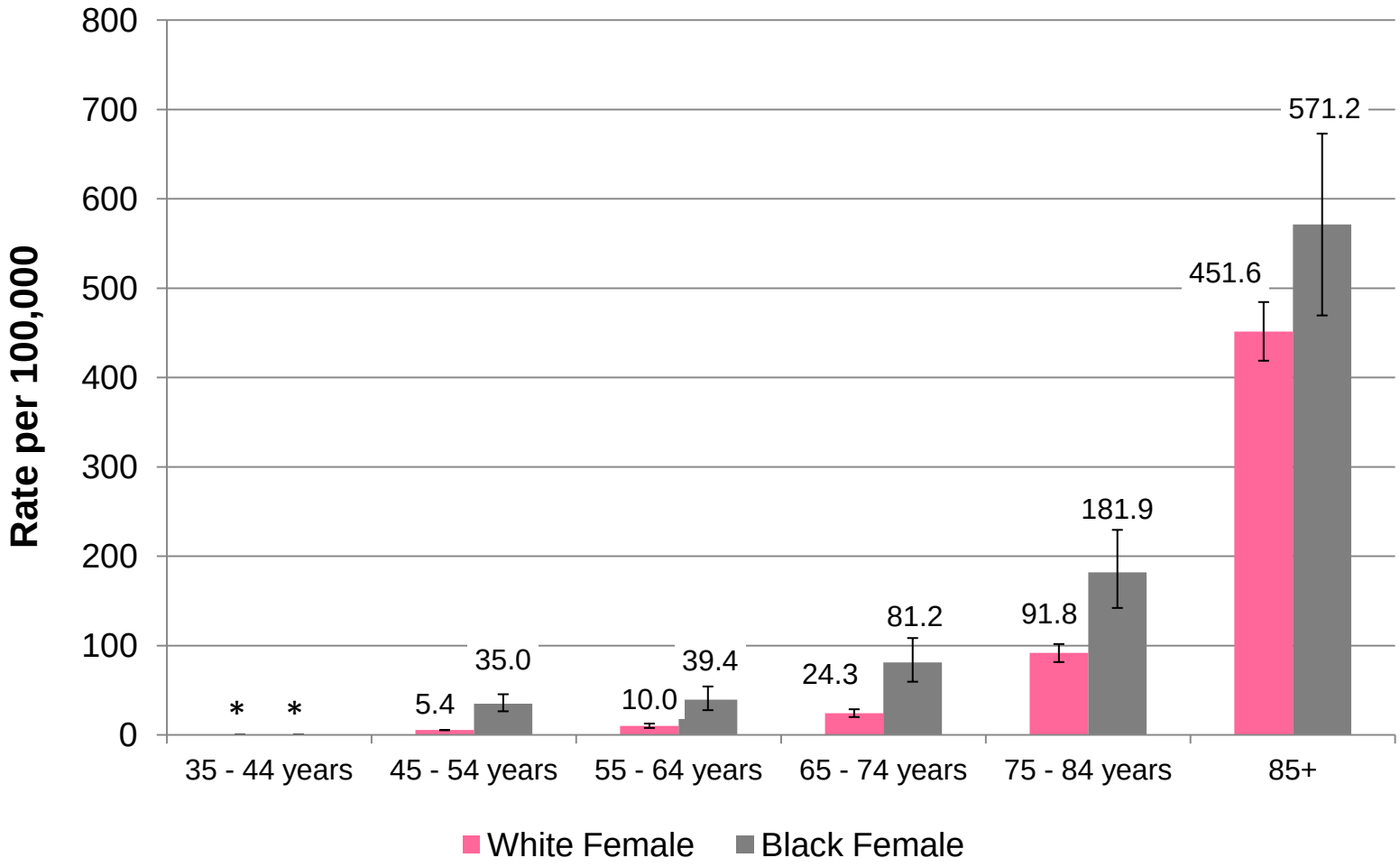
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Age-Specific Hypertension Mortality Rates Among Males, Arkansas, Combined 2004-2008



Source: CDC Wonder Detailed Mortality File

Age-Specific Hypertension Mortality Rates Among Females, Arkansas, Combined 2004-2008



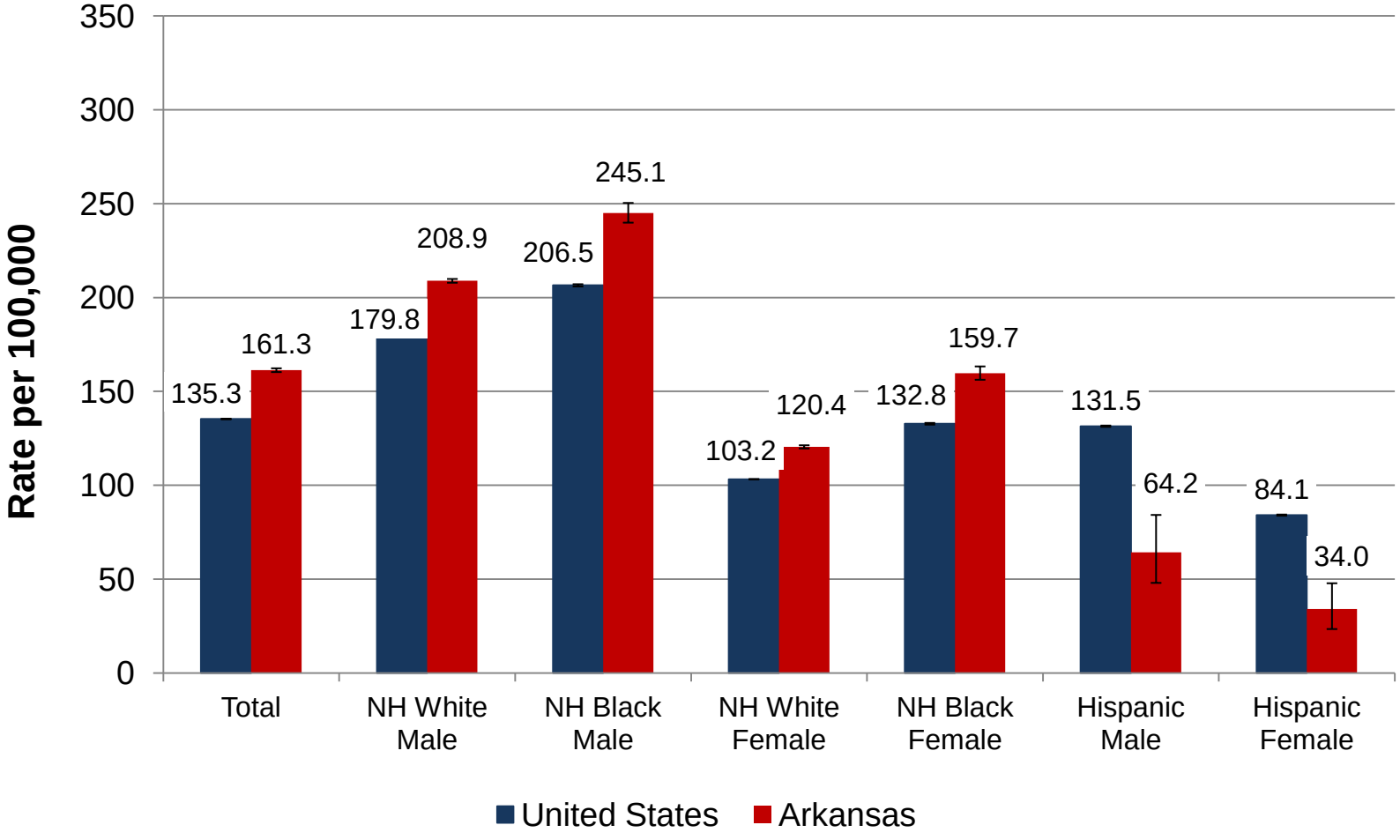
Source: CDC Wonder Detailed Mortality File
*Rates are suppressed due to small number of deaths

B. ISCHEMIC HEART DISEASE MORTALITY

Ischemic Heart Disease Mortality

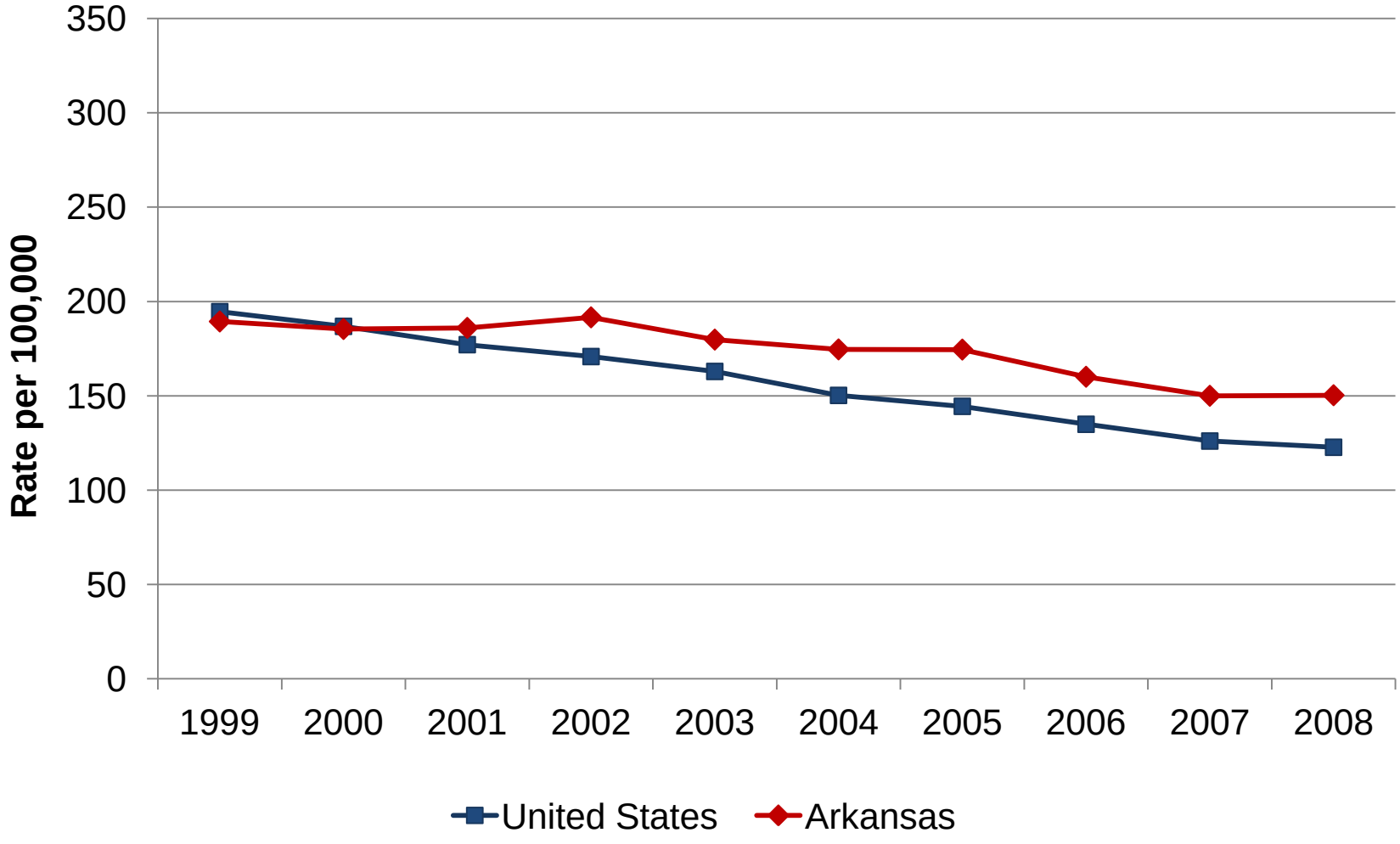
- Although there is a 20% decrease in ischemic heart disease mortality rates between years 1999 – 2008 in Arkansas, we maintained higher mortality rates than the U.S. during years 2001 – 2008.
- Overall, males in every race/ethnic group tend to have higher ischemic heart disease mortality rates than their female counterparts in both Arkansas and the U.S. Black males and females had higher mortality rates for ischemic heart disease than that of Whites.
- Hispanic males and females in Arkansas had statistically significant lower death rates from ischemic heart disease than the U.S., but the Arkansas rates are based on a small number of deaths.
- Black males had higher ischemic heart disease death rates from ages 35 – 84 than White males. Black females also had higher ischemic heart disease death rates from ages 35 – 84 than White females.

Ischemic Heart Disease Mortality Rates By Gender and Race/Ethnicity Arkansas & United States, Combined 2004-2008



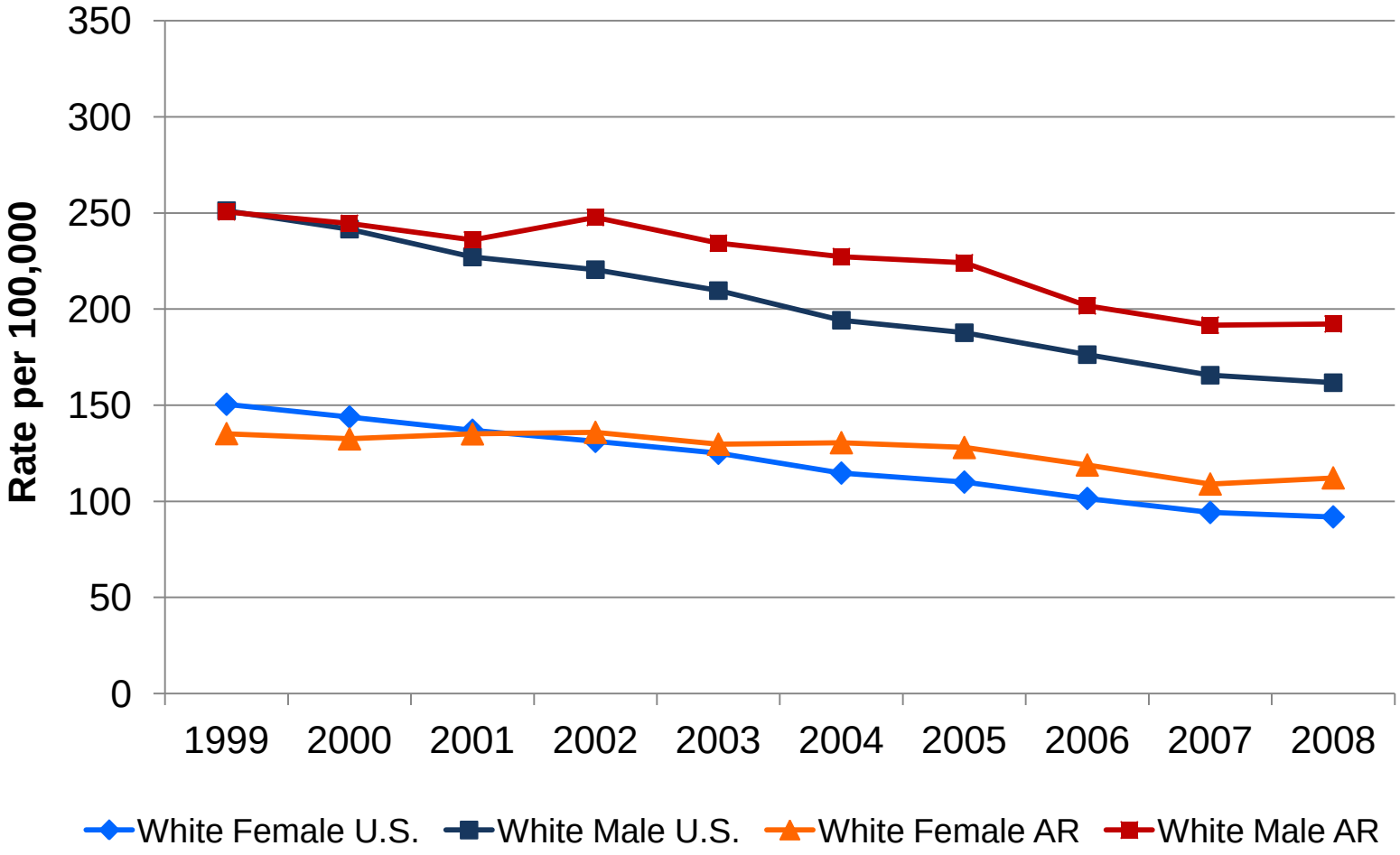
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Ischemic Heart Disease Mortality Rates
Arkansas and United States, 1999 - 2008



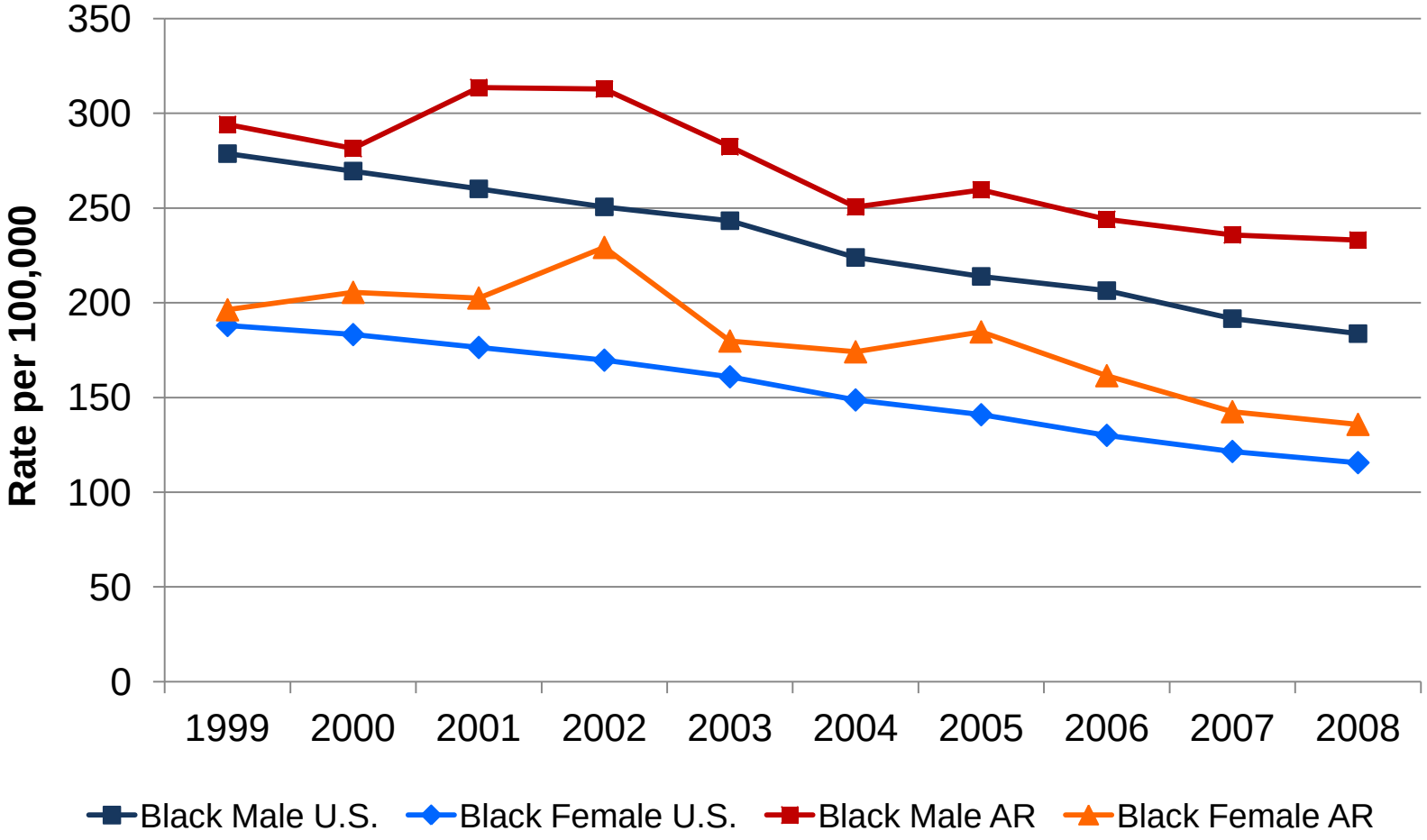
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Ischemic Heart Disease Mortality Rates Among White Males & Females Arkansas and United States, 1999 - 2008



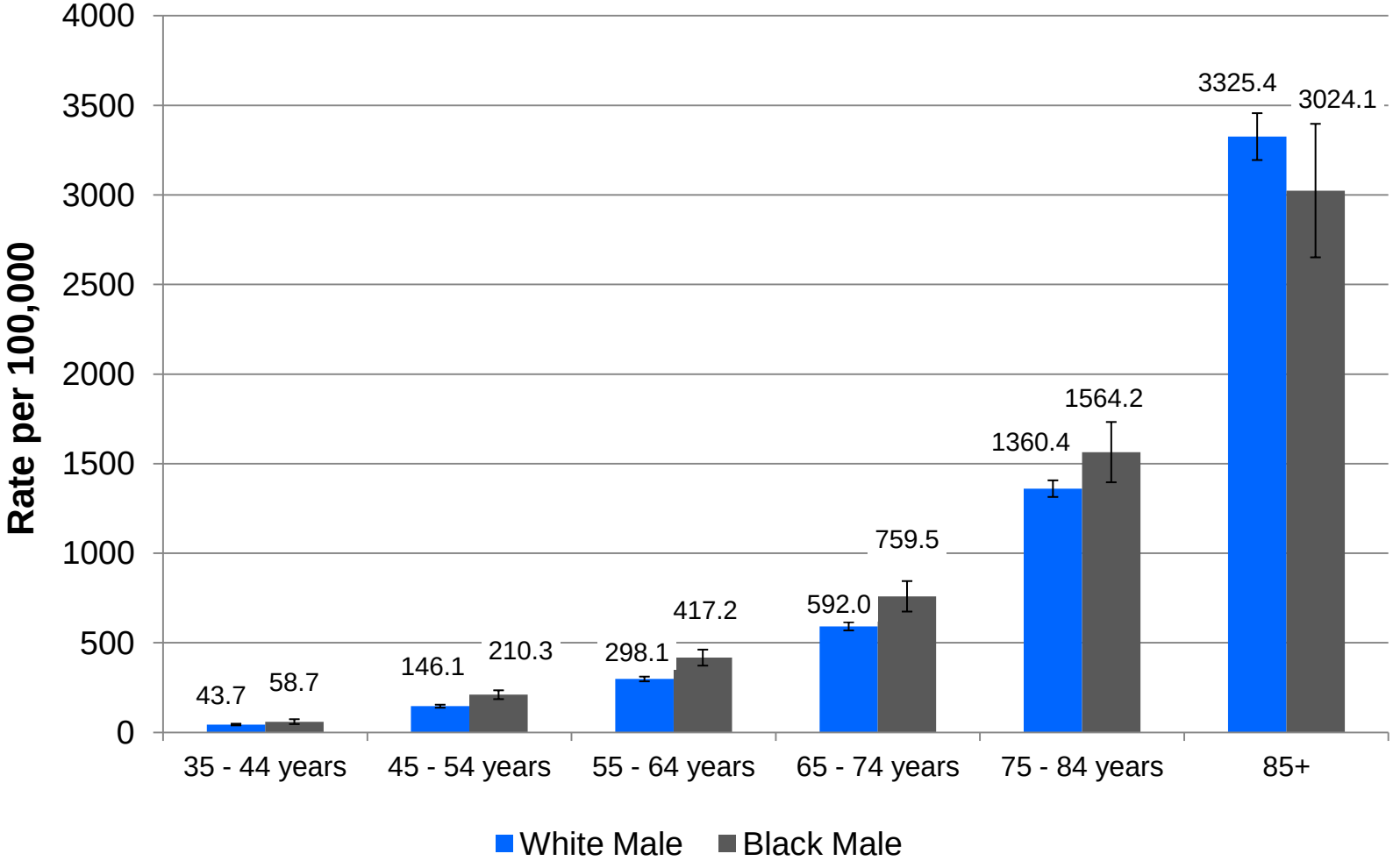
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Ischemic Heart Disease Mortality Rates Among Black Males & Females Arkansas and United States, 1999 - 2008



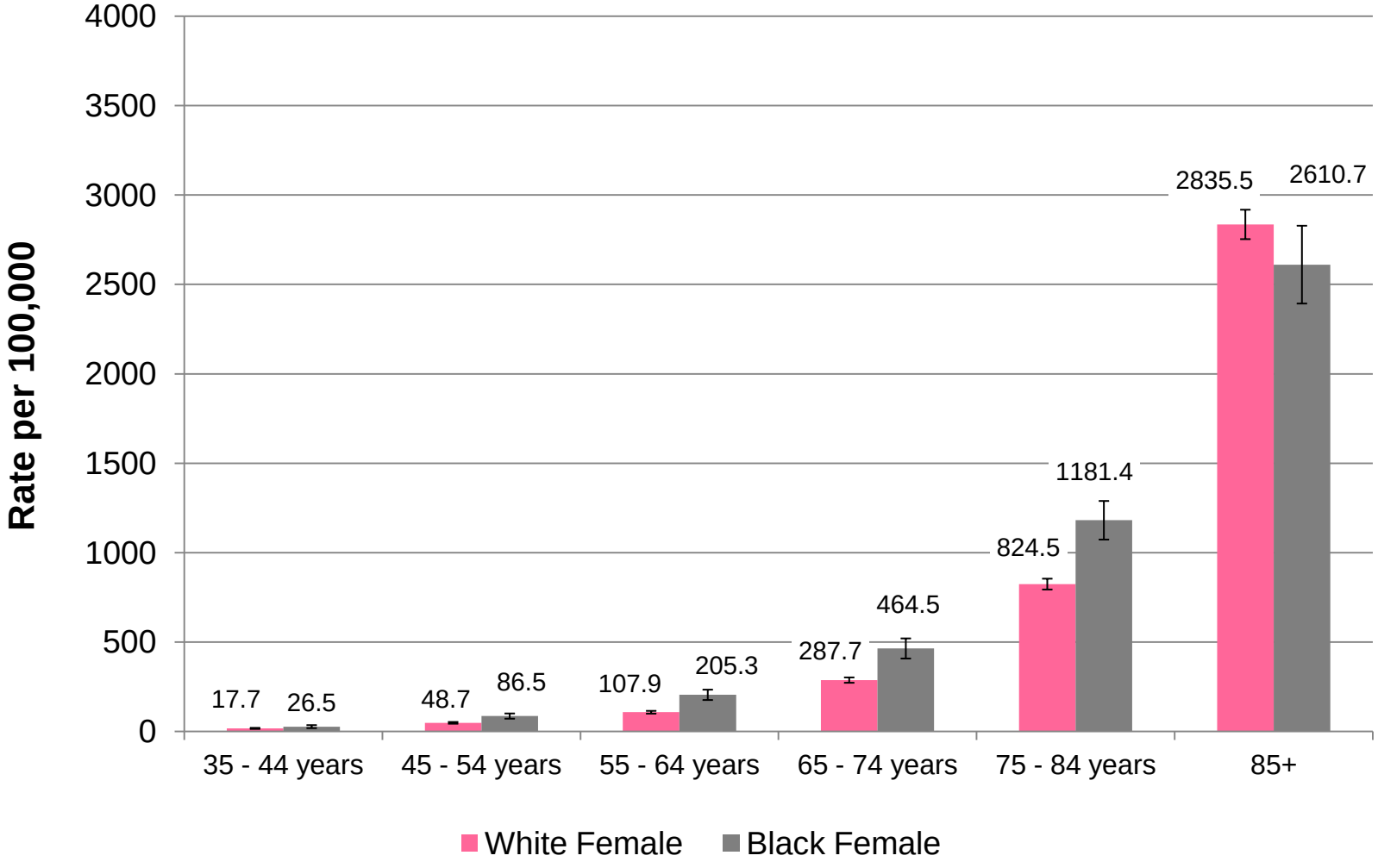
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Age-Specific Ischemic Heart Disease Mortality Rates Among Males, Arkansas, Combined 2004-2008



Source: CDC Wonder Detailed Mortality File

Age-Specific Ischemic Heart Disease Mortality Rates Among Females, Arkansas, Combined 2004-2008



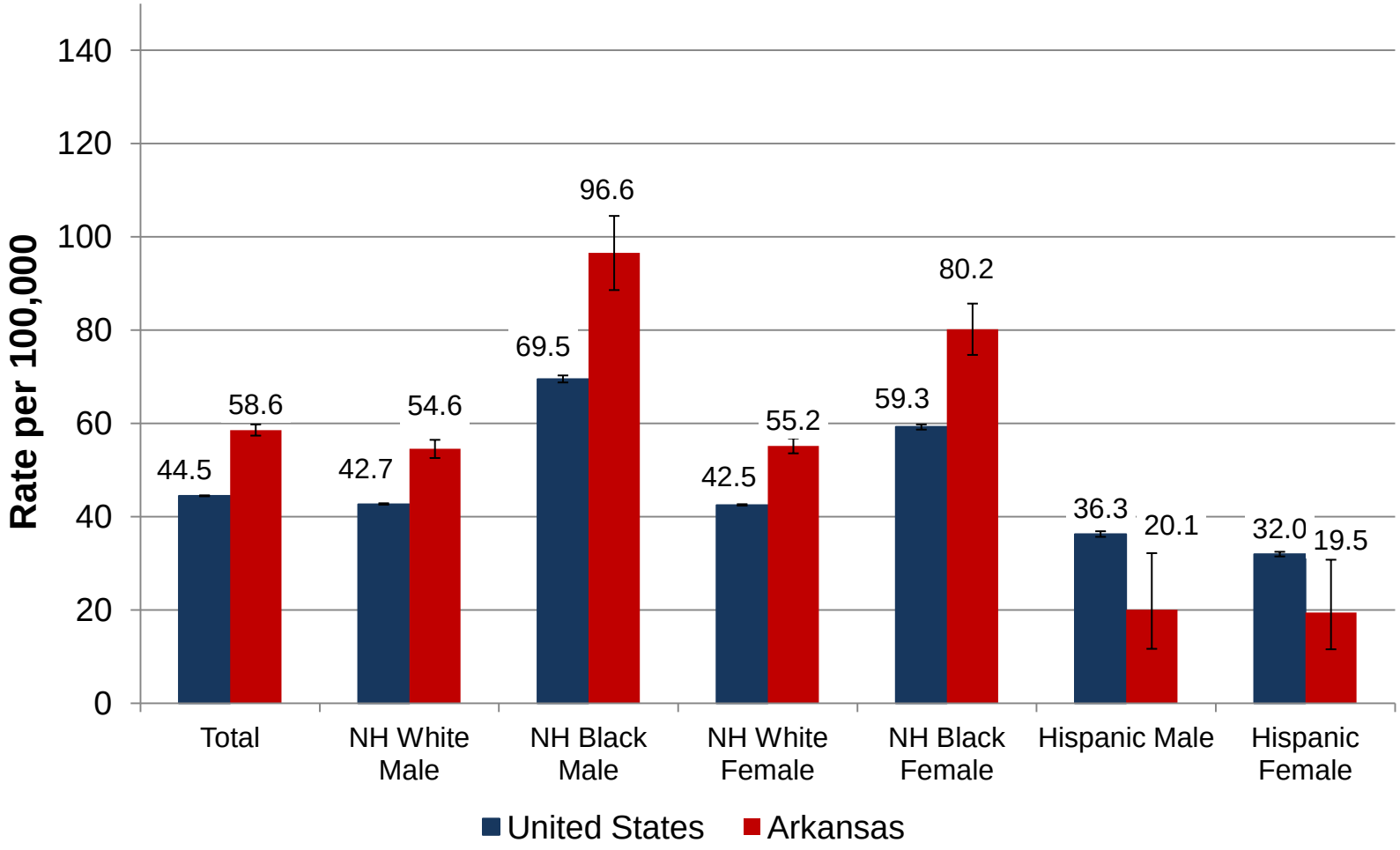
Source: CDC Wonder Detailed Mortality File

C. STROKE MORTALITY

Stroke Mortality

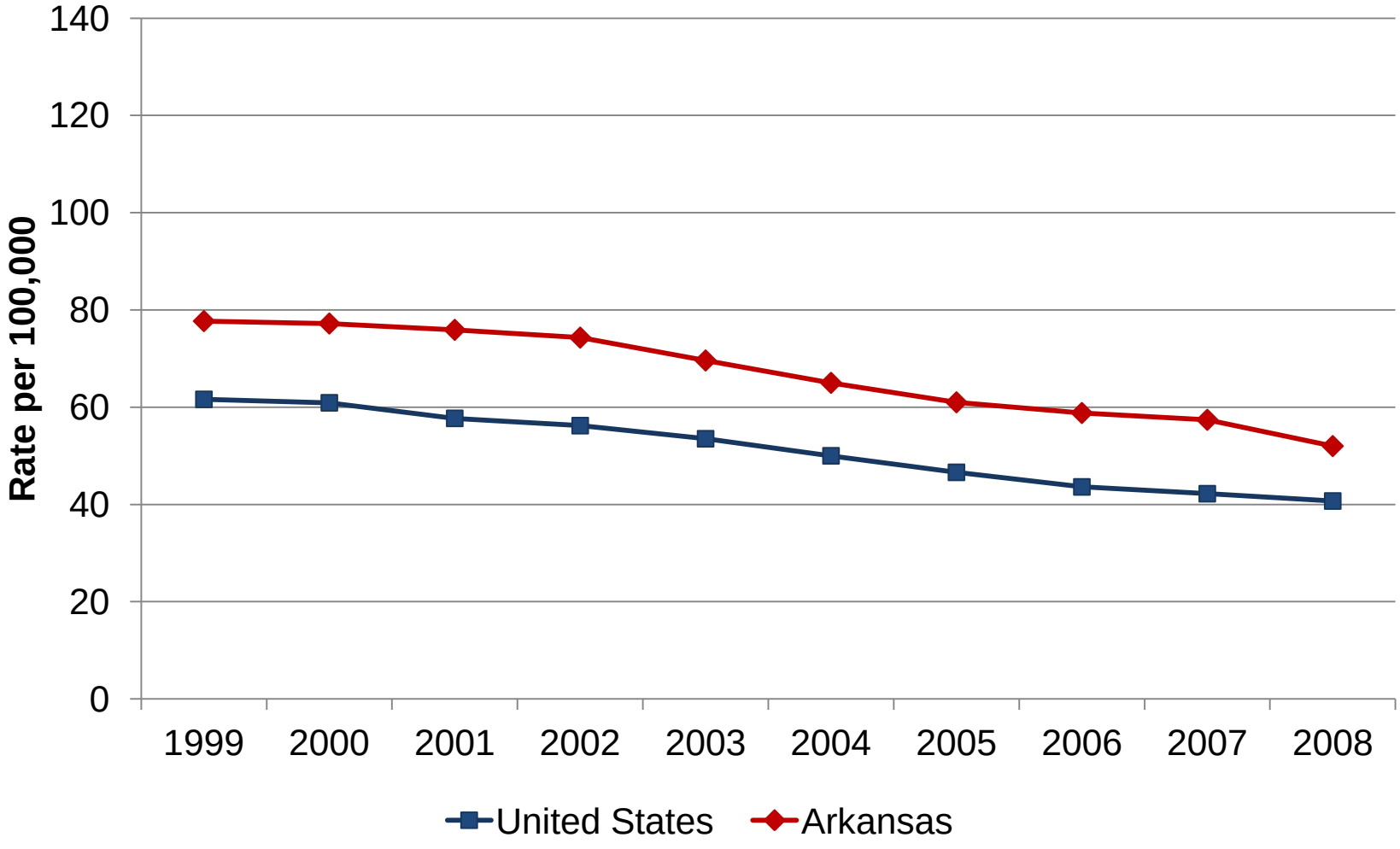
- Stroke mortality rates are decreasing at the same rate for both Arkansas and the U.S. Overall, Arkansas had a 49% decrease in stroke mortality rates during years 1999 – 2008. However, Arkansas maintains statistically significant higher stroke mortality rates than the U.S.
- There is a decreasing stroke mortality trend among Blacks, but the decrease is not as definitive as that seen among Whites.
- Hispanic males and females in Arkansas had lower mortality rates from stroke than the U.S., but the Arkansas rates are based on a small number of deaths.
- Stroke mortality increases with age for both White and Black males and females.
  - The age-specific mortality rates are higher for Blacks than their White counterparts for all age-groups, except among women ages 85+. For this age group, White females had higher stroke mortality rates than Black females.

Stroke Mortality Rates, By Gender and Race/Ethnicity, Arkansas & United States, Combined 2004-2008



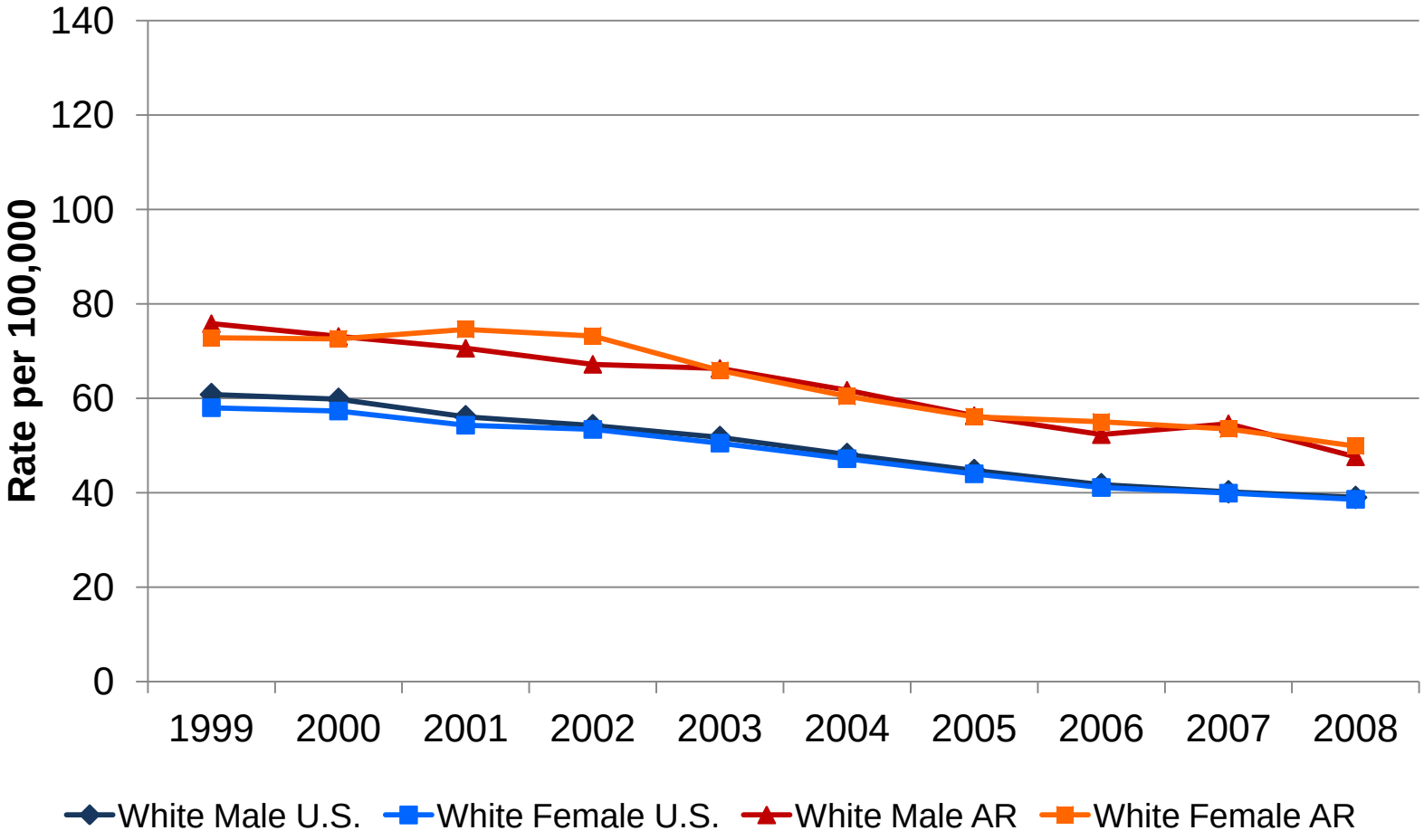
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Stroke Mortality Rates
Arkansas and United States, 1999 - 2008



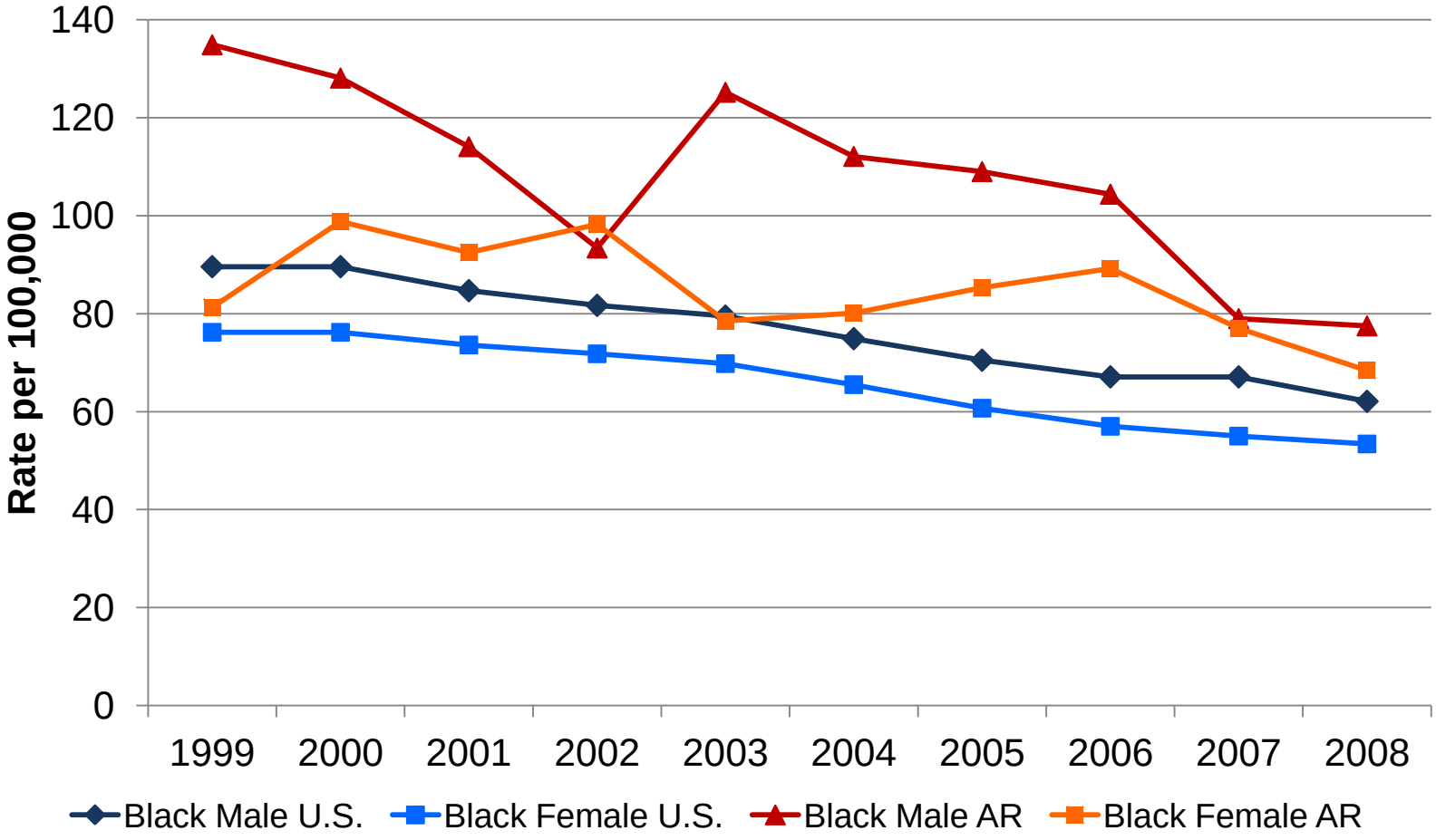
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Stroke Mortality Rates Among White Males & Females, Arkansas and United States, 1999 - 2008



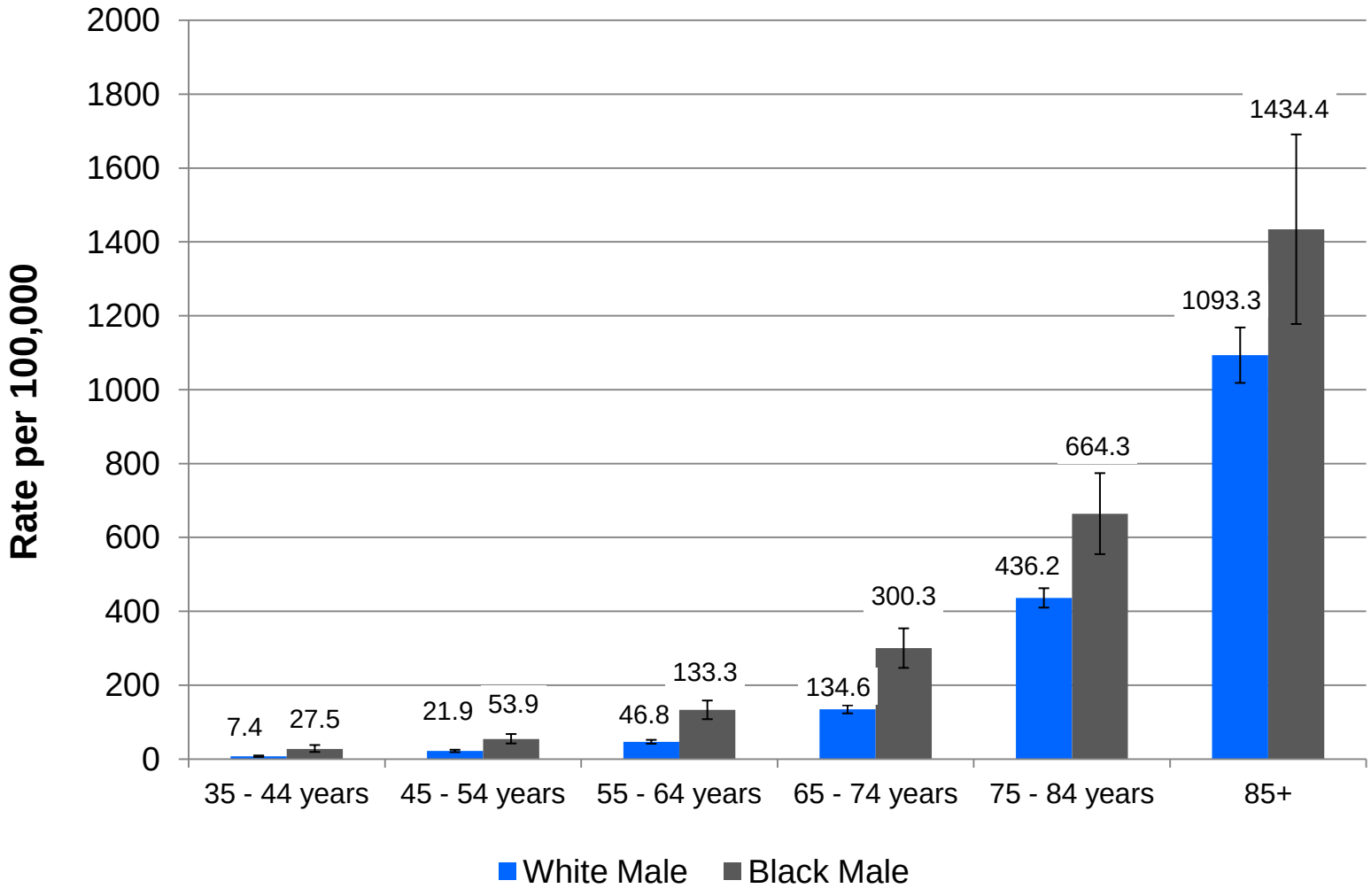
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Stroke Mortality Rates Among Black Males & Females Arkansas and United States, 1999 - 2008



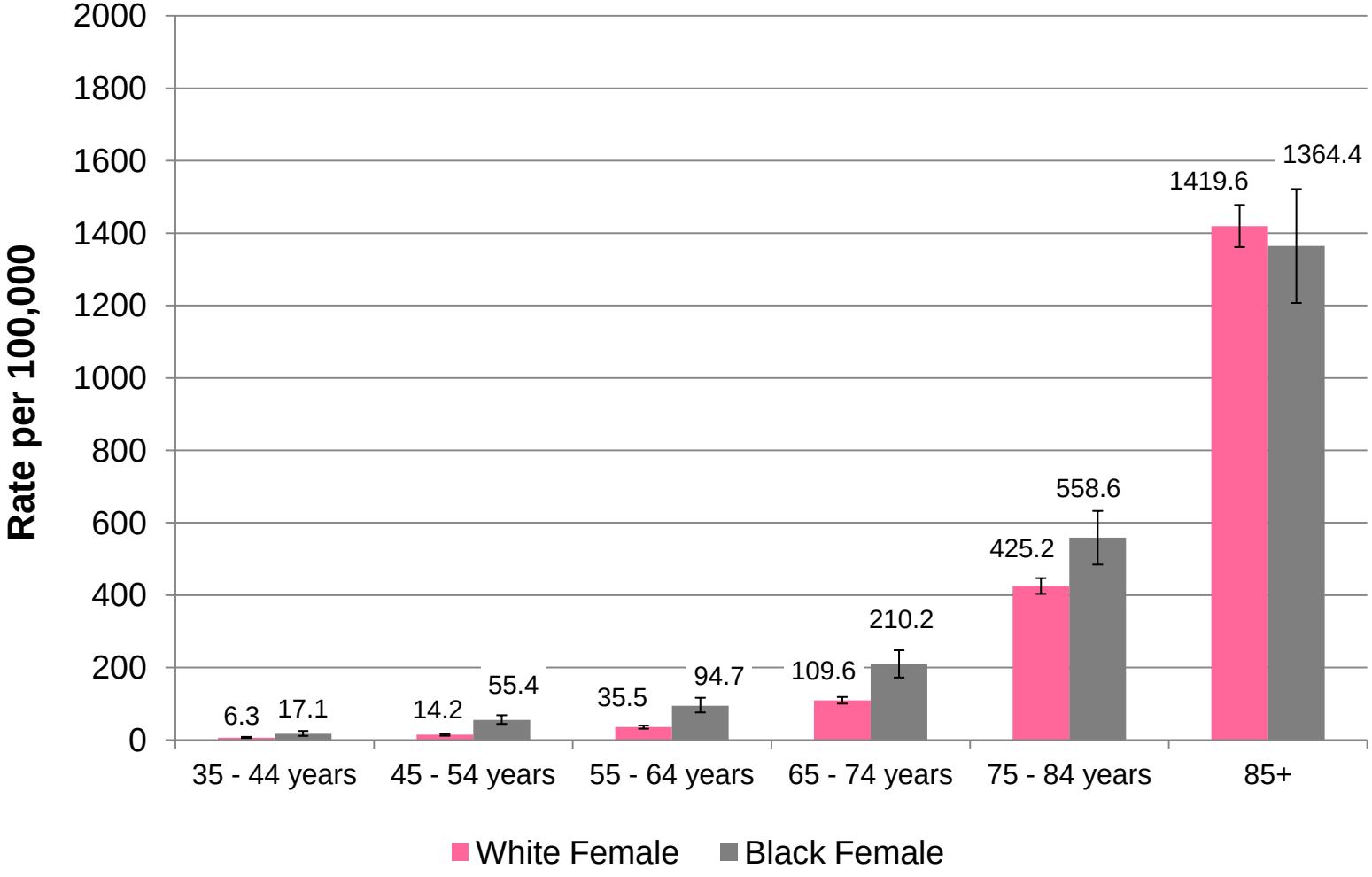
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Age-Specific Stroke Mortality Rates Among Males Arkansas, Combined 2004-2008



Source: CDC Wonder Detailed Mortality File

Age-Specific Stoke Mortality Rates Among Females Arkansas, Combined 2004-2008



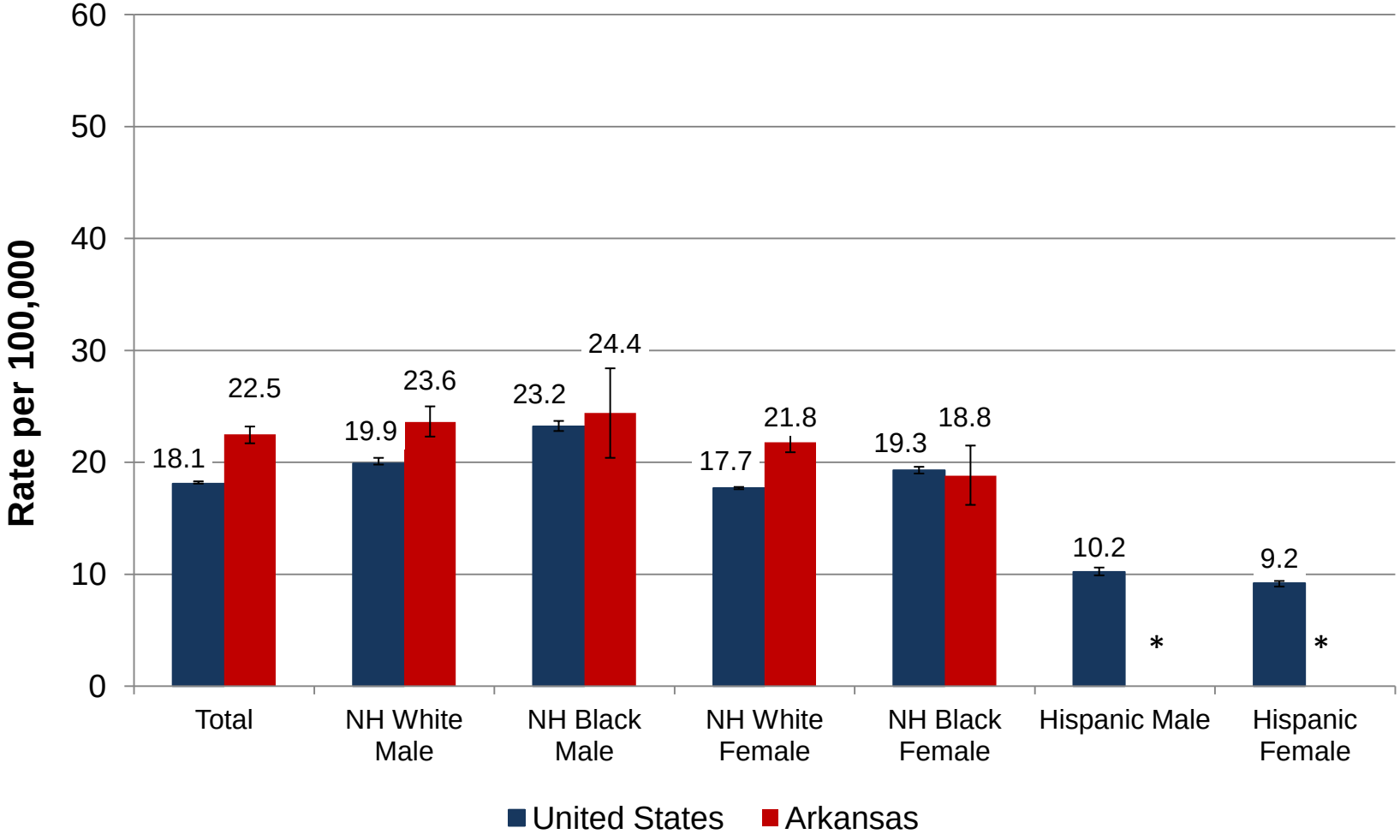
Source: CDC Wonder Detailed Mortality File

D. CONGESTIVE HEART FAILURE MORTALITY

Congestive Heart Failure Mortality

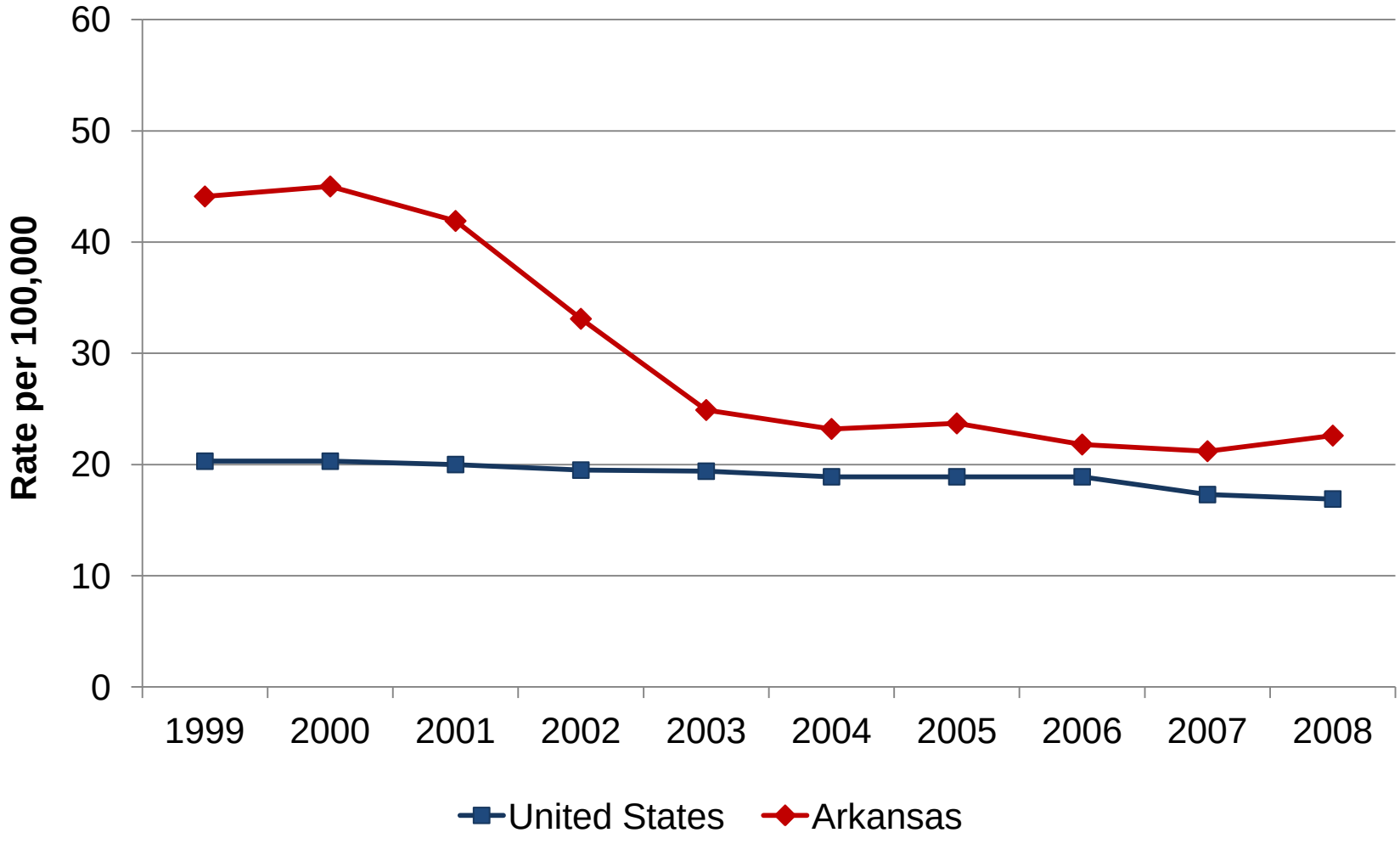
- From 2000 – 2003, there was a 45% decrease in congestive heart failure mortality rates in Arkansas. Since then, the rates have remained stable but higher than the U.S. rates through 2008.
- The decrease in the overall congestive heart failure mortality rate was driven by White males and females. However, rates among Blacks decreased for the same time-period.
- The number of congestive heart failure deaths among Hispanics in Arkansas were too small to calculate stable rates.
- White males and females had higher age-specific mortality rates than Blacks for older ages 75 and above. However, the number of deaths for each age-group were small.

Congestive Heart Failure Mortality Rates By Gender and Race/Ethnicity Arkansas & United States, Combined 2004-2008



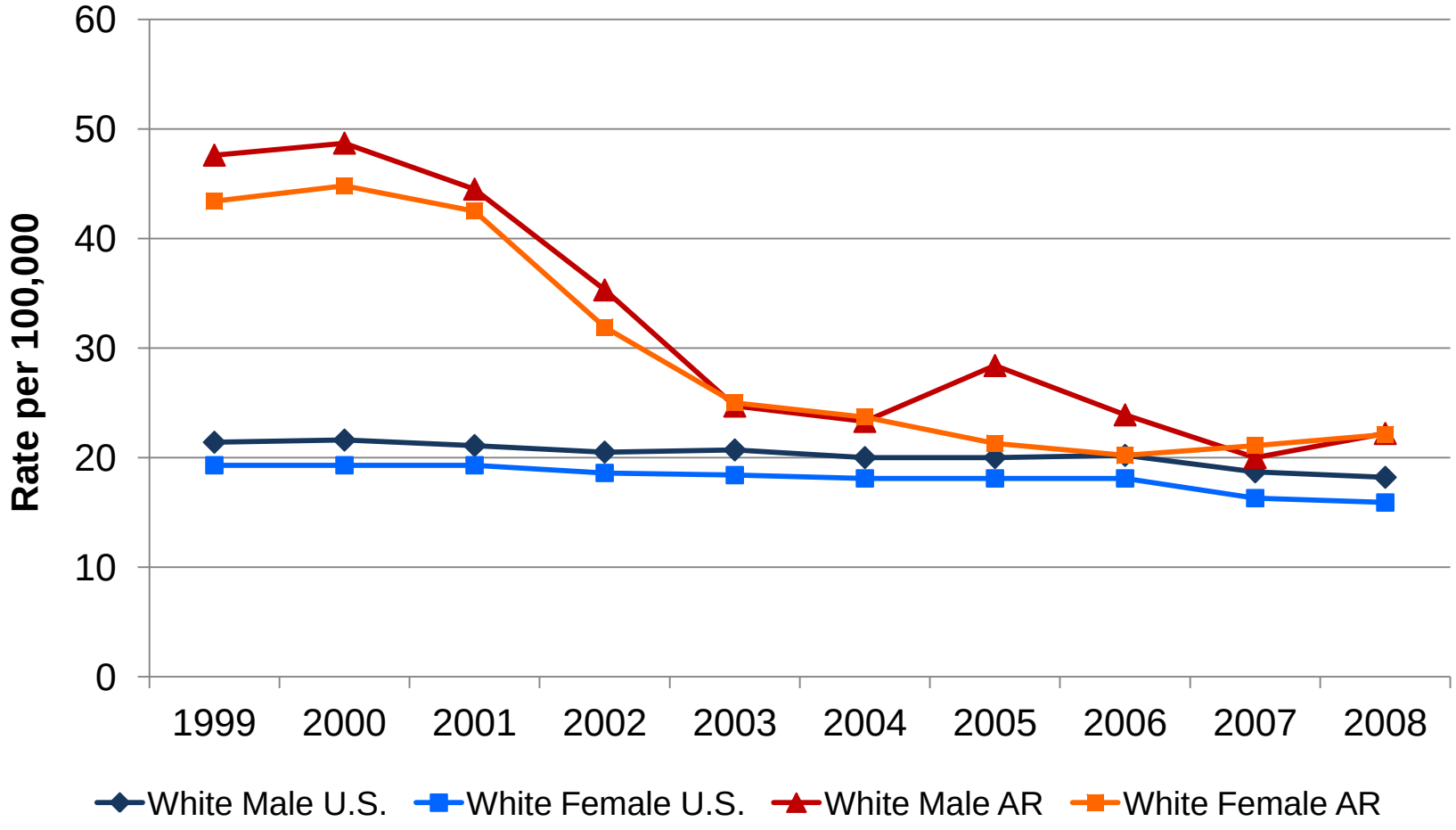
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.
*Rates are suppressed because of the low number of CHD deaths among Hispanics in Arkansas

Congestive Heart Failure Mortality Rates Arkansas and United States, 1999 - 2008



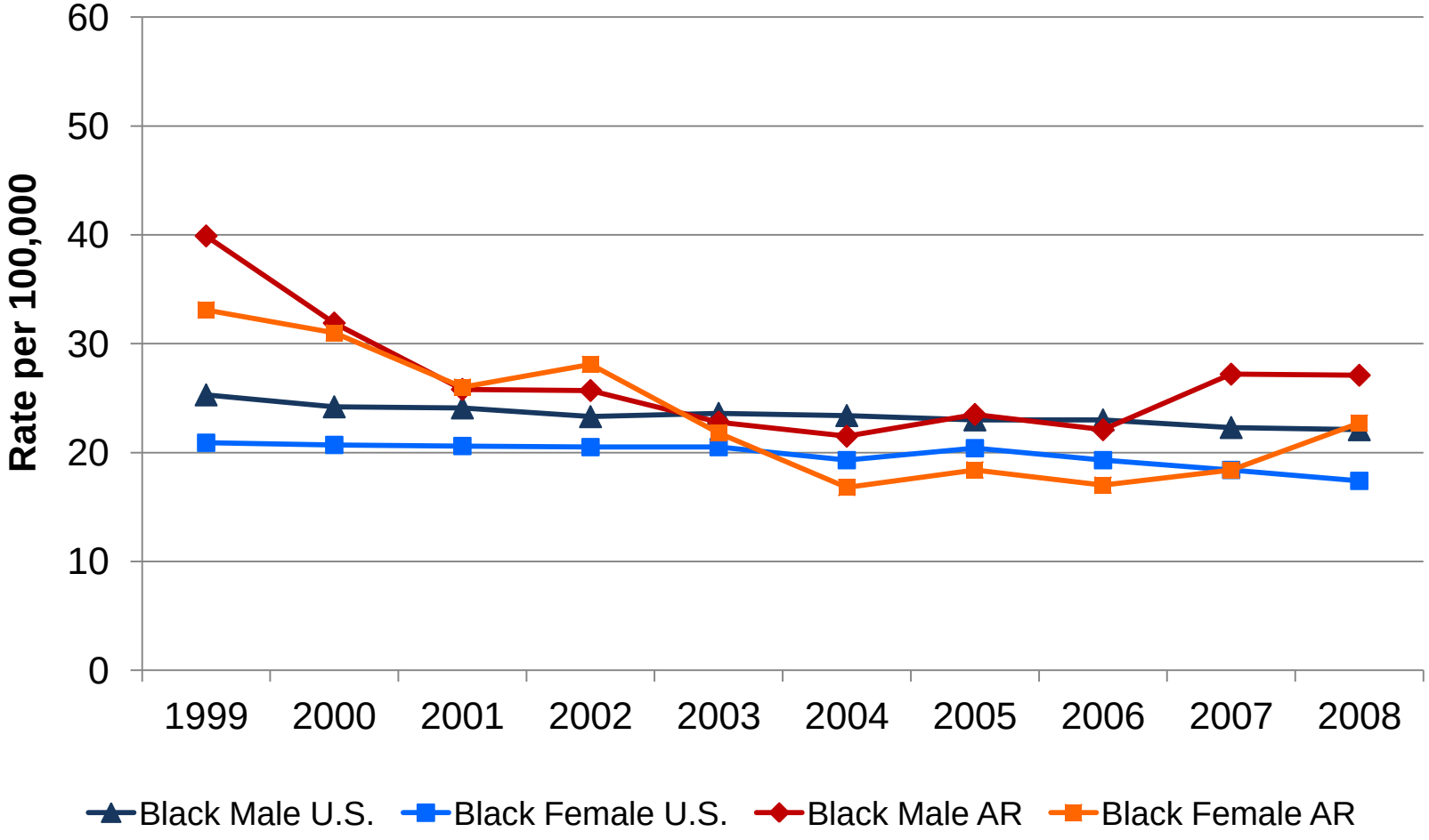
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Congestive Heart Failure Mortality Rates Among White Males and Females Arkansas and United States, 1999 - 2008



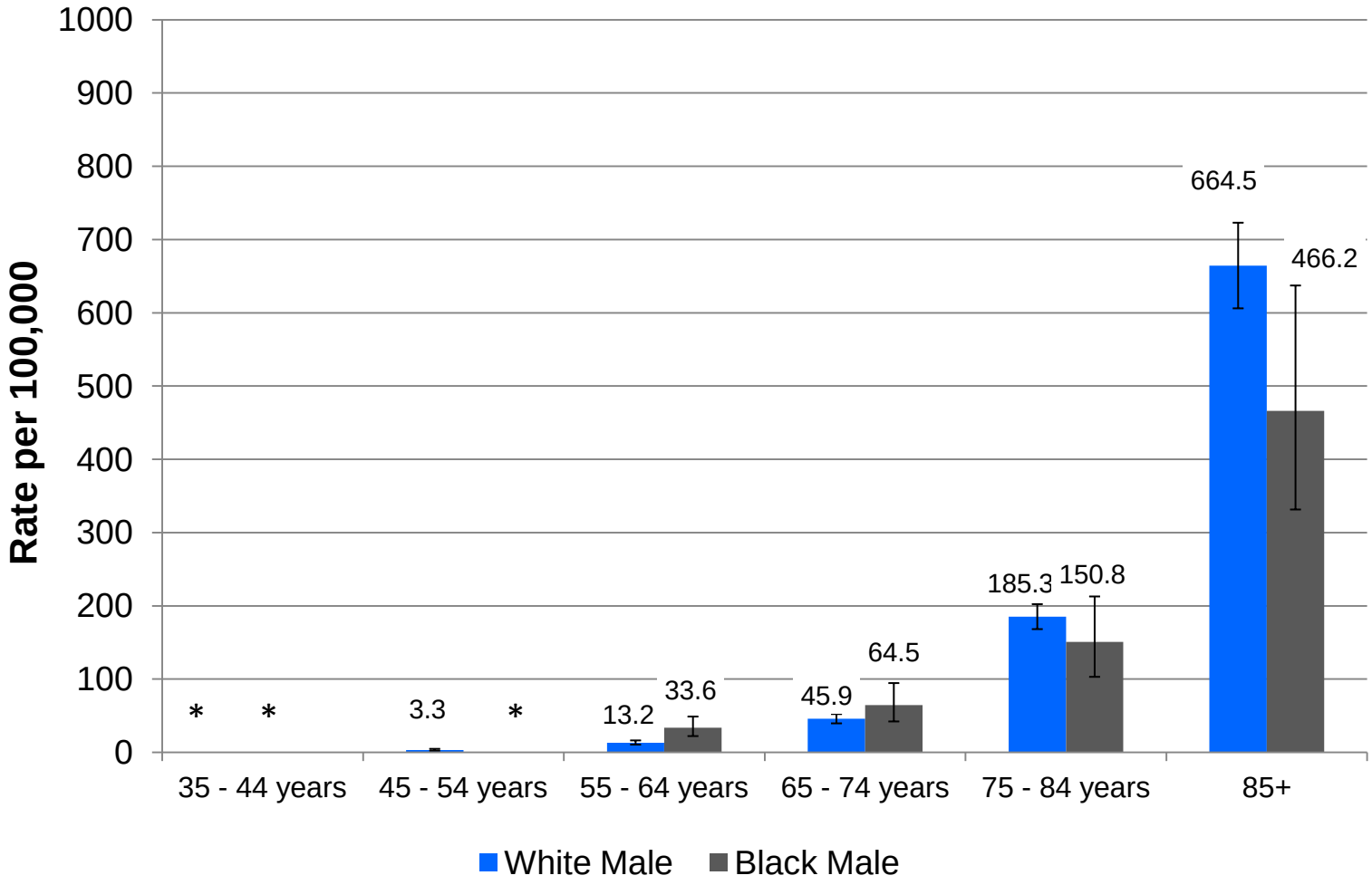
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Congestive Heart Failure Mortality Rates Among Black Males & Females Arkansas and United States, 1999 - 2008



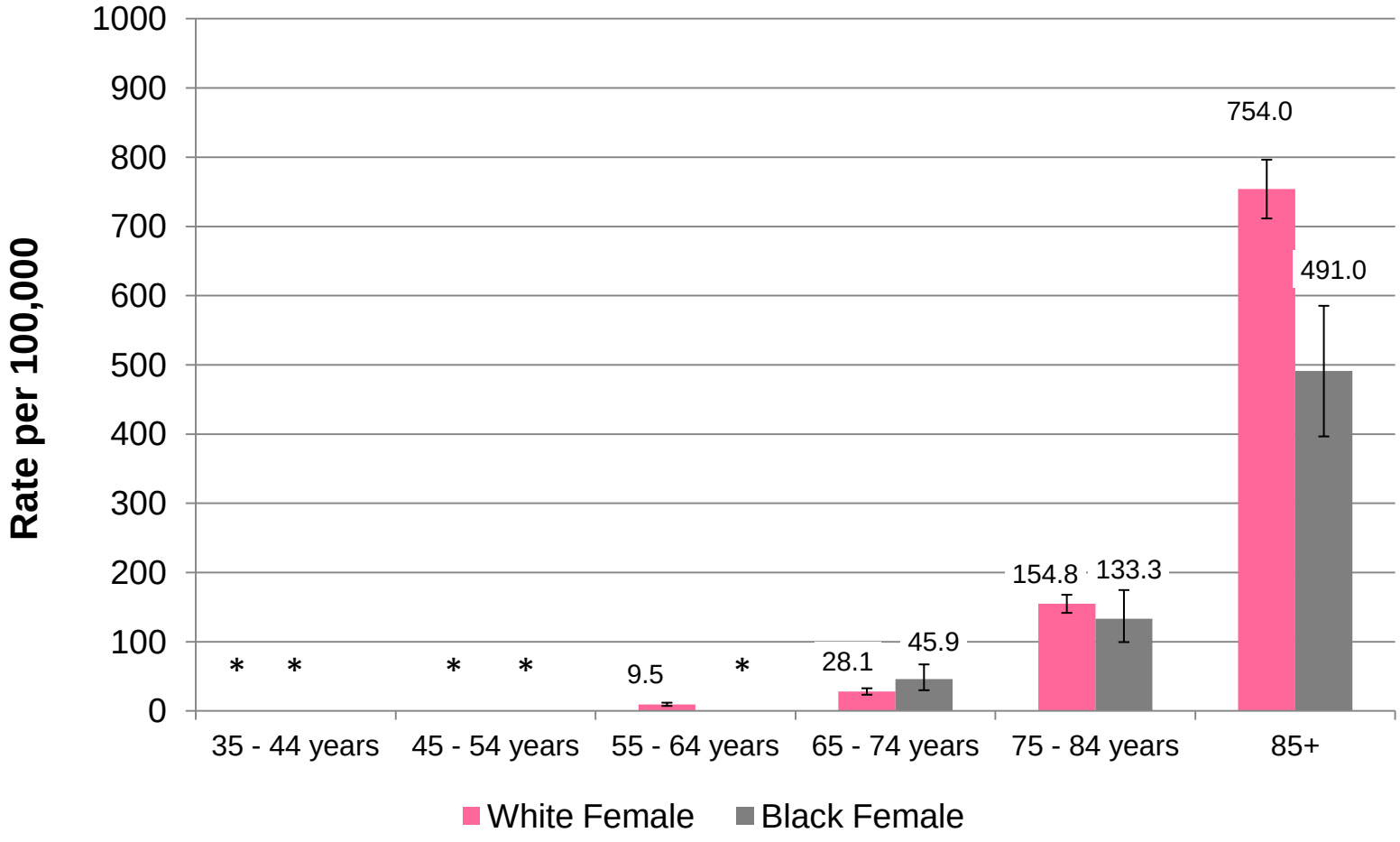
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Age-Specific Congestive Heart Failure Mortality Rates Among Males, Arkansas, Combined 2004-2008



Source: CDC Wonder Detailed Mortality File
*Rates are suppressed due to small number of deaths

Age-Specific Congestive Heart Failure Mortality Rates Among Females, Arkansas, Combined 2004-2008



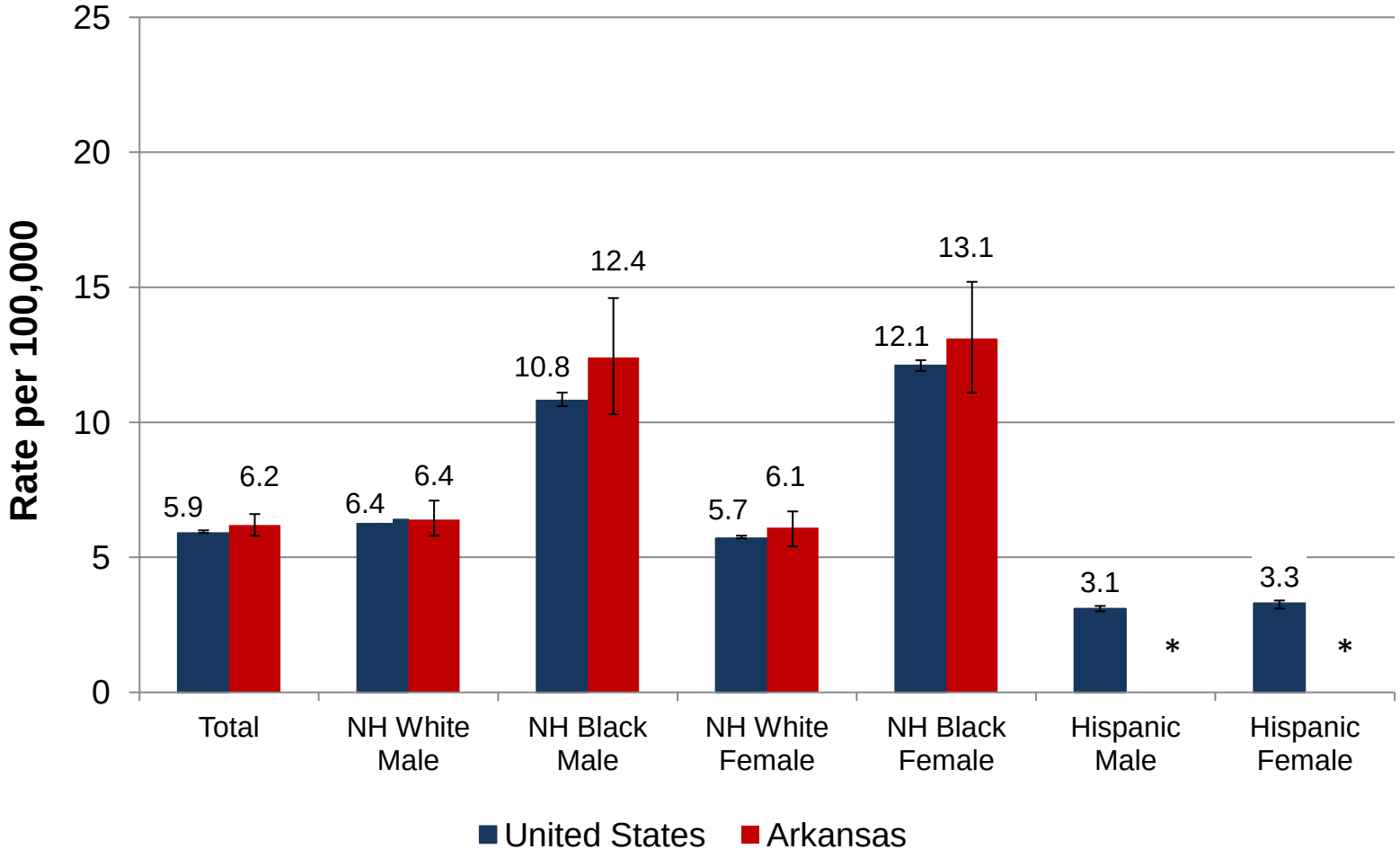
Source: CDC Wonder Detailed Mortality File
*Rates are suppressed due to small number of deaths

E. CHRONIC KIDNEY DISEASE MORTALITY

Chronic Kidney Disease Mortality

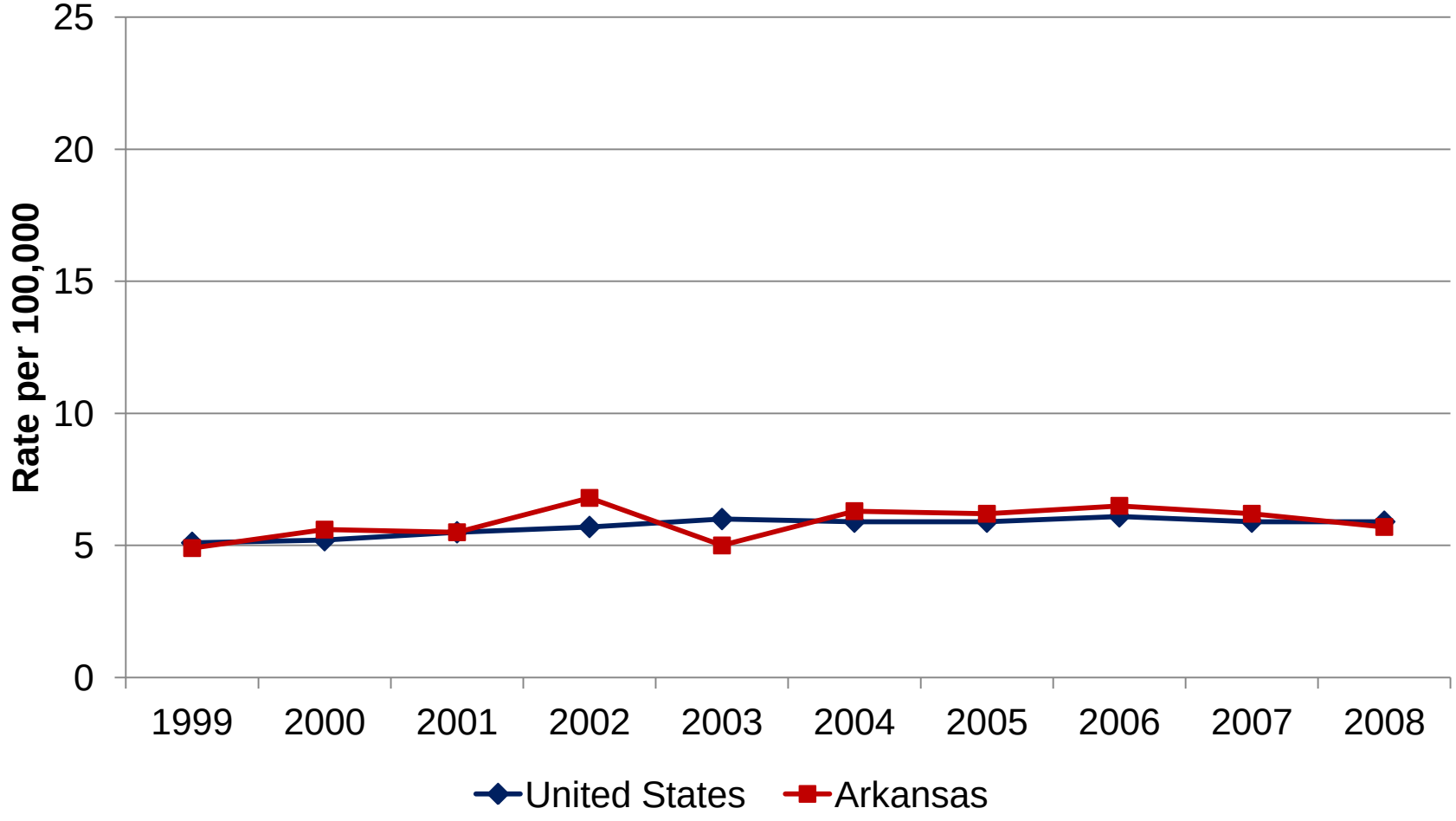
- Chronic kidney disease mortality rates in Arkansas remained stable and comparable to the mortality trends in the U.S.
- Black males and females had higher chronic kidney mortality rates than Whites in Arkansas.
- The number of chronic kidney disease deaths among Hispanics in Arkansas were too small to calculate stable rates.
- Chronic kidney disease mortality rates increased with age among White males and females, but no age-specific trends were noticeable for Black males and females due the small number of deaths for each age group.

Chronic Kidney Disease Mortality Rates By Gender and Race/Ethnicity Arkansas & United States, Combined 2004-2008



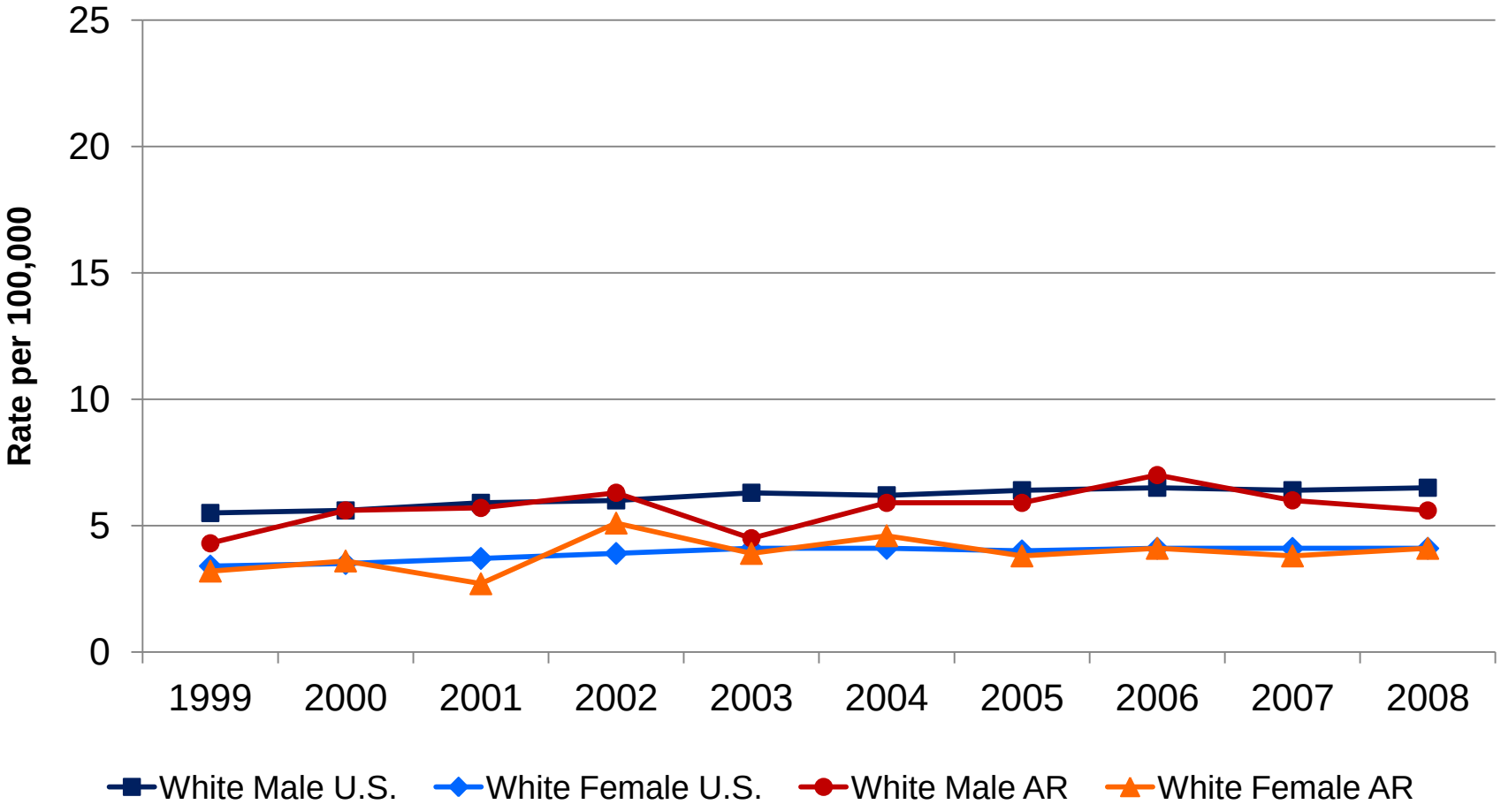
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.
*Rates are suppressed because of the low number of CHD deaths among Hispanics in Arkansas

Chronic Kidney Disease Mortality Rates Arkansas and United States, 1999-2008



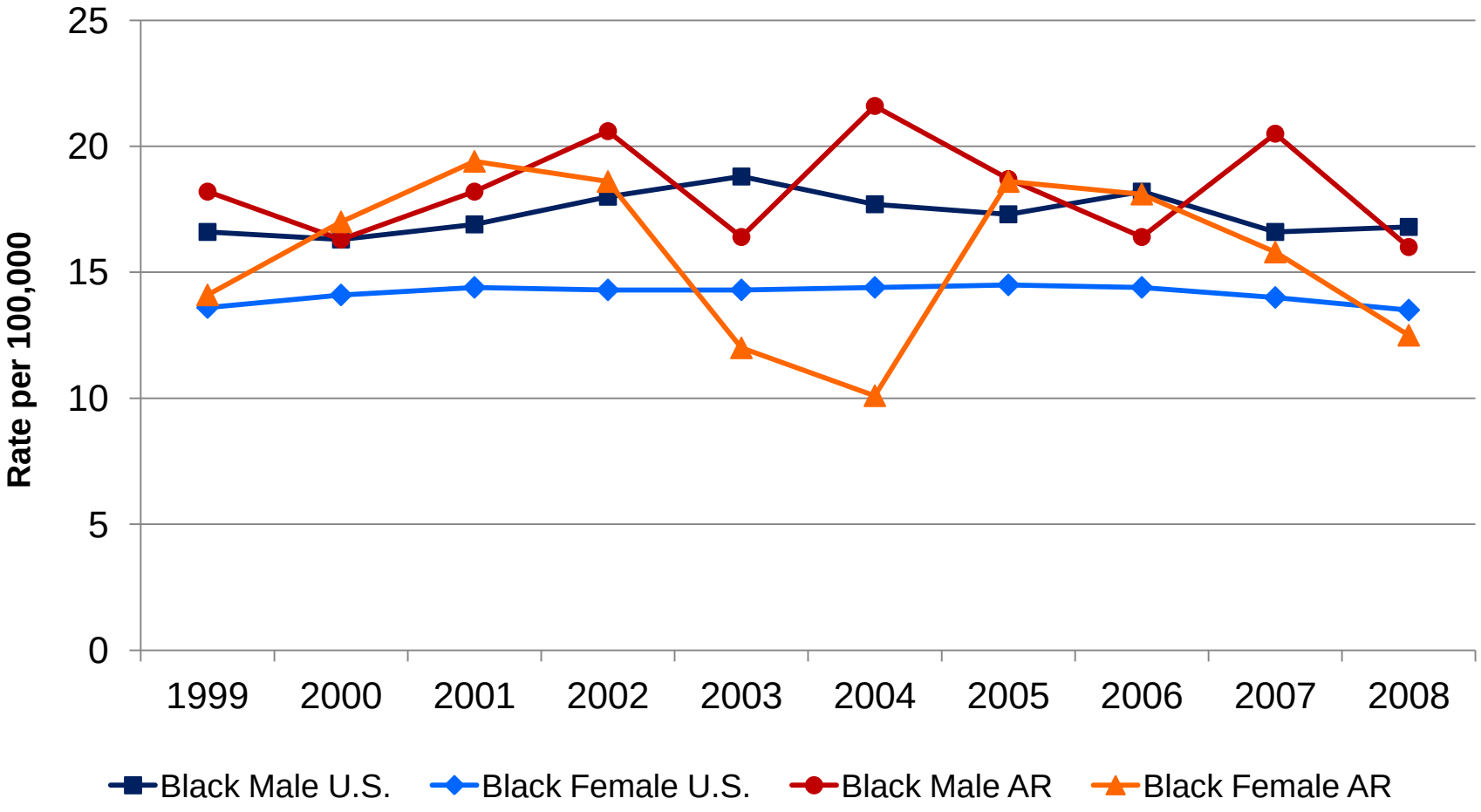
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Chronic Kidney Disease Mortality Rates Among White Males and Females Arkansas and United States, 1999-2008



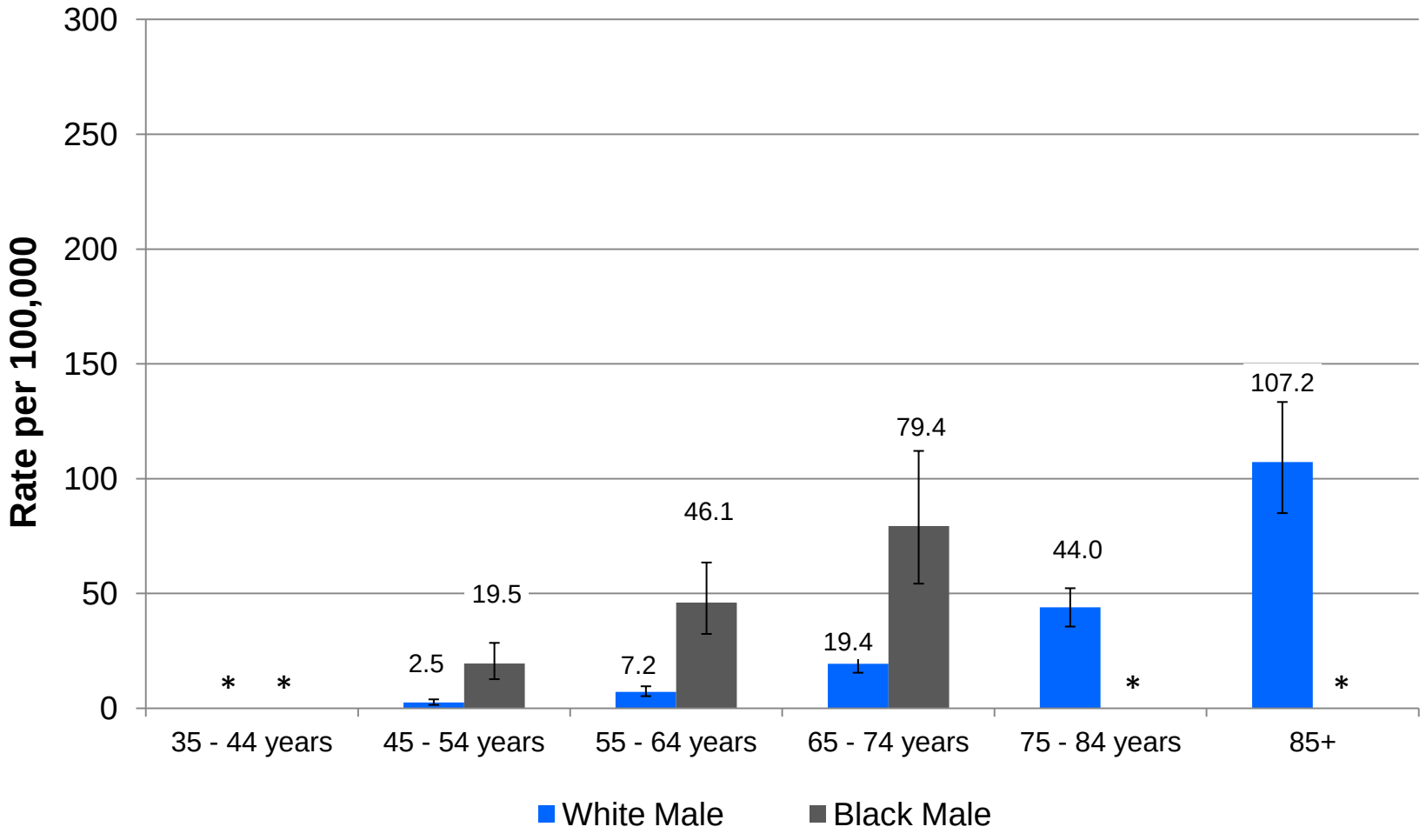
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Chronic Kidney Disease Mortality Rates Among Black Males and Females Arkansas and United States, 1999-2008



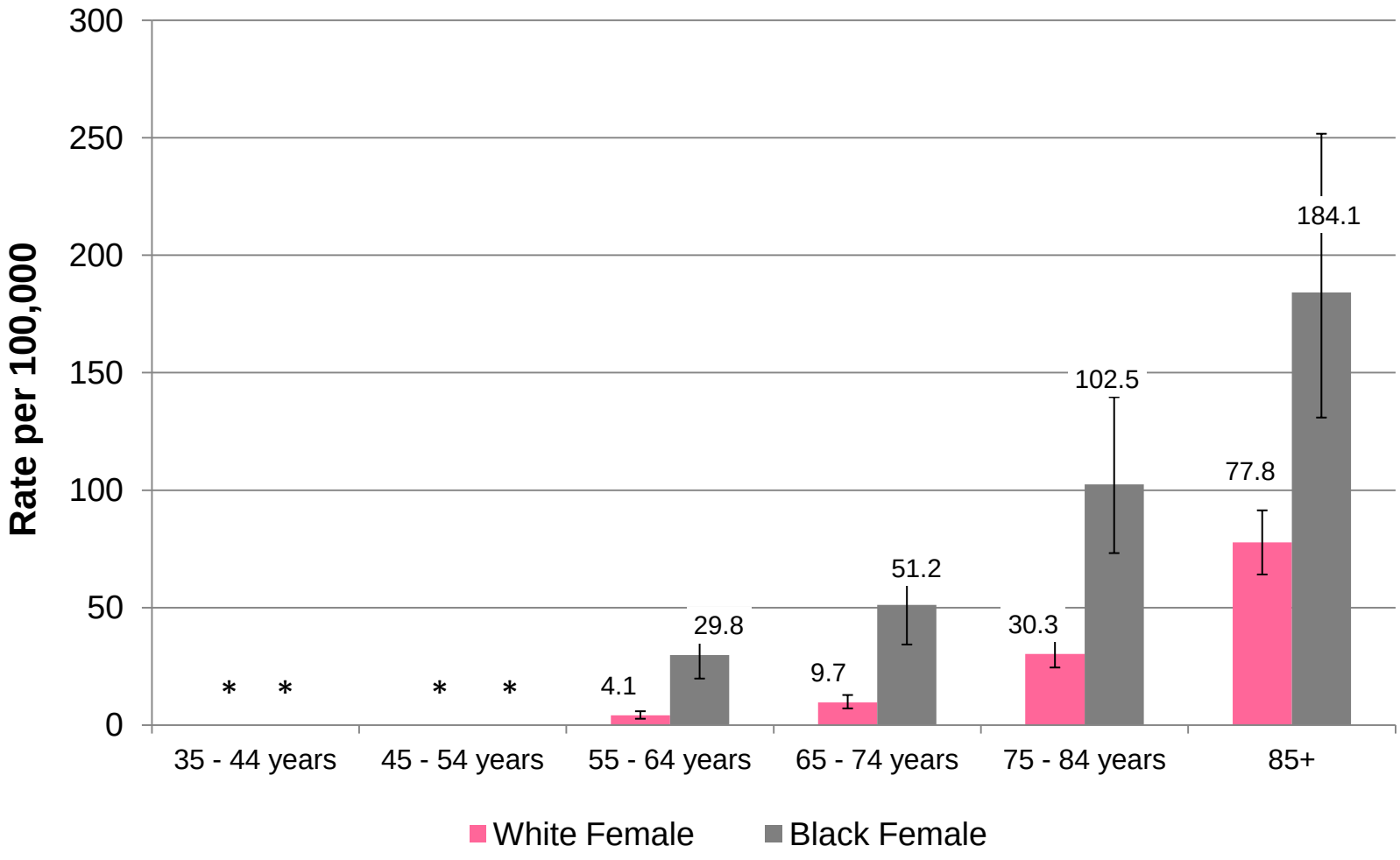
Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Age-Specific Chronic Kidney Disease Mortality Rates Among Males, Arkansas, Combined 2004-2008



Source: CDC Wonder Detailed Mortality File
*Rates are suppressed due to small number of deaths

Age-Specific Chronic Kidney Disease Mortality Rates Among Females, Arkansas, Combined 2004-2008



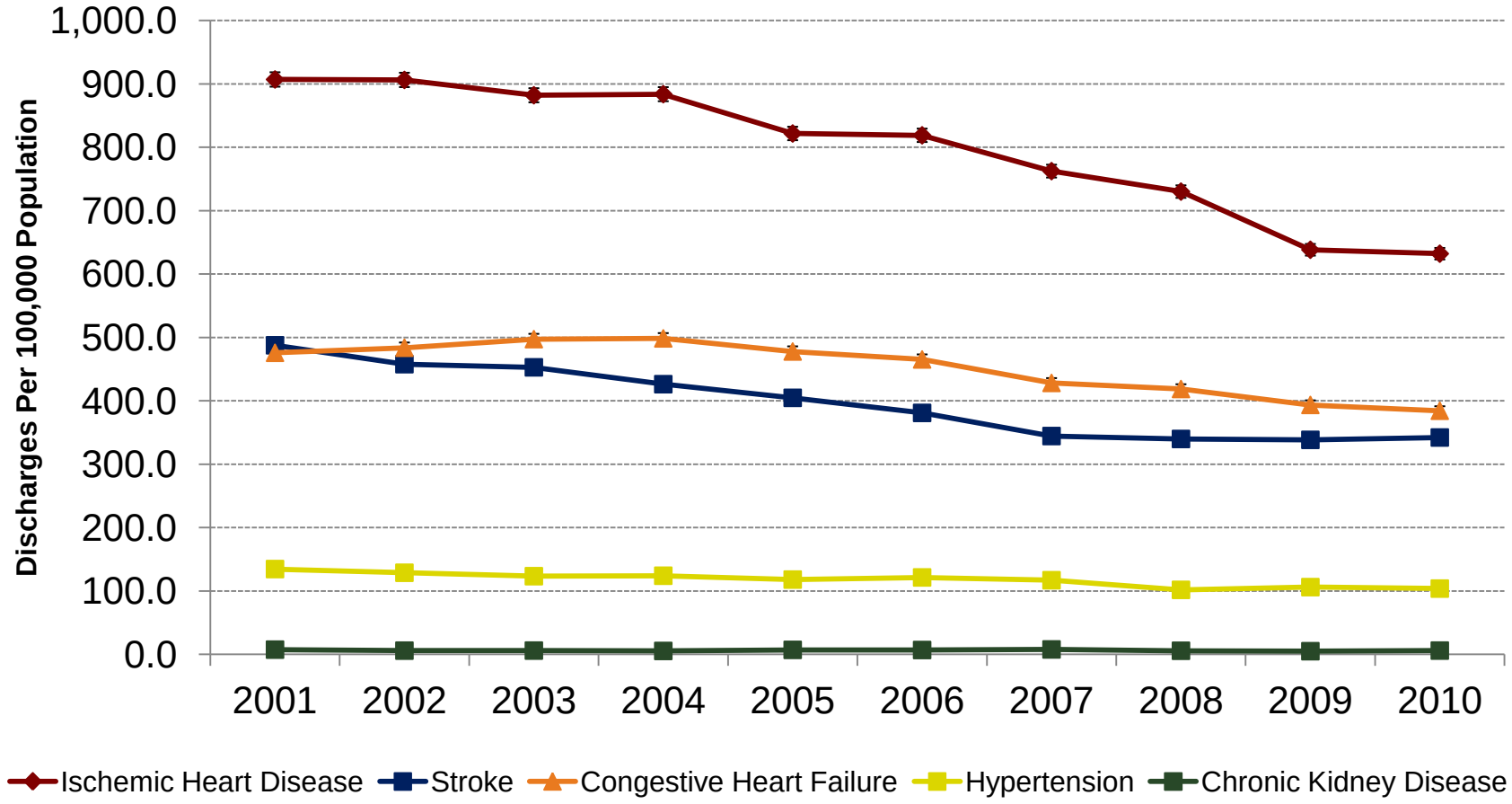
Source: CDC Wonder Detailed Mortality File
*Rates are suppressed due to small number of deaths

SECTION V: HOSPITAL DISCHARGES ASSOCIATED WITH HYPERTENSION

A. Hospital Discharges Rates
B. Total Hospital Charges
C. Average Hospital Charges
D. Average Length of Hospital Stay

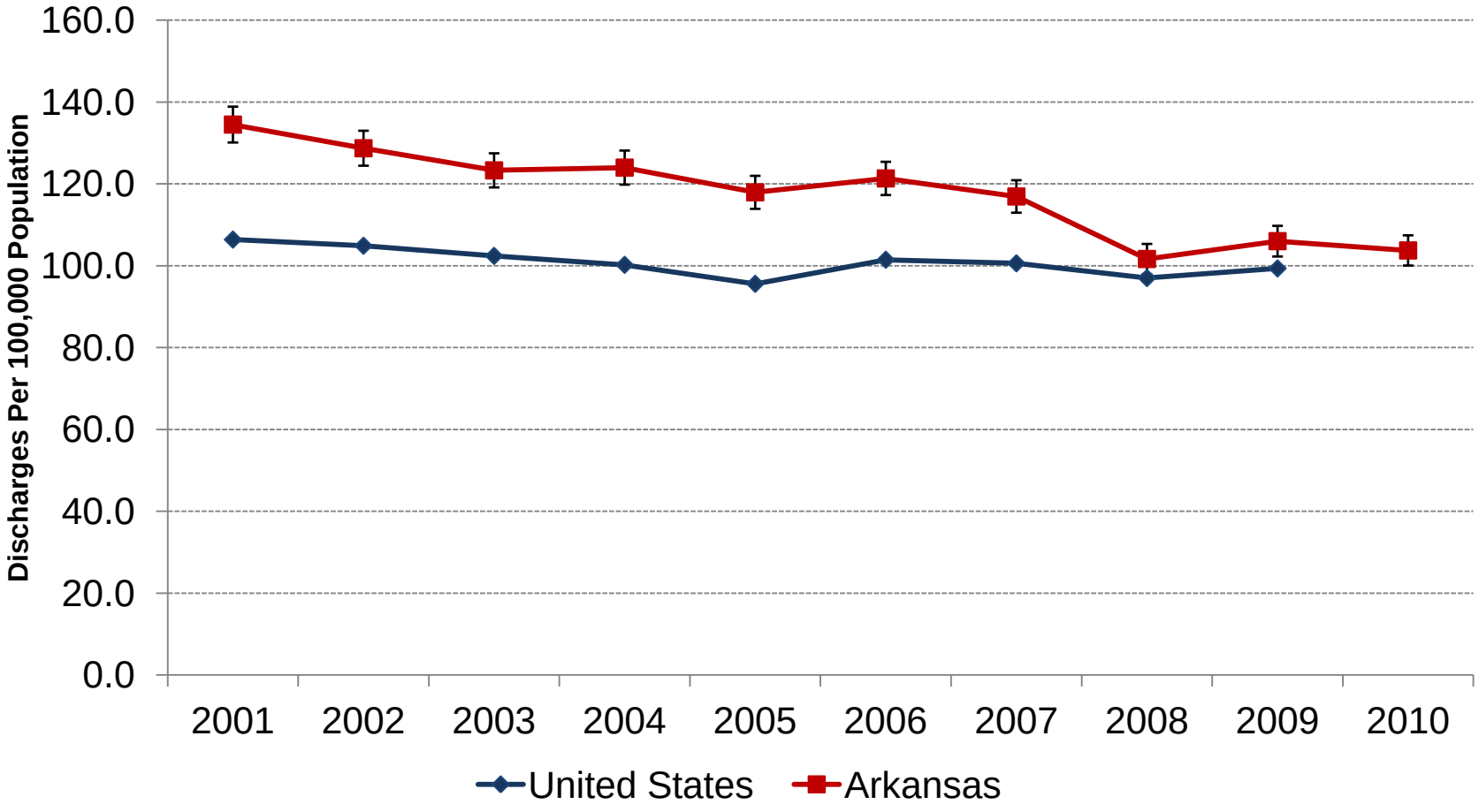
A. HOSPITAL DISCHARGE RATES

Hospital Discharge Rates
Hypertension and Related Diseases
Arkansas, 2001-2010



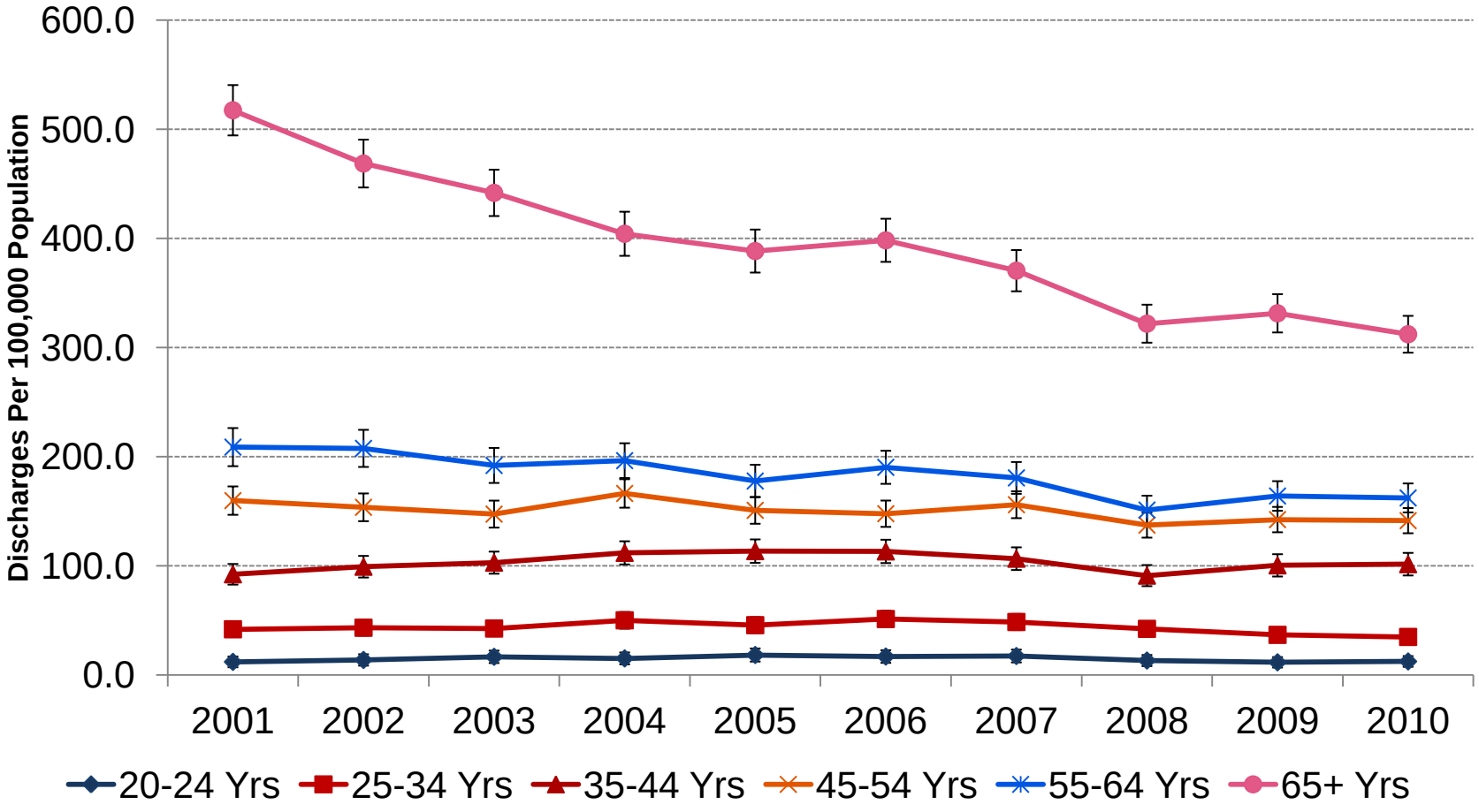
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Hypertension Hospital Discharge Rates
Arkansas & United States, 2001-2010



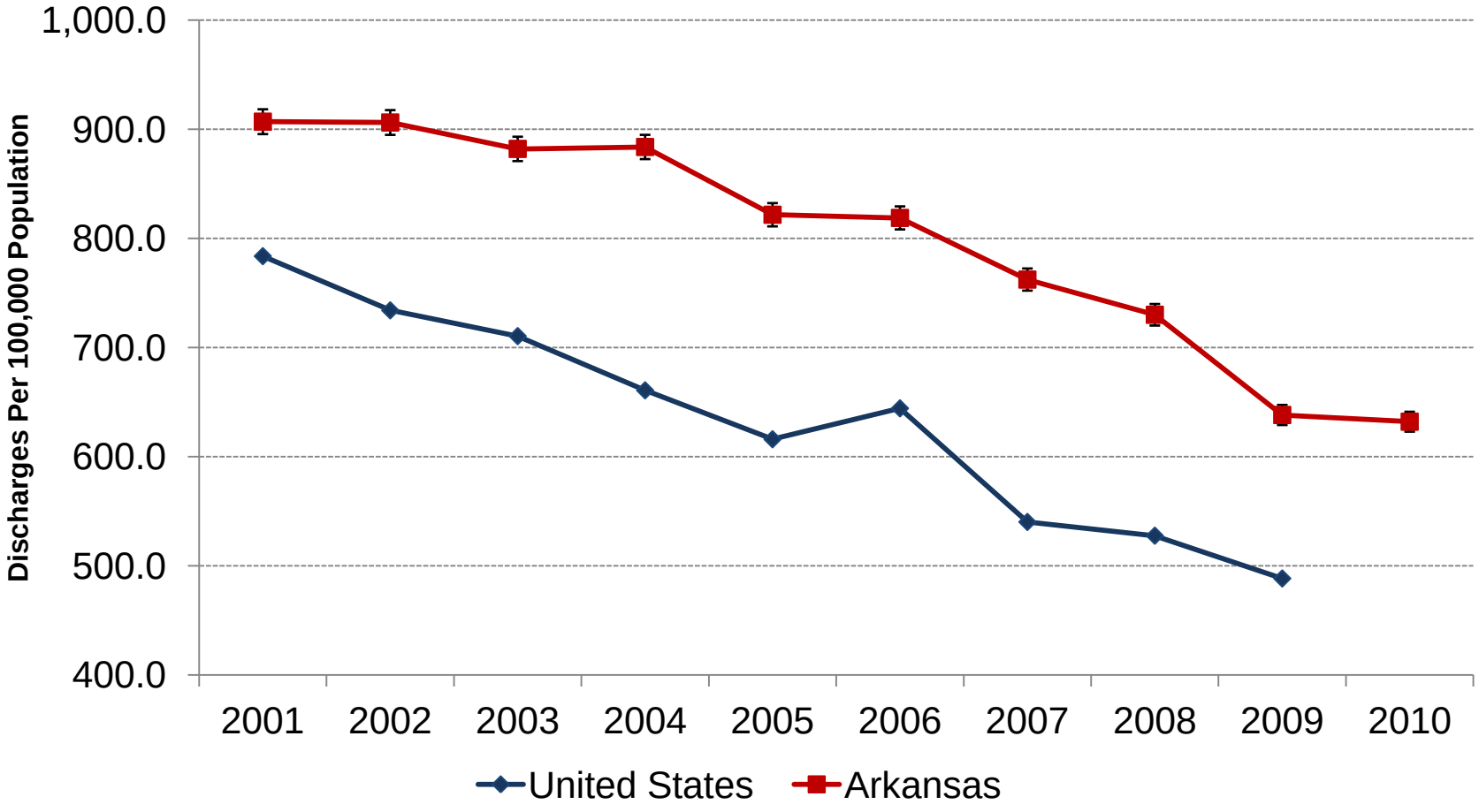
Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System & Agency for Healthcare Research and Quality, HCUP Nationwide Inpatient Sample.

Hypertension Hospital Discharge Rates by Age Group, Arkansas, 2001-2010



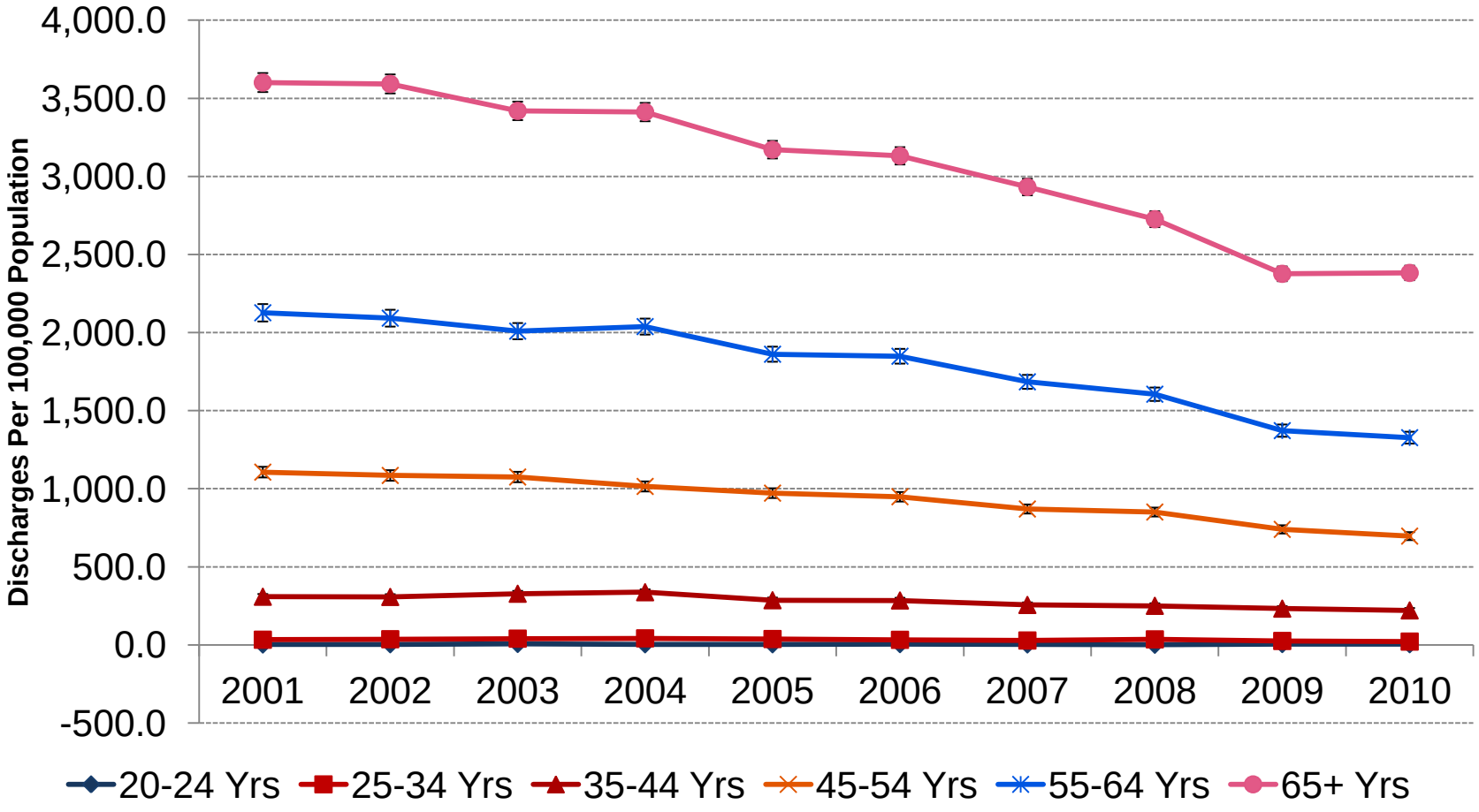
Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Ischemic Heart Disease Hospital Discharge Rates Arkansas & United States, 2001-2010



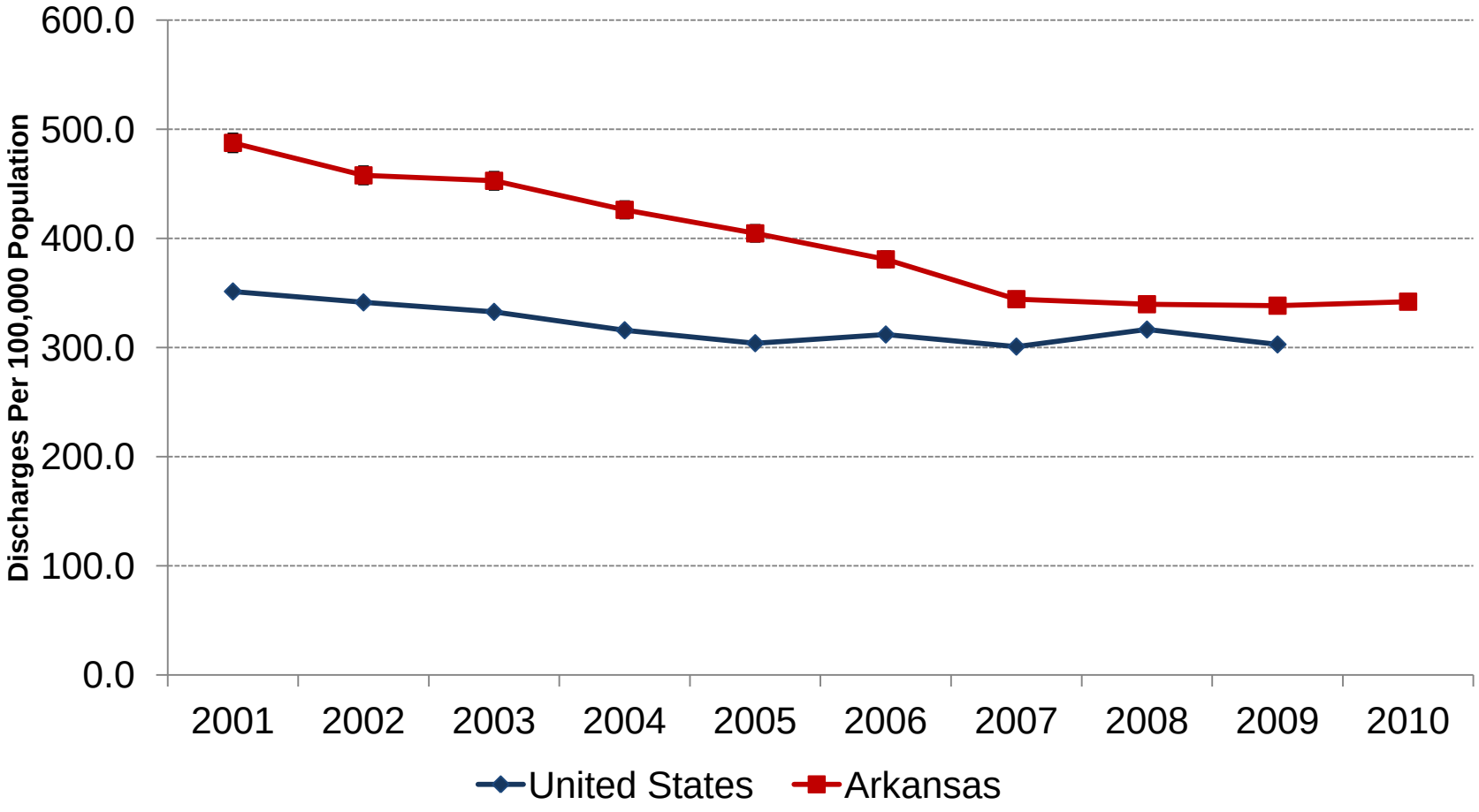
Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System & Agency for Healthcare Research and Quality, HCUP Nationwide Inpatient Sample.

Ischemic Heart Disease Hospital Discharge Rates by Age Group, Arkansas, 2001-2010



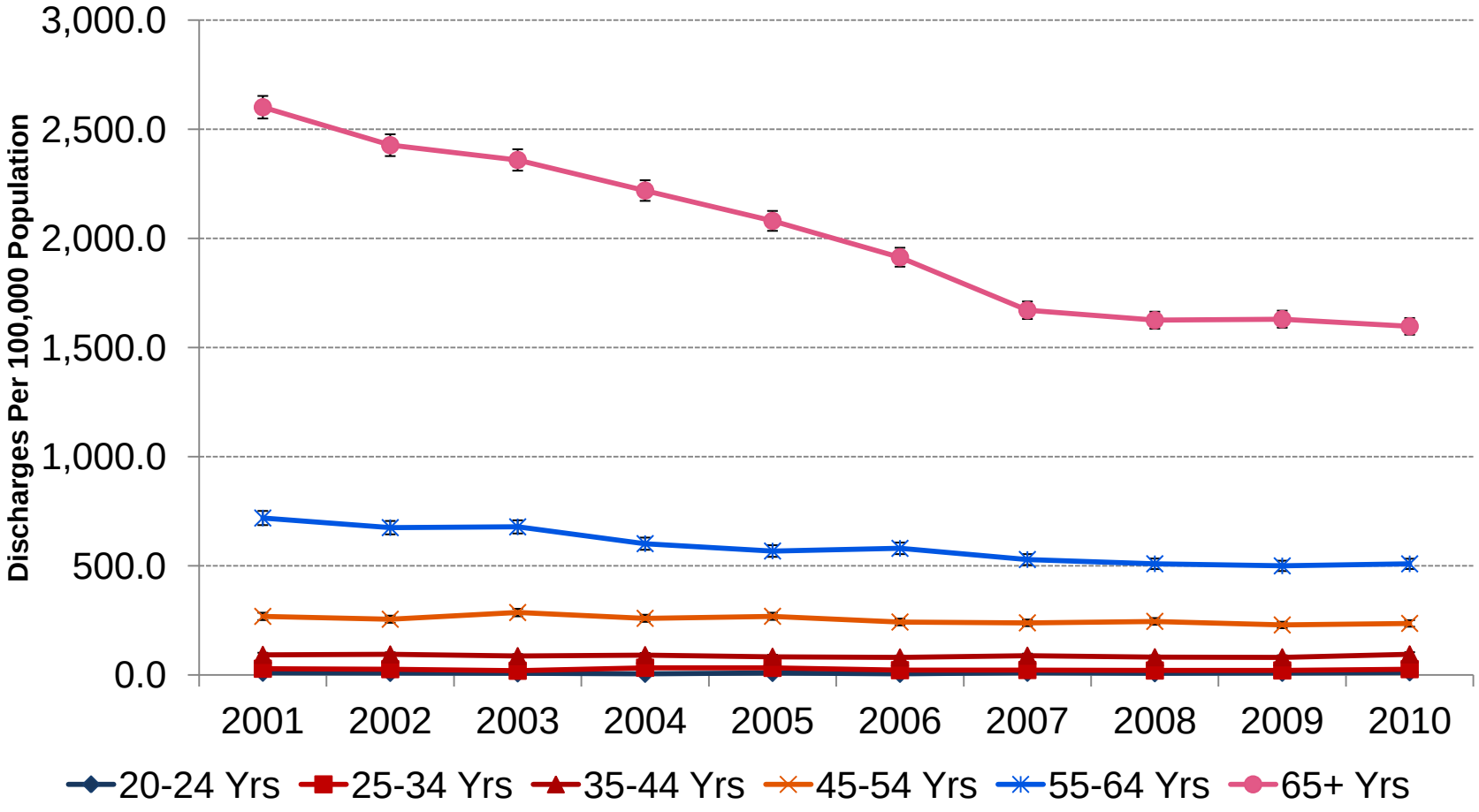
Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Stroke Hospital Discharge Rates
Arkansas & United States, 2001-2010



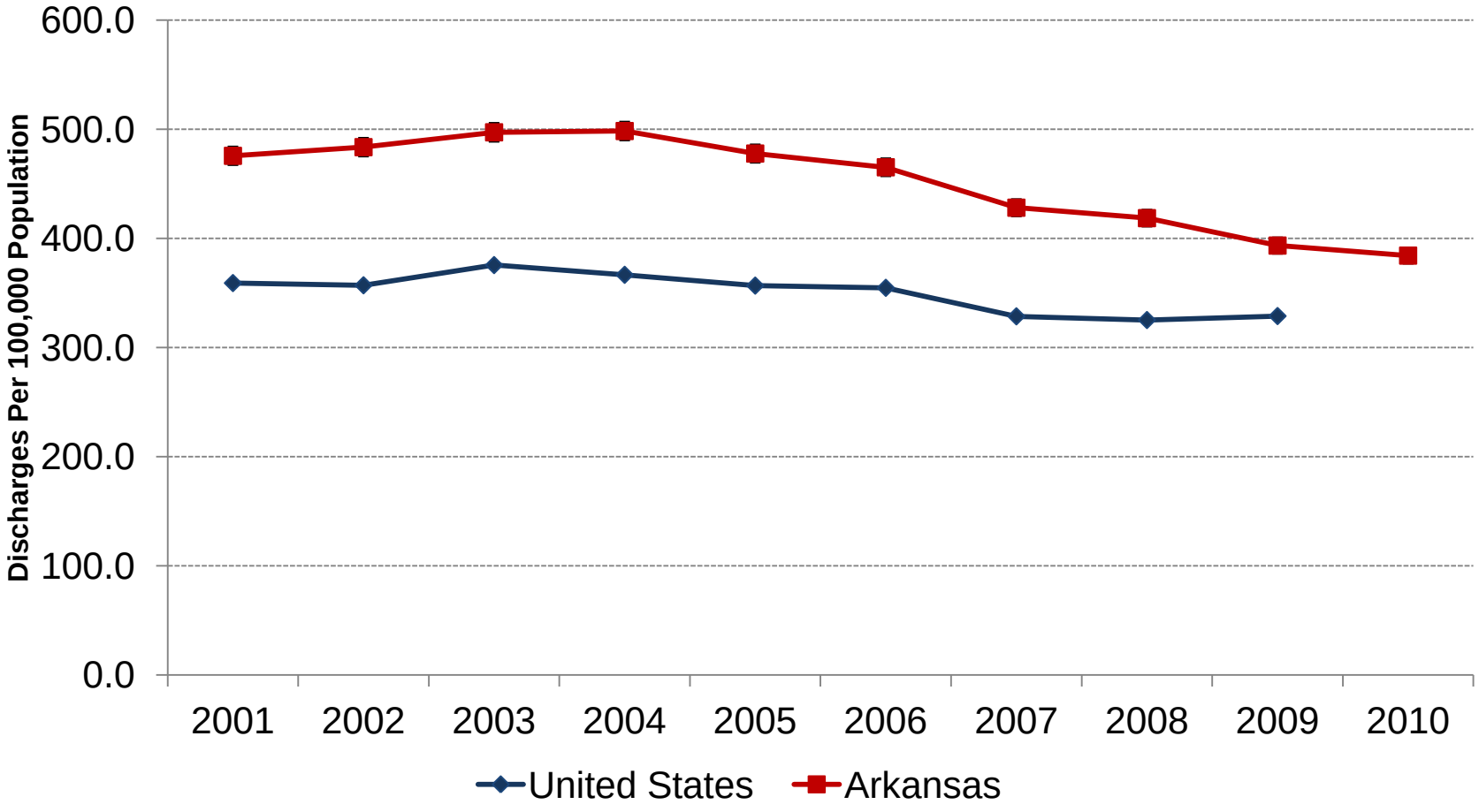
Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System & Agency for Healthcare Research and Quality, HCUP Nationwide Inpatient Sample.

Stroke Hospital Discharge Rates by Age Group, Arkansas, 2001-2010



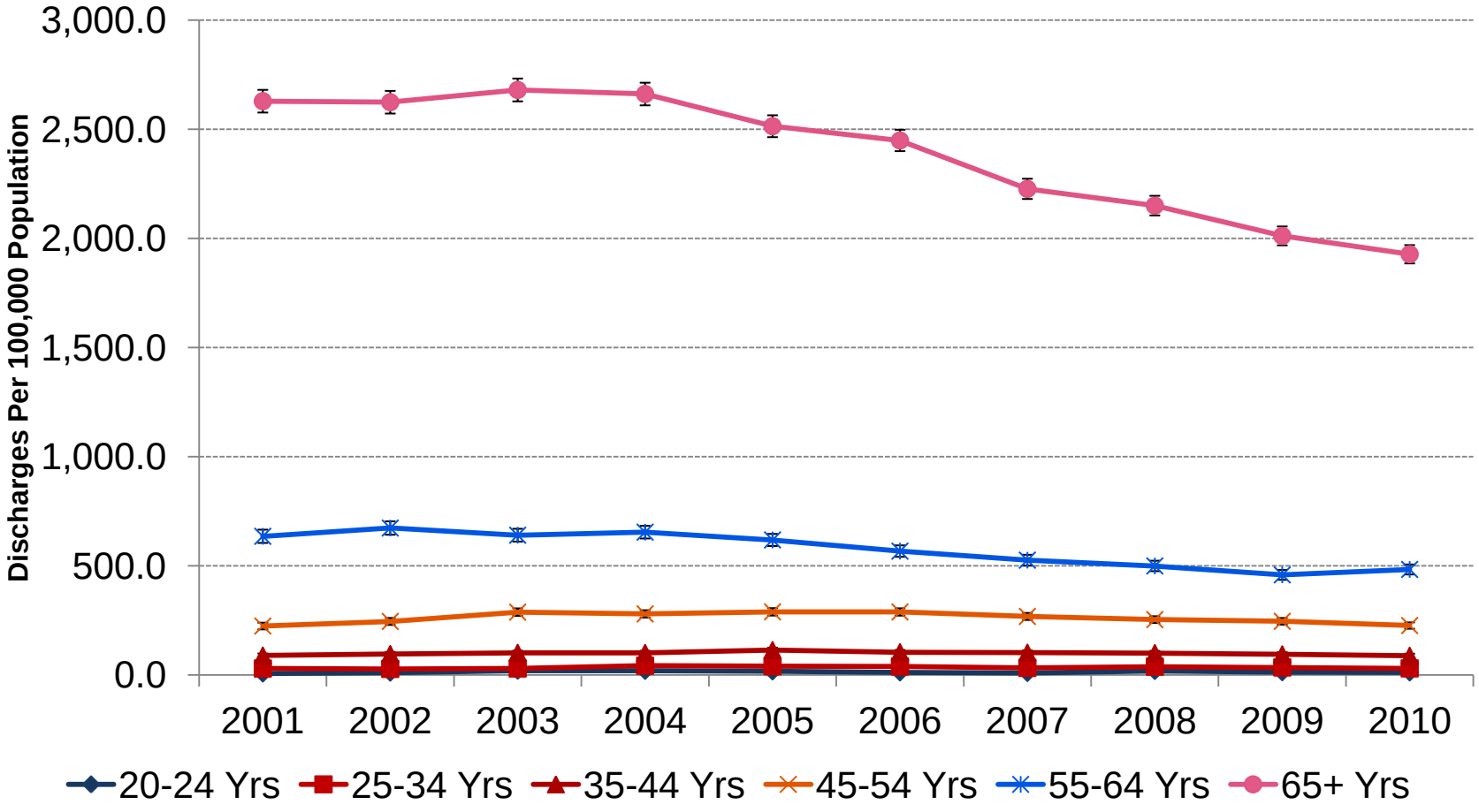
Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Congestive Heart Failure Hospital Discharge Rates Arkansas & United States, 2001-2010



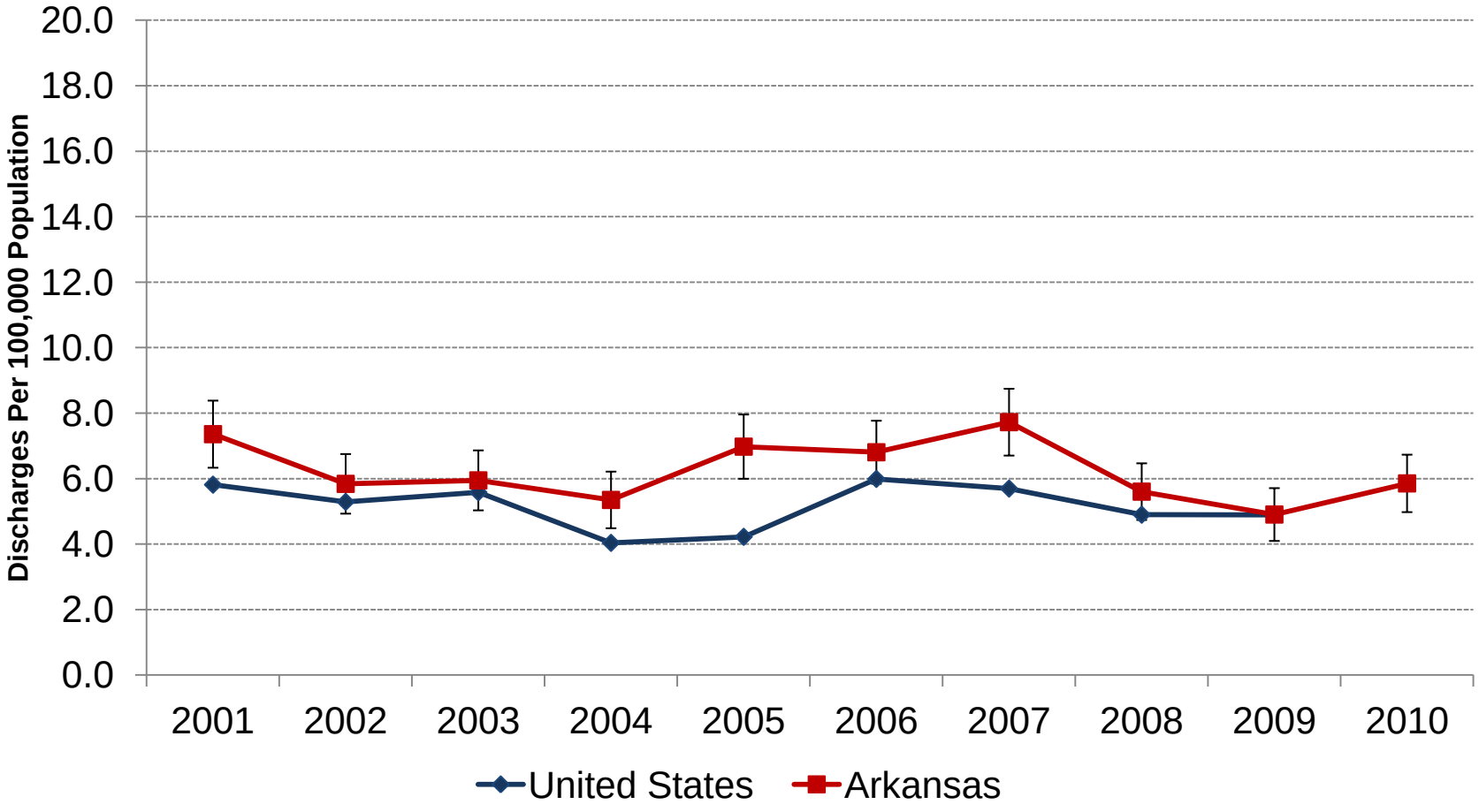
Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System & Agency for Healthcare Research and Quality, HCUP Nationwide Inpatient Sample.

Congestive Heart Failure Hospital Discharge Rates by Age Group, Arkansas, 2001-2010



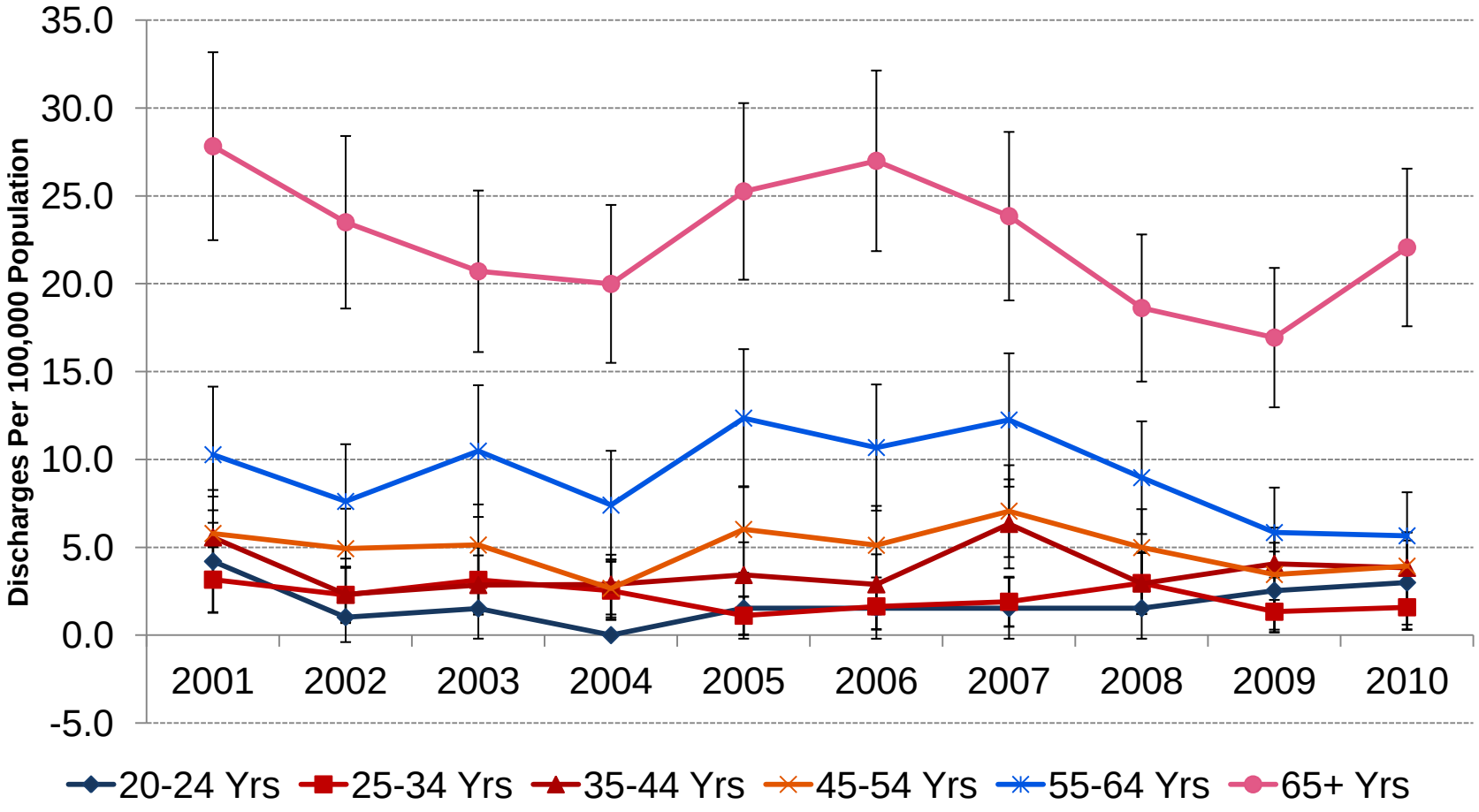
Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Chronic Kidney Disease Hospital Discharge Rates Arkansas & United States, 2001-2010



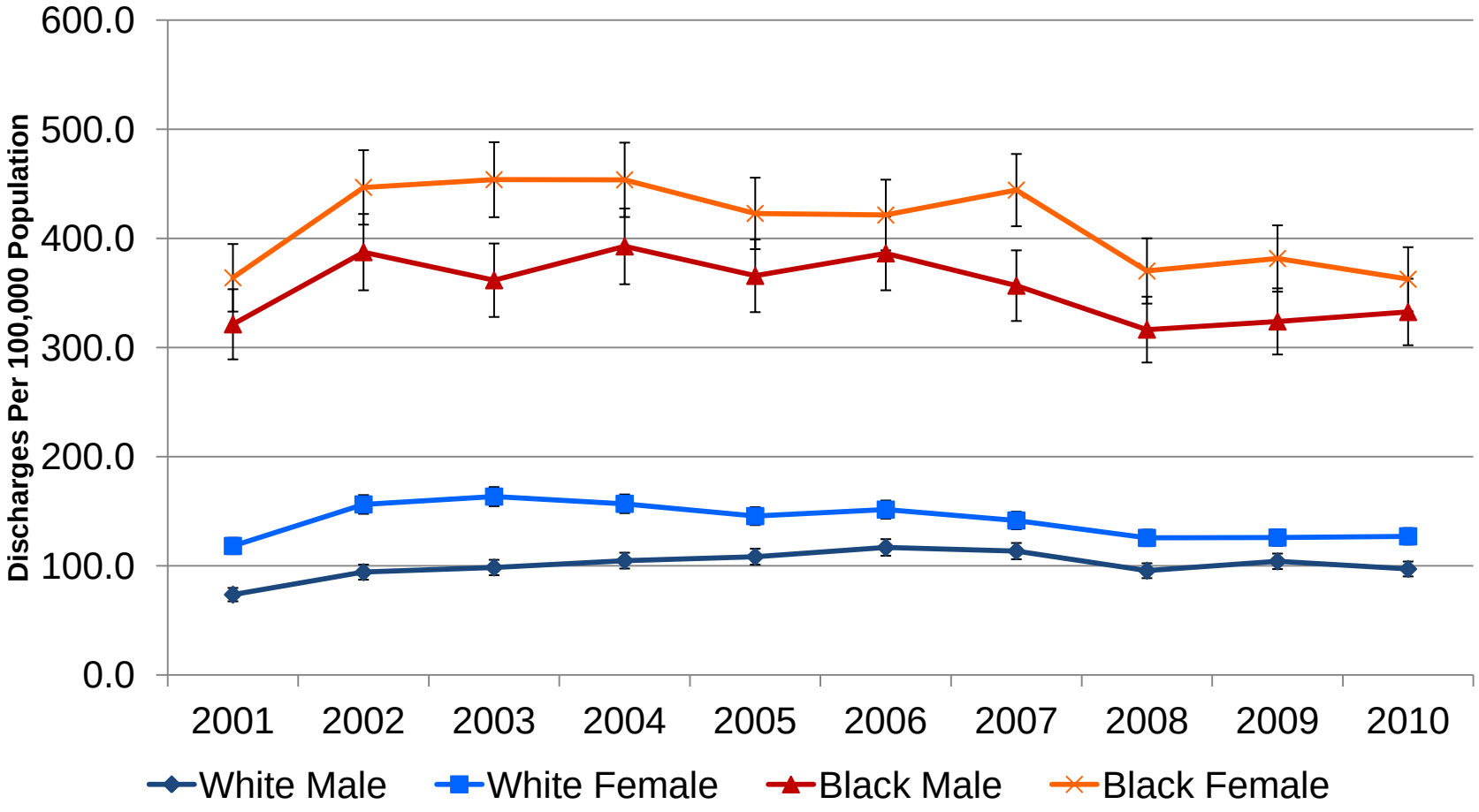
Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System & Agency for Healthcare Research and Quality, HCUP Nationwide Inpatient Sample.

Chronic Kidney Disease Hospital Discharge Rates by Age Group, Arkansas, 2001-2010



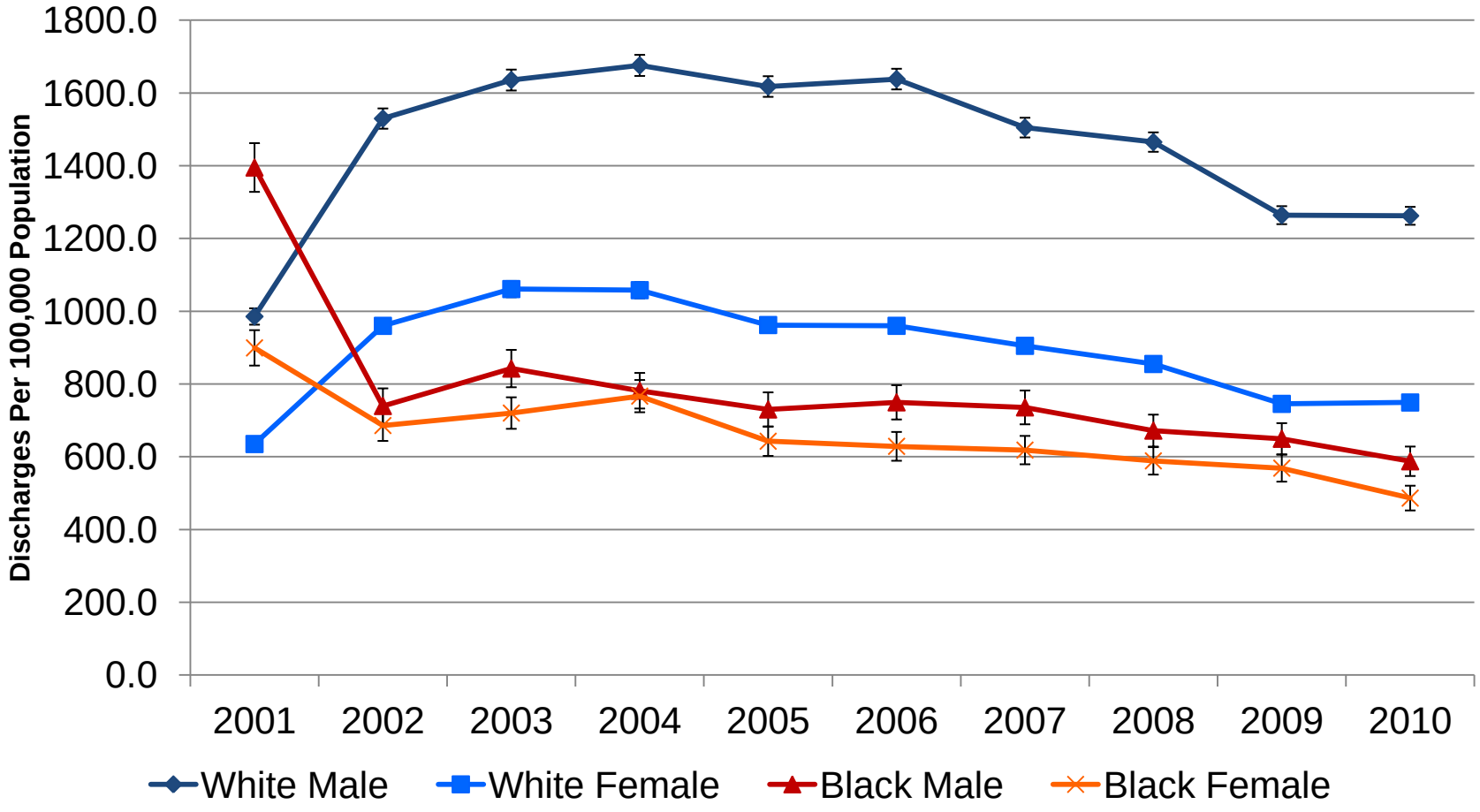
Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Hypertension Hospital Discharge Rates Among Adults (20+) by Race & Gender Arkansas, 2001-2010



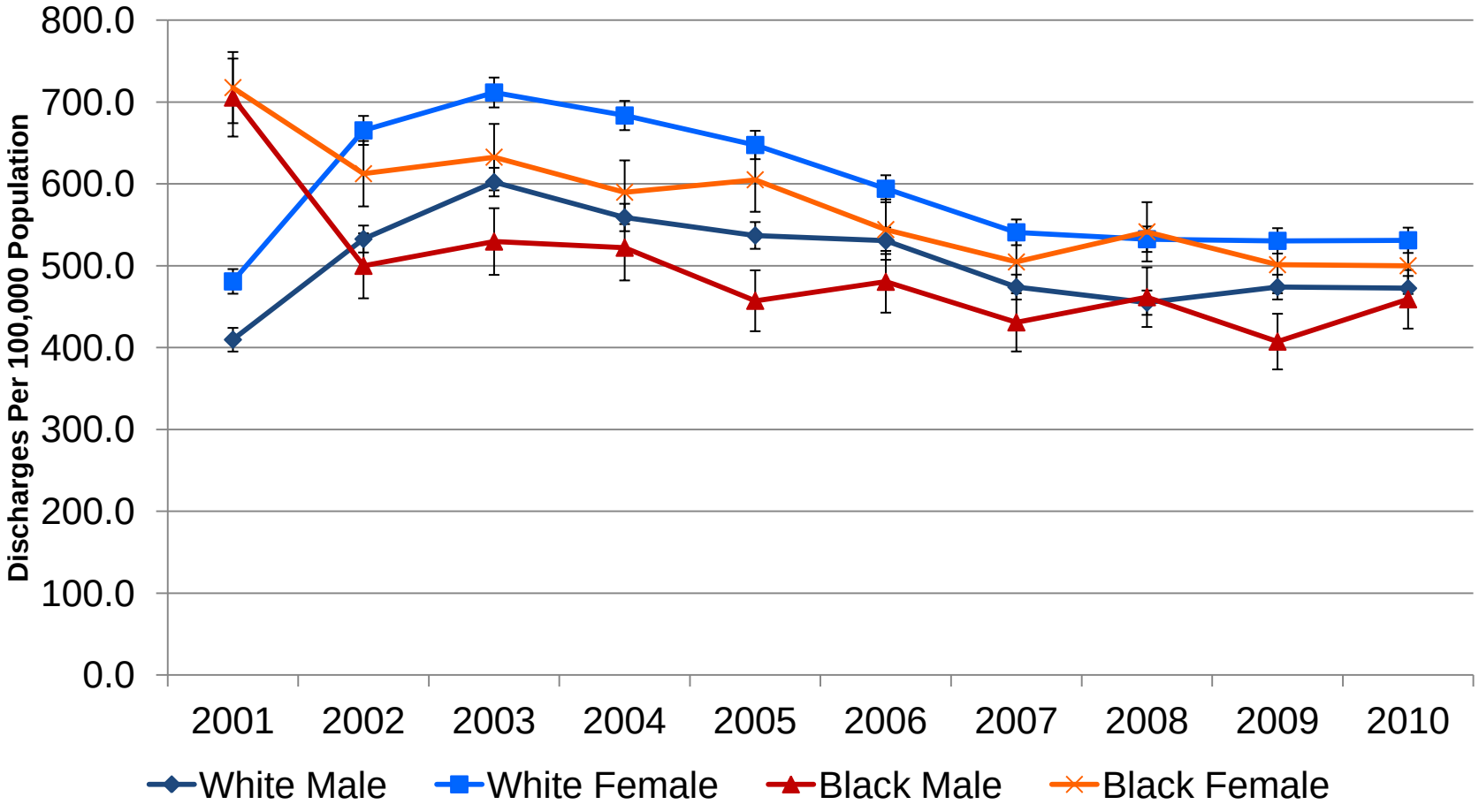
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Ischemic Heart Disease Hospital Discharge Rates Among Adults (20+) by Race & Gender Arkansas, 2001-2010



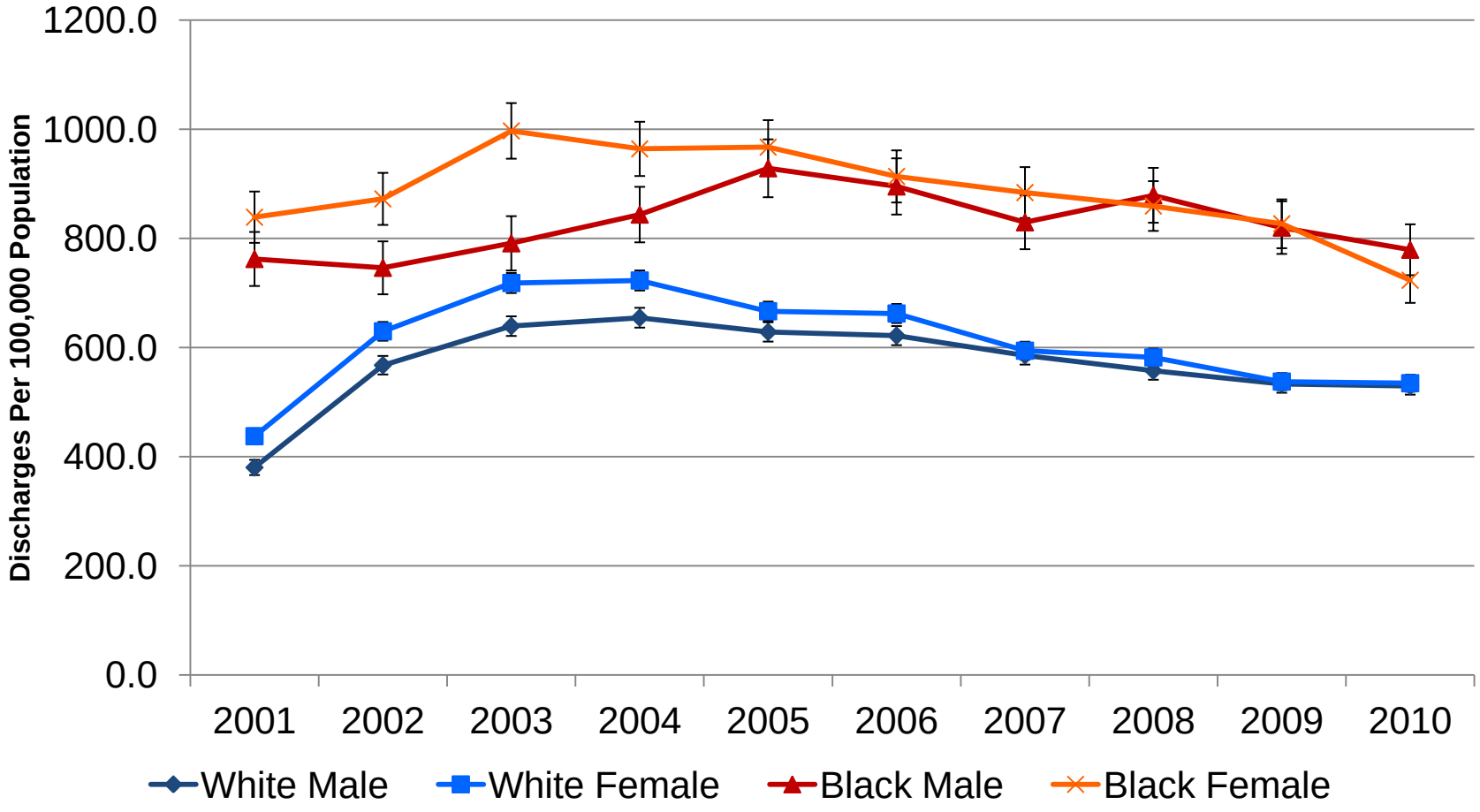
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Stroke Hospital Discharge Rates Among Adults (20+) by Race & Gender Arkansas, 2001-2010



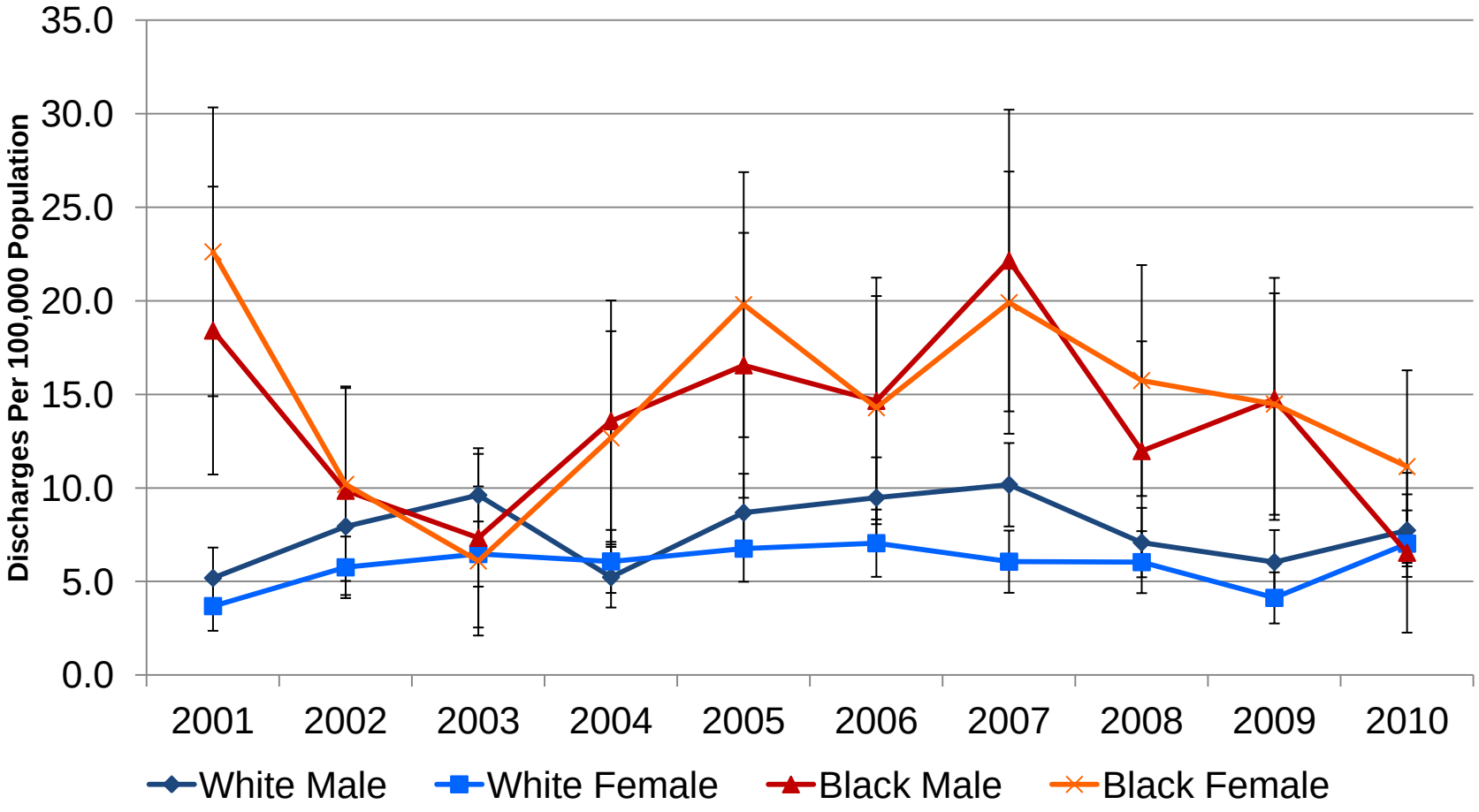
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Congestive Heart Failure Hospital Discharge Rates Among Adults (20+) by Race & Gender Arkansas, 2001-2010



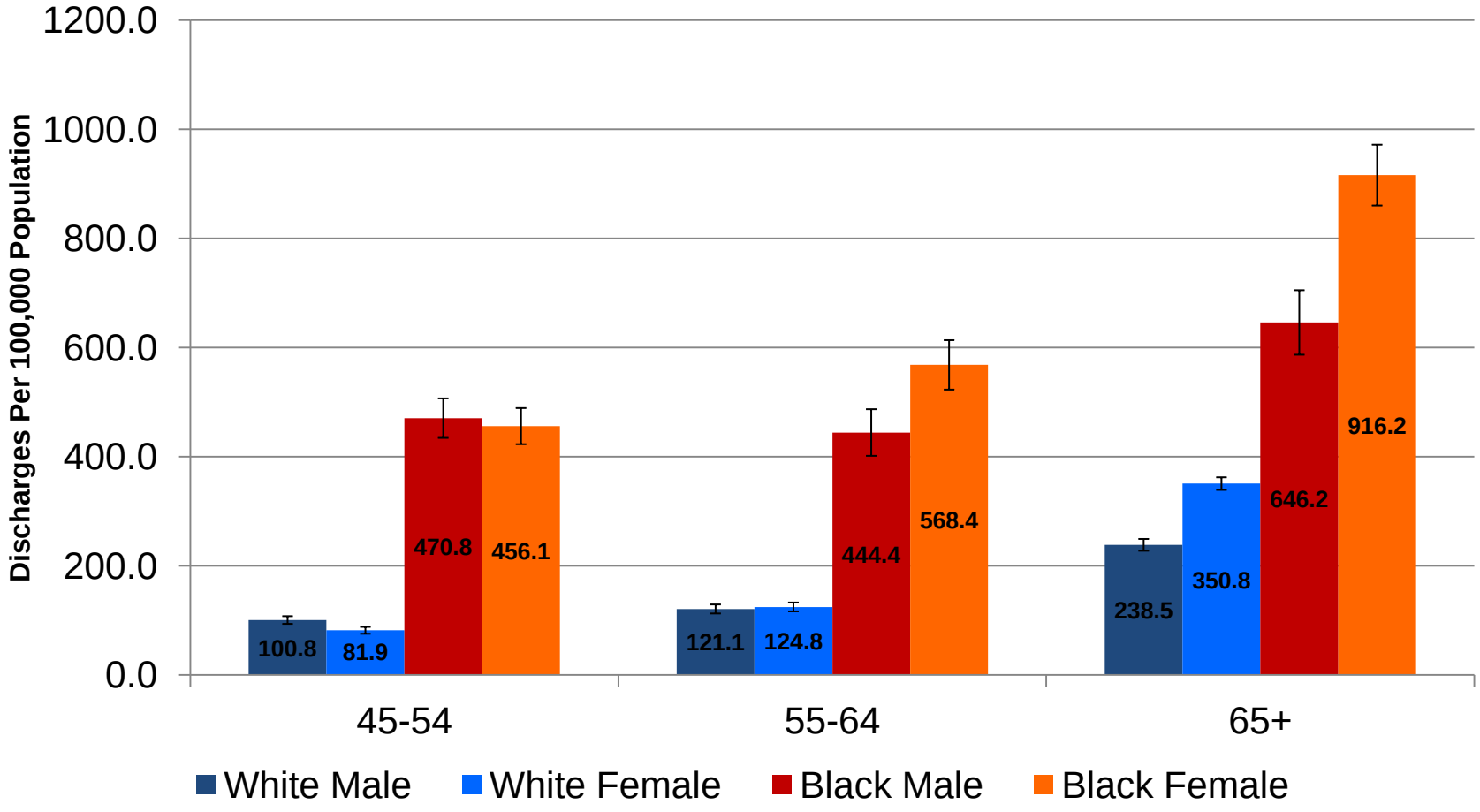
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Chronic Kidney Disease Hospital Discharge Rates Among Adults (20+) by Race & Gender Arkansas, 2001-2010



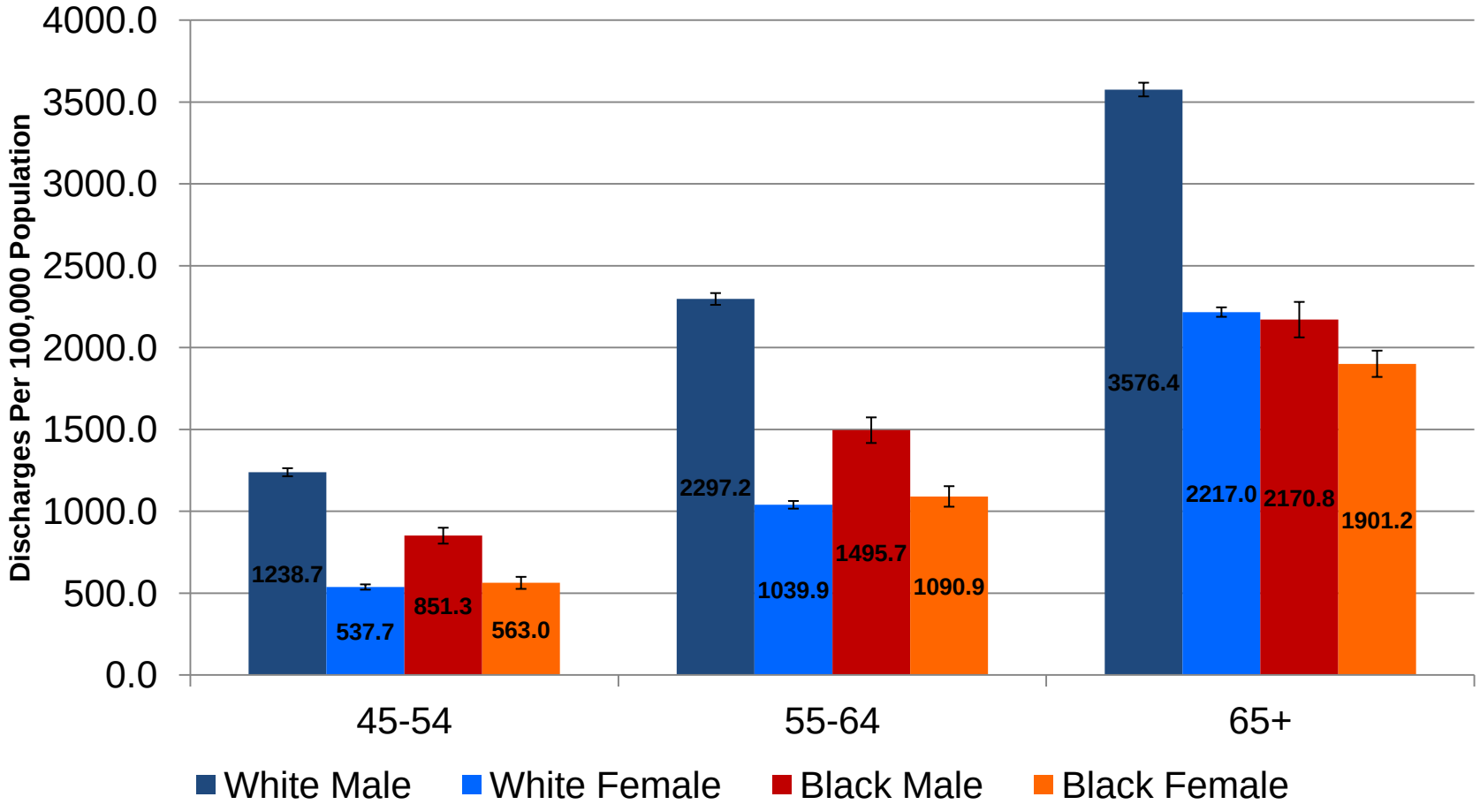
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Hypertension Hospital Discharge Rates Among Adults (45+) by Race & Gender Arkansas, Combined 2006-2010



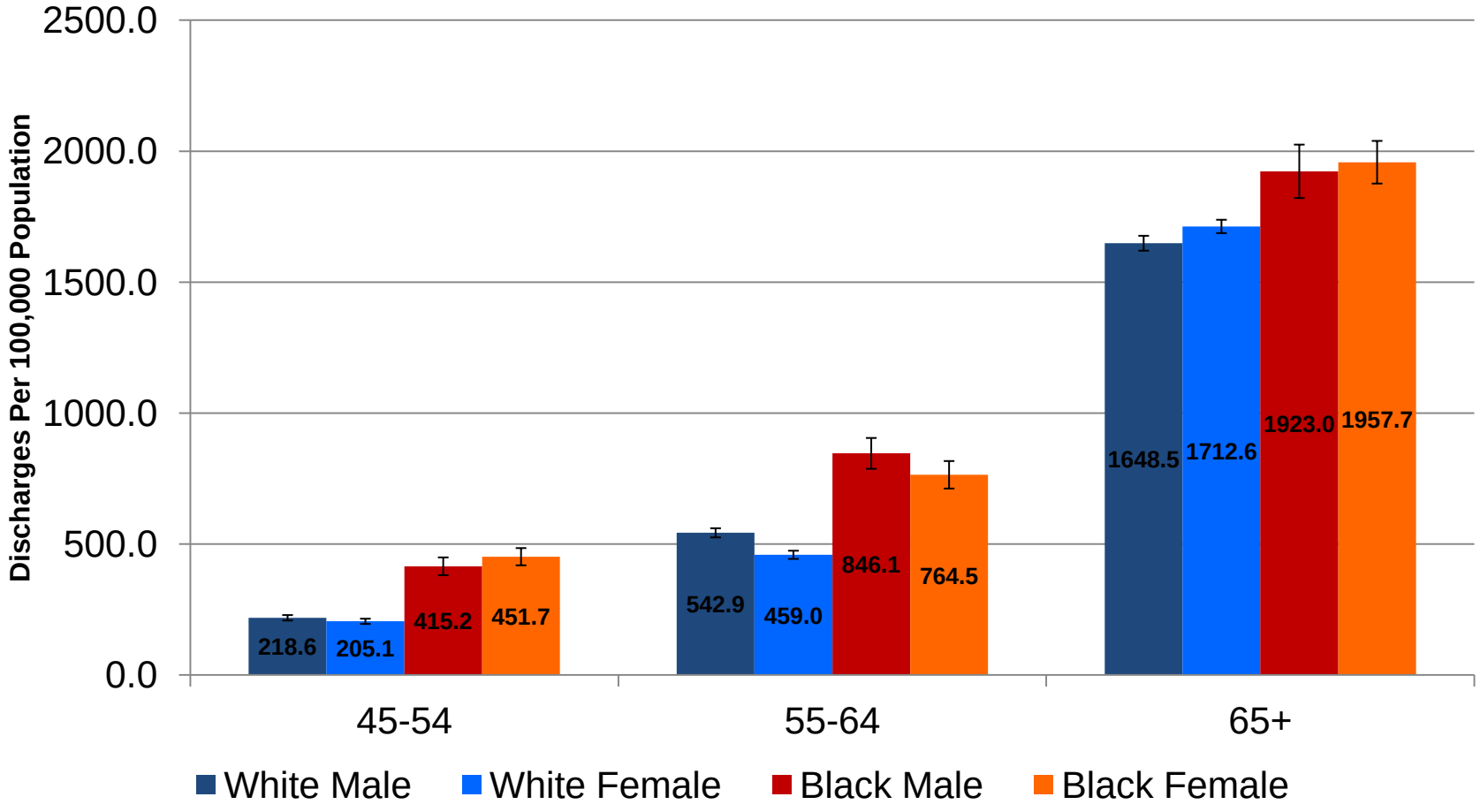
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Ischemic Heart Disease Hospital Discharge Rates Among Adults (45+) by Race & Gender Arkansas, Combined 2006-2010



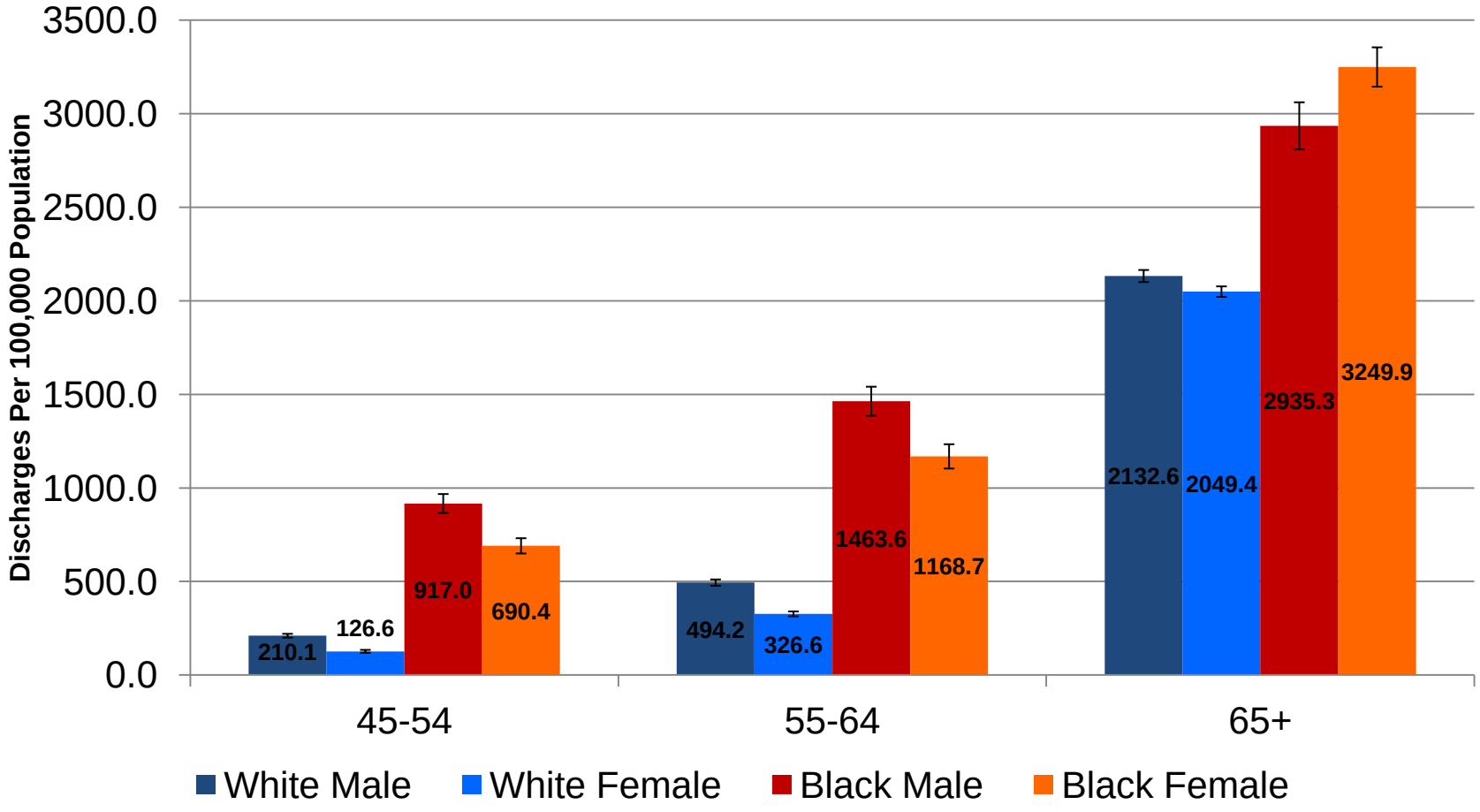
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Stroke Hospital Discharge Rates Among Adults (45+) by Race & Gender Arkansas, Combined 2006-2010



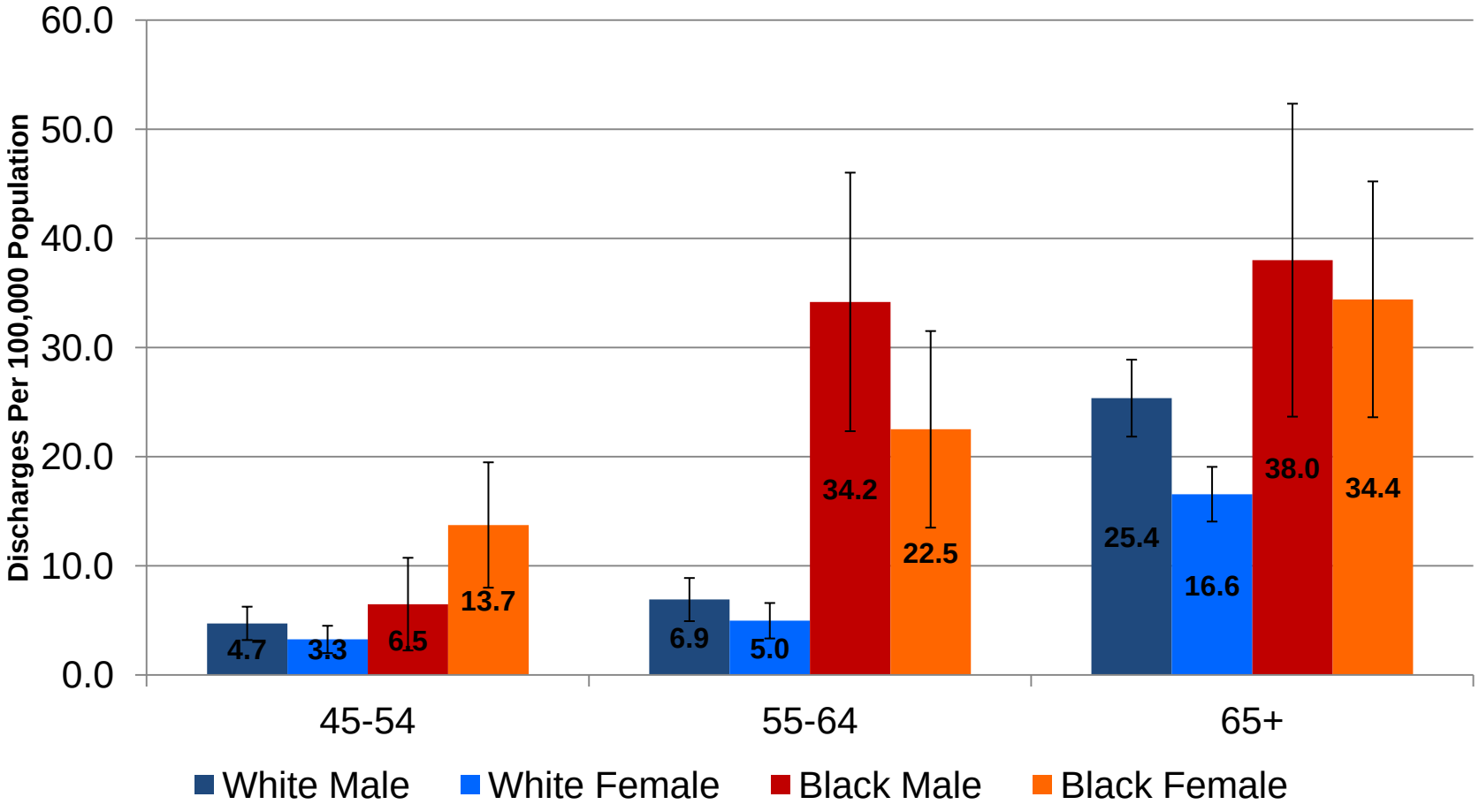
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Congestive Heart Failure Hospital Discharge Rates Among Adults (45+) by Race & Gender Arkansas, Combined 2006-2010



Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Chronic Kidney Disease Hospital Discharge Rates Among Adults (45+) by Race & Gender Arkansas, Combined 2006-2010



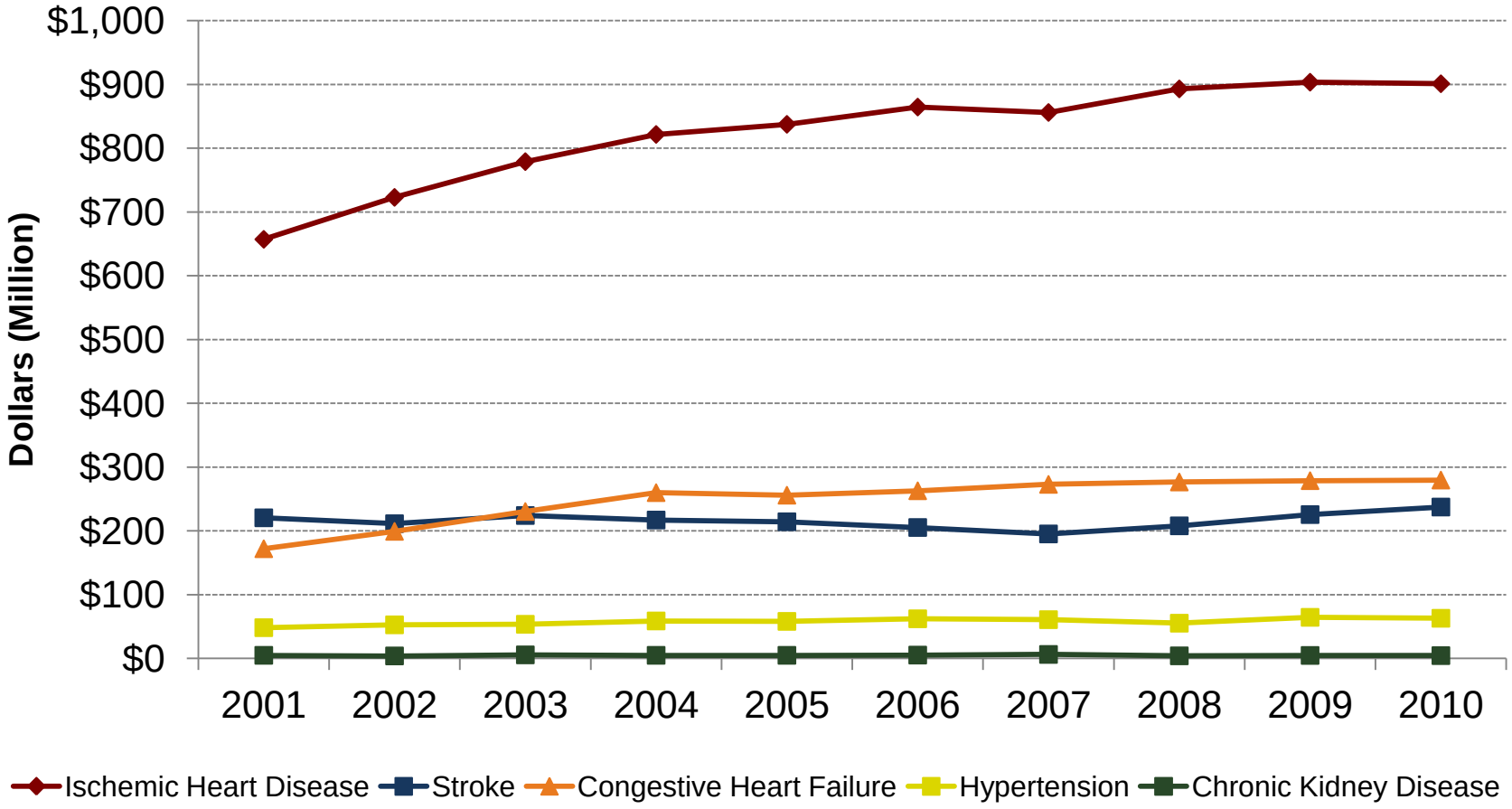
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

B. TOTAL HOSPITAL CHARGES

Total Hospital Charges

- From 2001-2010, there was an upward trend in total charges for ischemic heart disease.
- The trend in total charges remained flat for stroke, congestive heart failure, hypertension and chronic kidney disease.

Total Hospital Charges
Hypertension and Related Diseases
Arkansas, 2001-2010



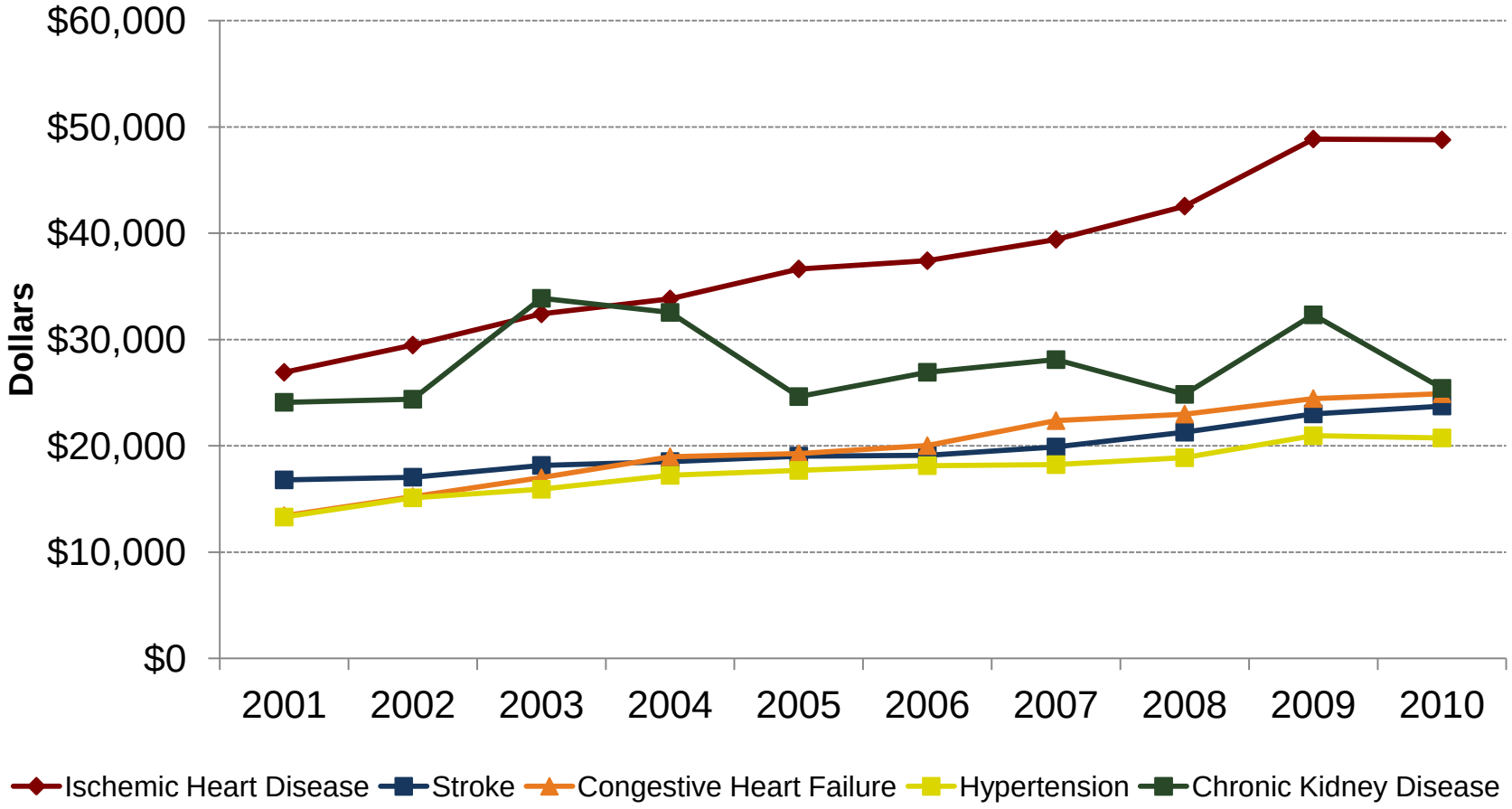
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

C. AVERAGE HOSPITAL CHARGES

Average Hospital Charges

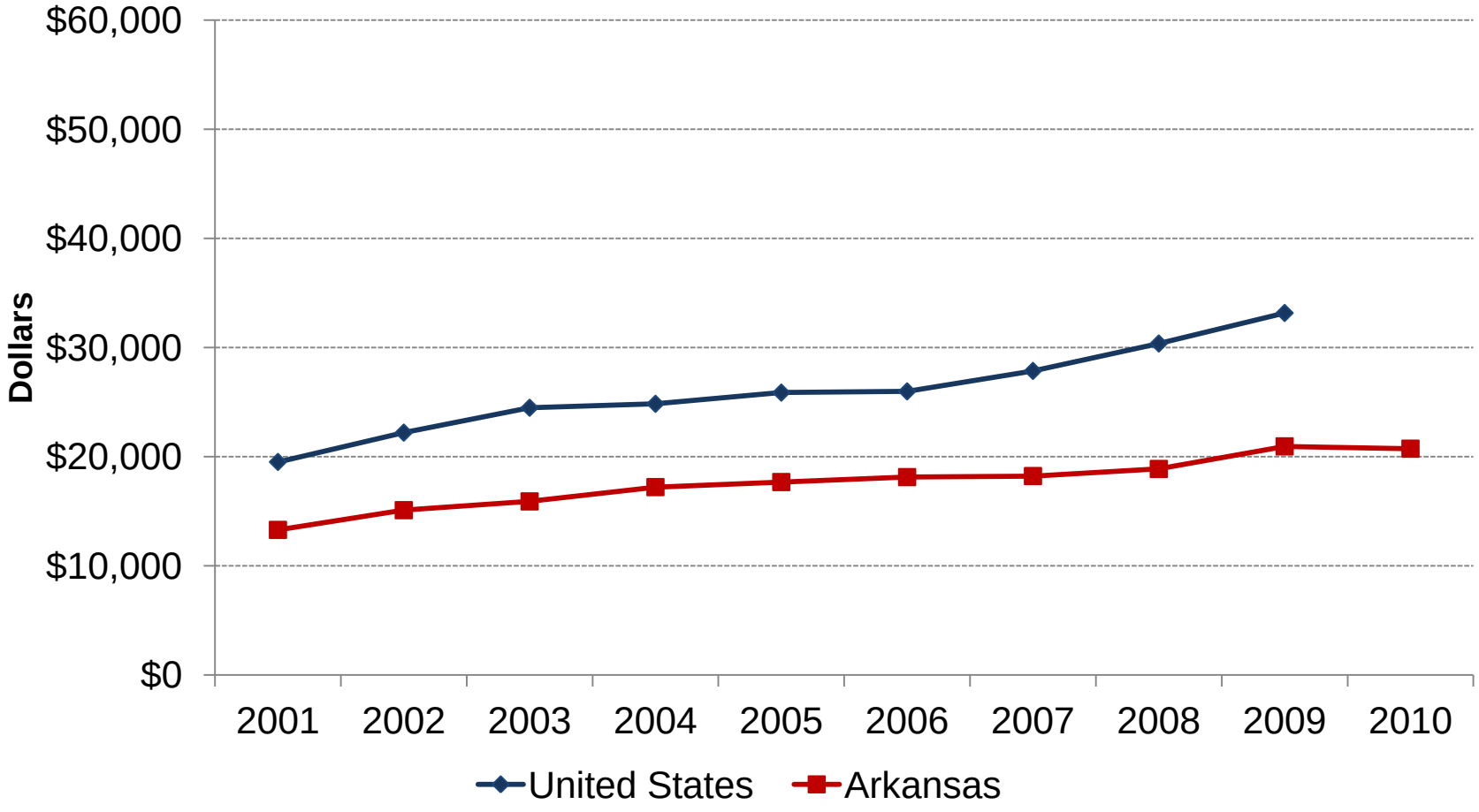
- As with total hospital charges, ischemic heart disease demonstrated an upward trend in average hospital charges from 2001-2010.
- Upward trends could also be seen in stroke, congestive heart failure and hypertension.
- Due to small numbers, average hospital charges were unstable for chronic kidney disease.
- In comparison to the U.S., average hospital charges remained lower in Arkansas for the ten year period.

Average Hospital Charges
Hypertension and Related Diseases
Arkansas, 2001-2010



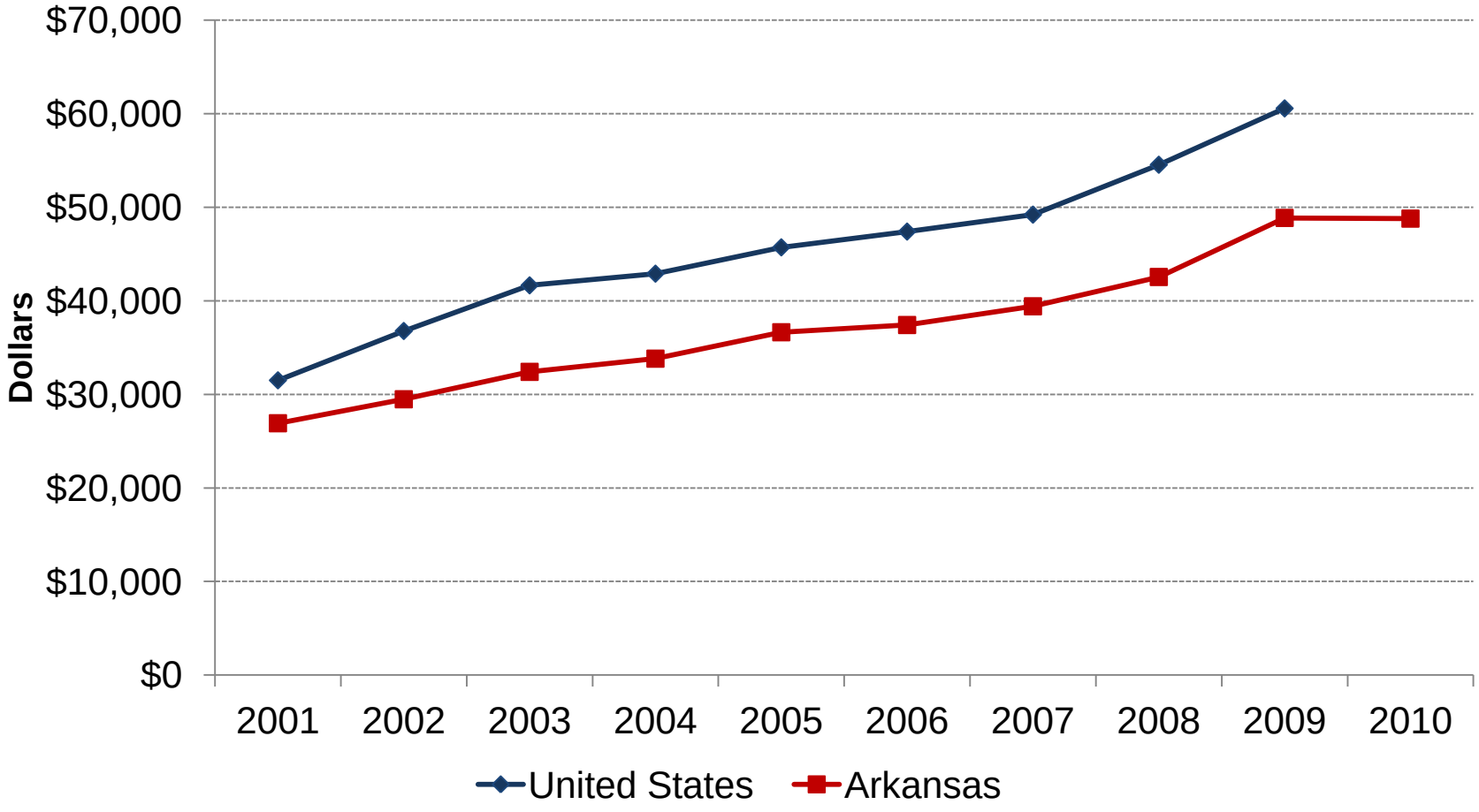
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Hypertension Average Hospital Charges Arkansas & United States, 2001-2010



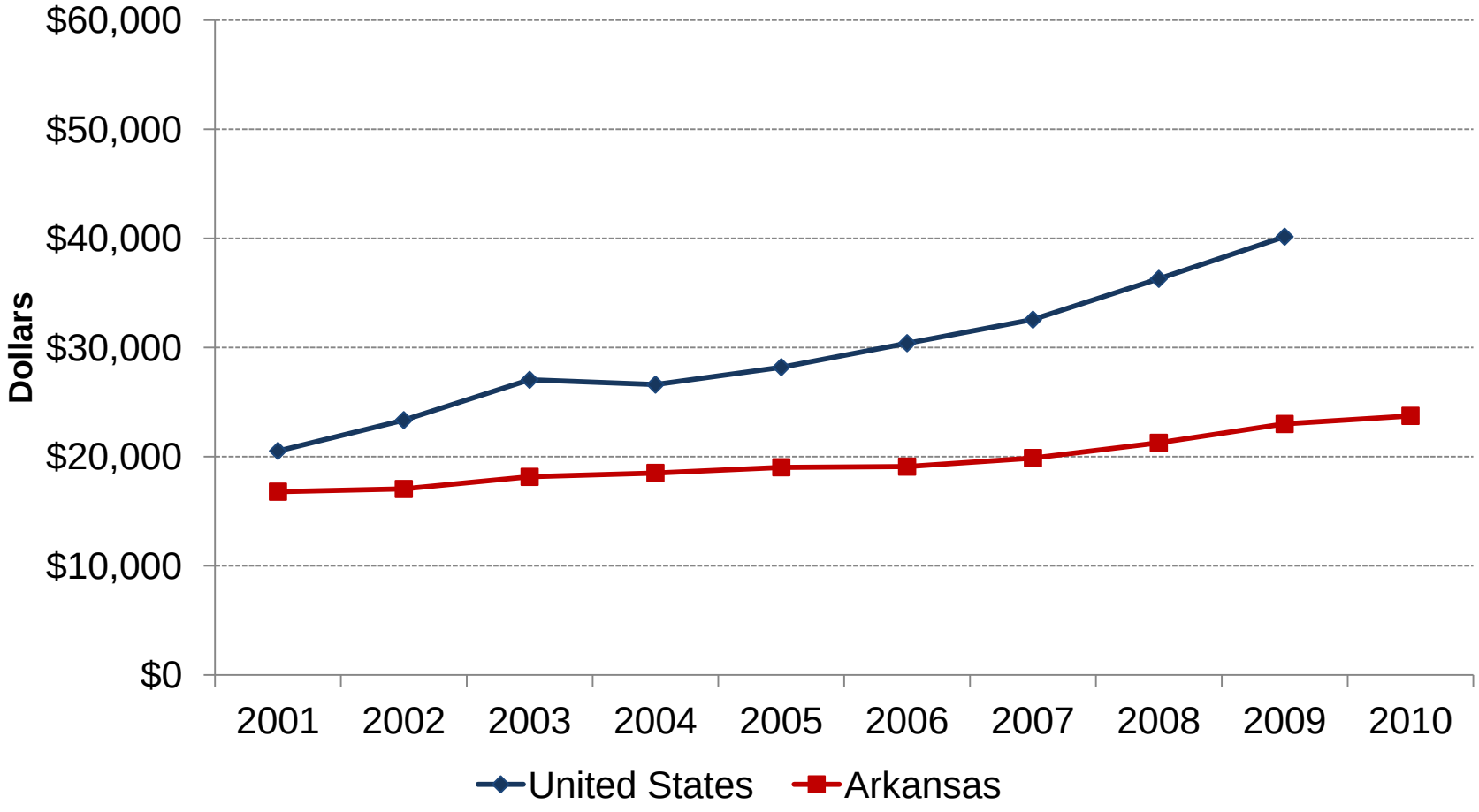
Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System & Agency for Healthcare Research and Quality, HCUP Nationwide Inpatient Sample.

Ischemic Heart Disease Average Hospital Charges Arkansas & United States, 2001-2010



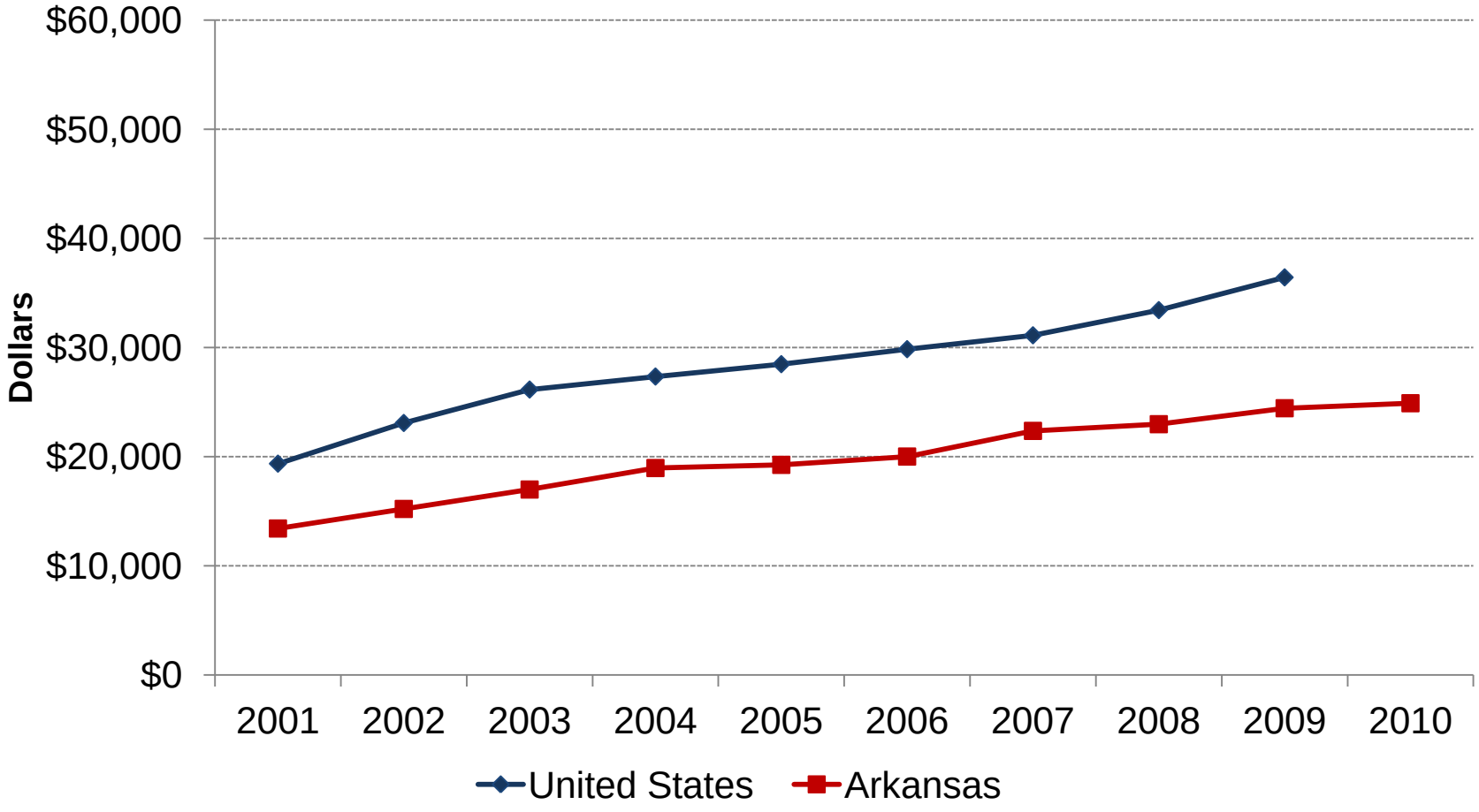
Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System & Agency for Healthcare Research and Quality, HCUP Nationwide Inpatient Sample.

Stroke Average Hospital Charges
Arkansas & United States, 2001-2010



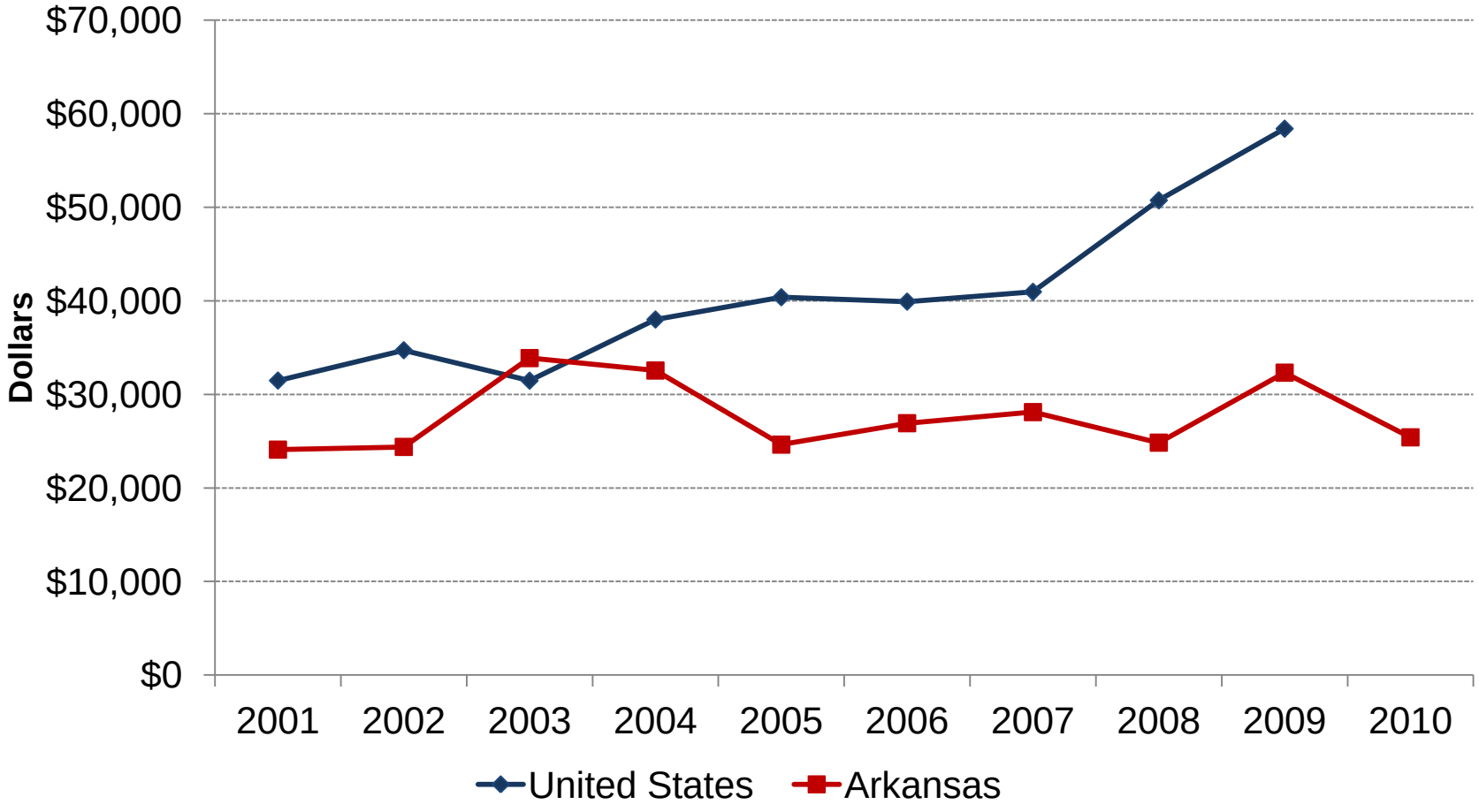
Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System & Agency for Healthcare Research and Quality, HCUP Nationwide Inpatient Sample.

Congestive Heart Failure Average Hospital Charges Arkansas & United States, 2001-2010



Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System & Agency for Healthcare Research and Quality, HCUP Nationwide Inpatient Sample.

Chronic Kidney Disease Average Hospital Charges Arkansas & United States, 2001-2010



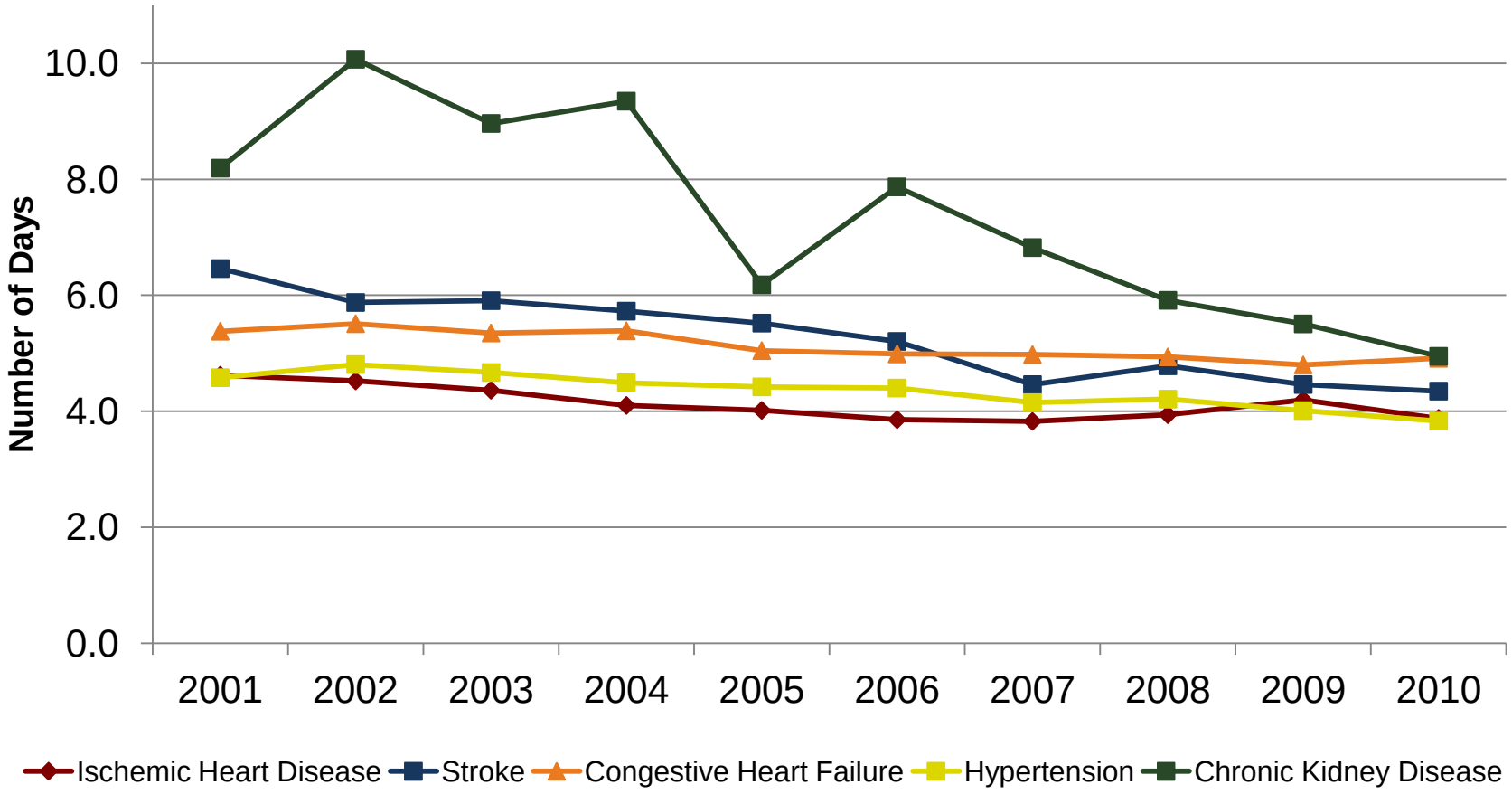
Sources: Arkansas Center for Health Statistics, Hospital Discharge Data System & Agency for Healthcare Research and Quality, HCUP Nationwide Inpatient Sample.

D. AVERAGE LENGTH OF HOSPITAL STAY

Average Length of Hospital Stay

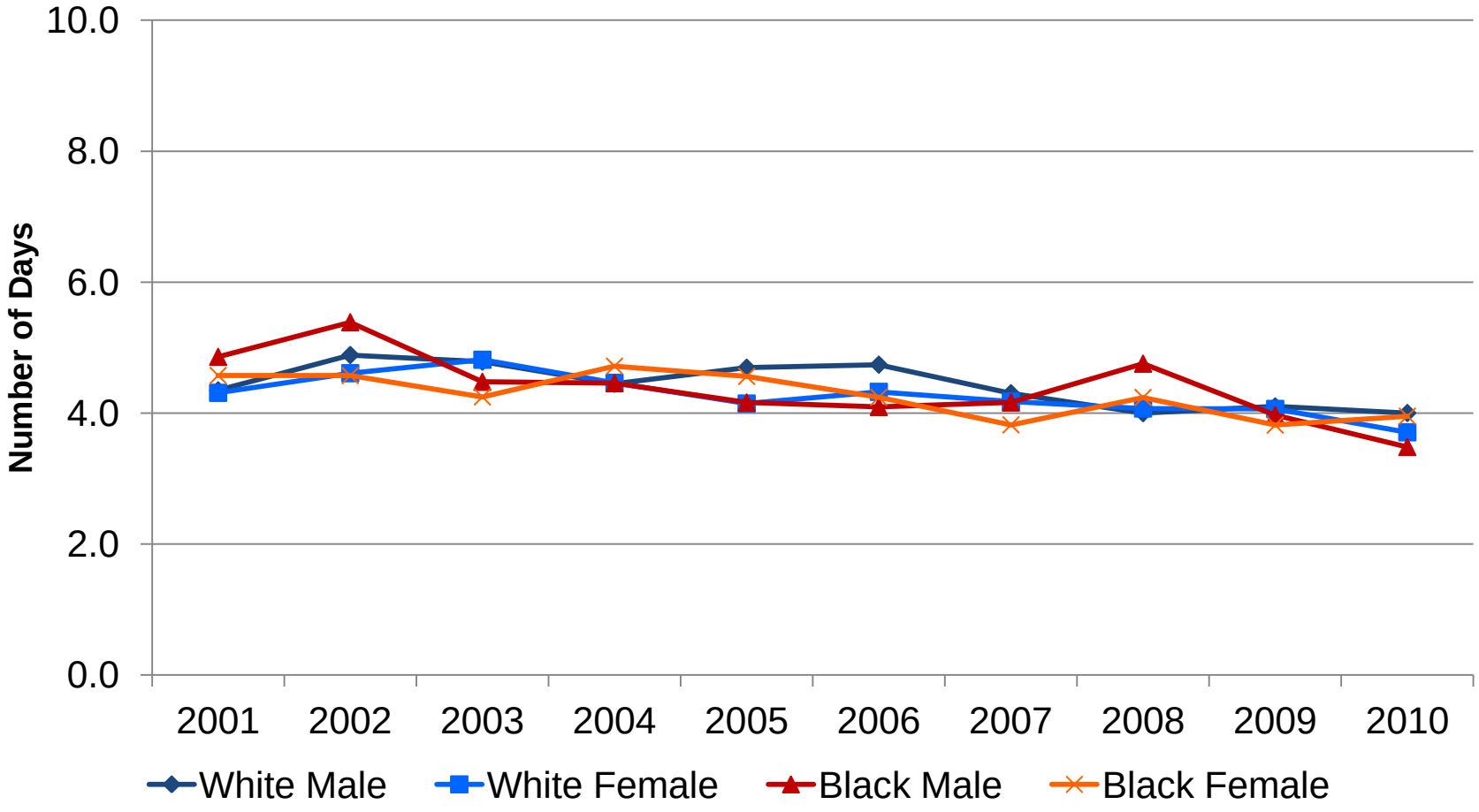
- Average length of hospital stay was highest among chronic kidney disease discharges reaching a high of 10.1 days in 2002.
- Average length of stay for Ischemic heart disease, stroke, congestive heart failure and hypertension was relatively flat remaining within the 4-6 day range per hospital stay.
- There was very little difference among race/gender groups in average number of days per hospital stay for all diseases.
- There was a slight difference by race for stroke with blacks averaging slightly above 6 days and whites averaging 5 days or less.
- Chronic kidney disease clustered between 5-10 days by race and gender with the exception of a spike in 2002 for black males.

Average Length of Hospital Stay
Hypertension and Related Diseases
Arkansas, 2001-2010



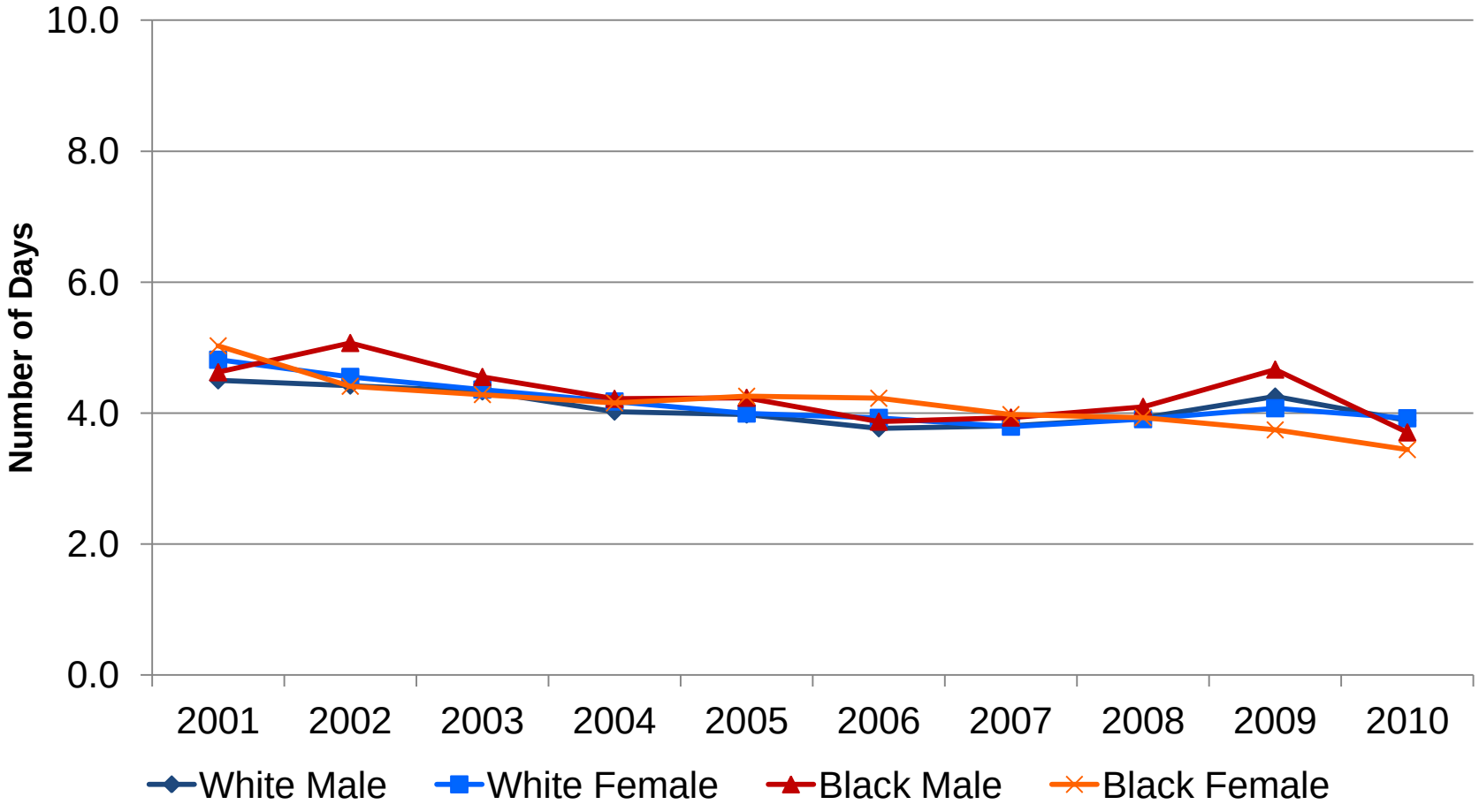
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Hypertension Average Length of Stay by Race & Gender Arkansas, 2001-2010



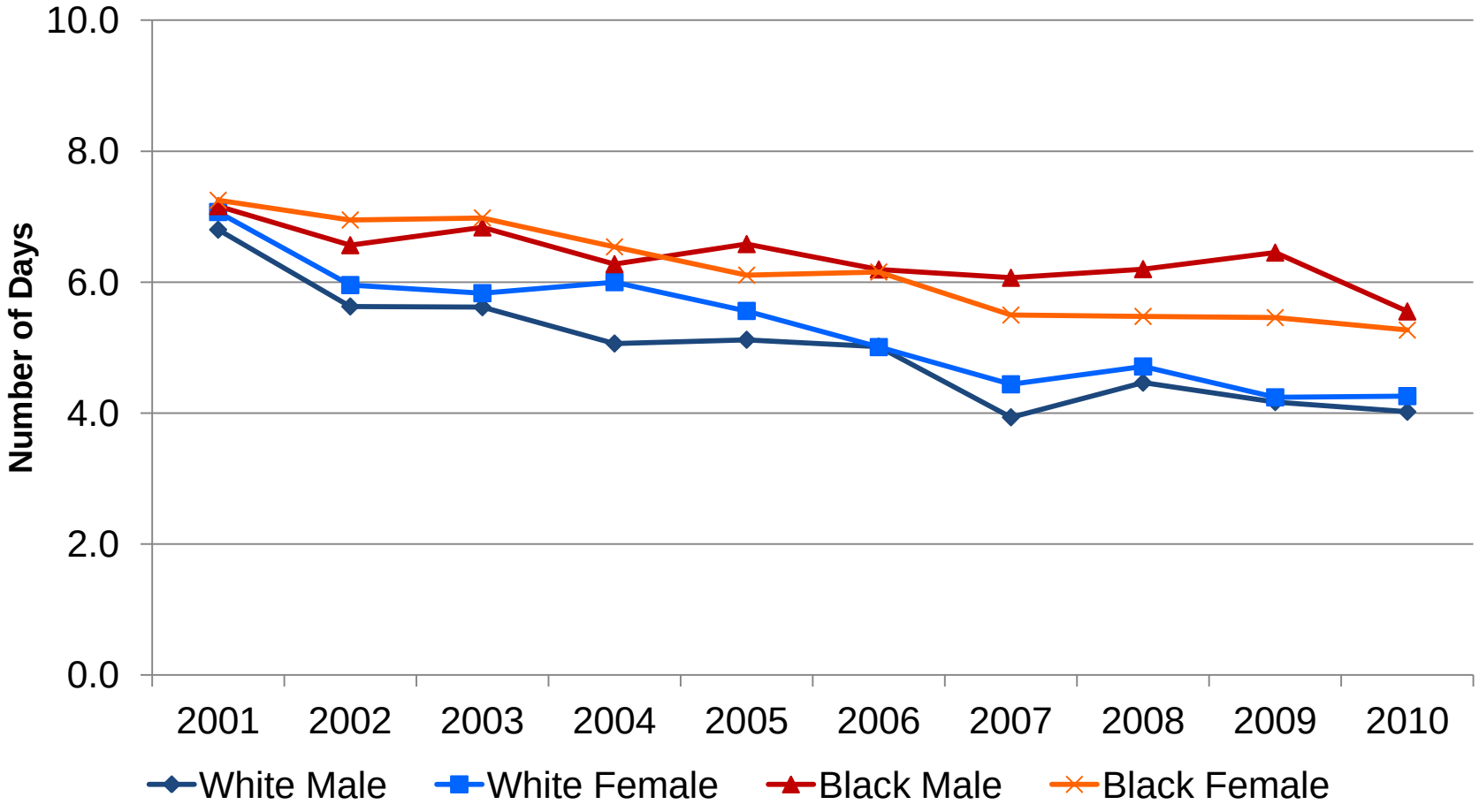
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Ischemic Heart Disease Average Length of Stay by Race & Gender Arkansas, 2001-2010



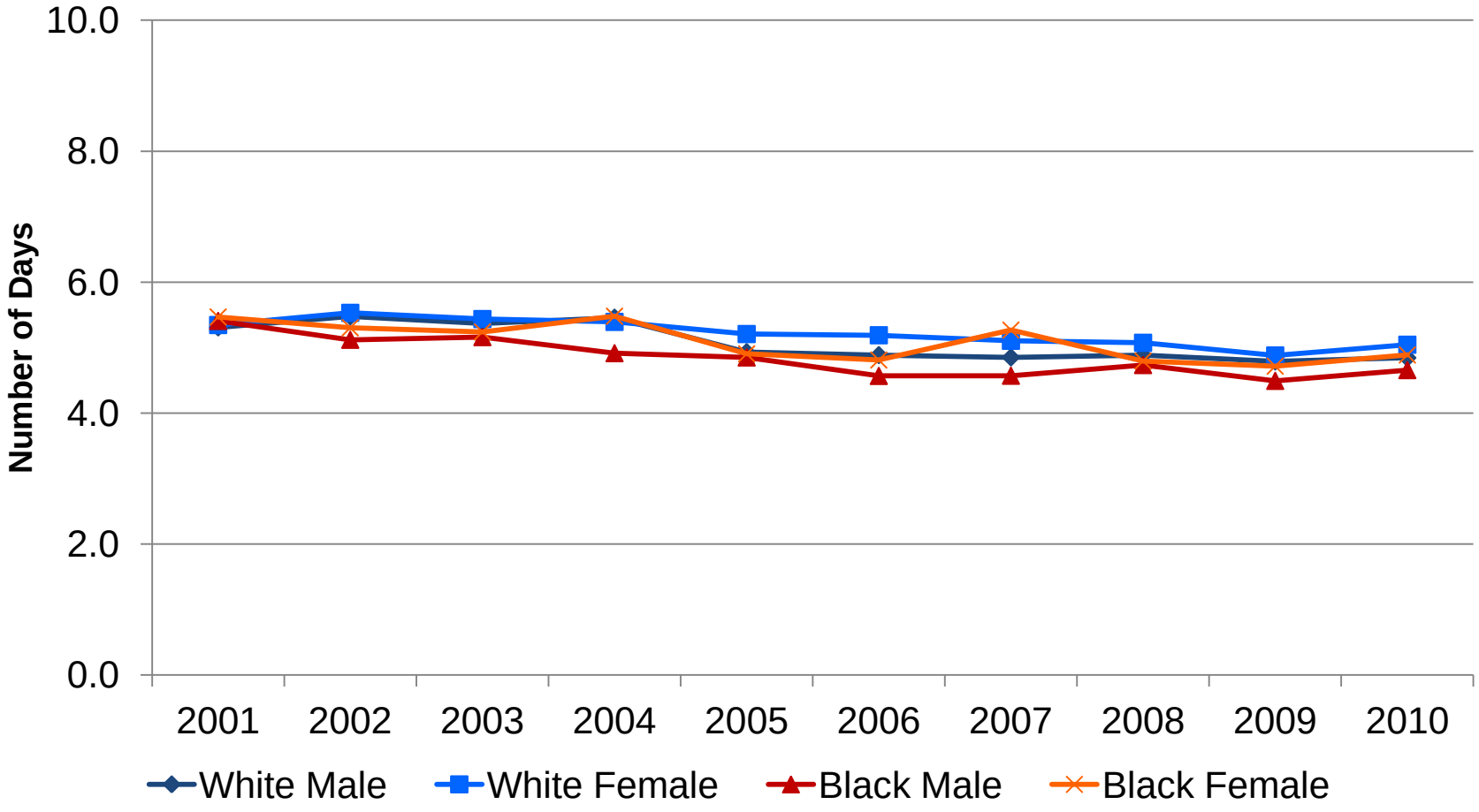
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Stroke Average Length of Stay by Race & Gender Arkansas, 2001-2010



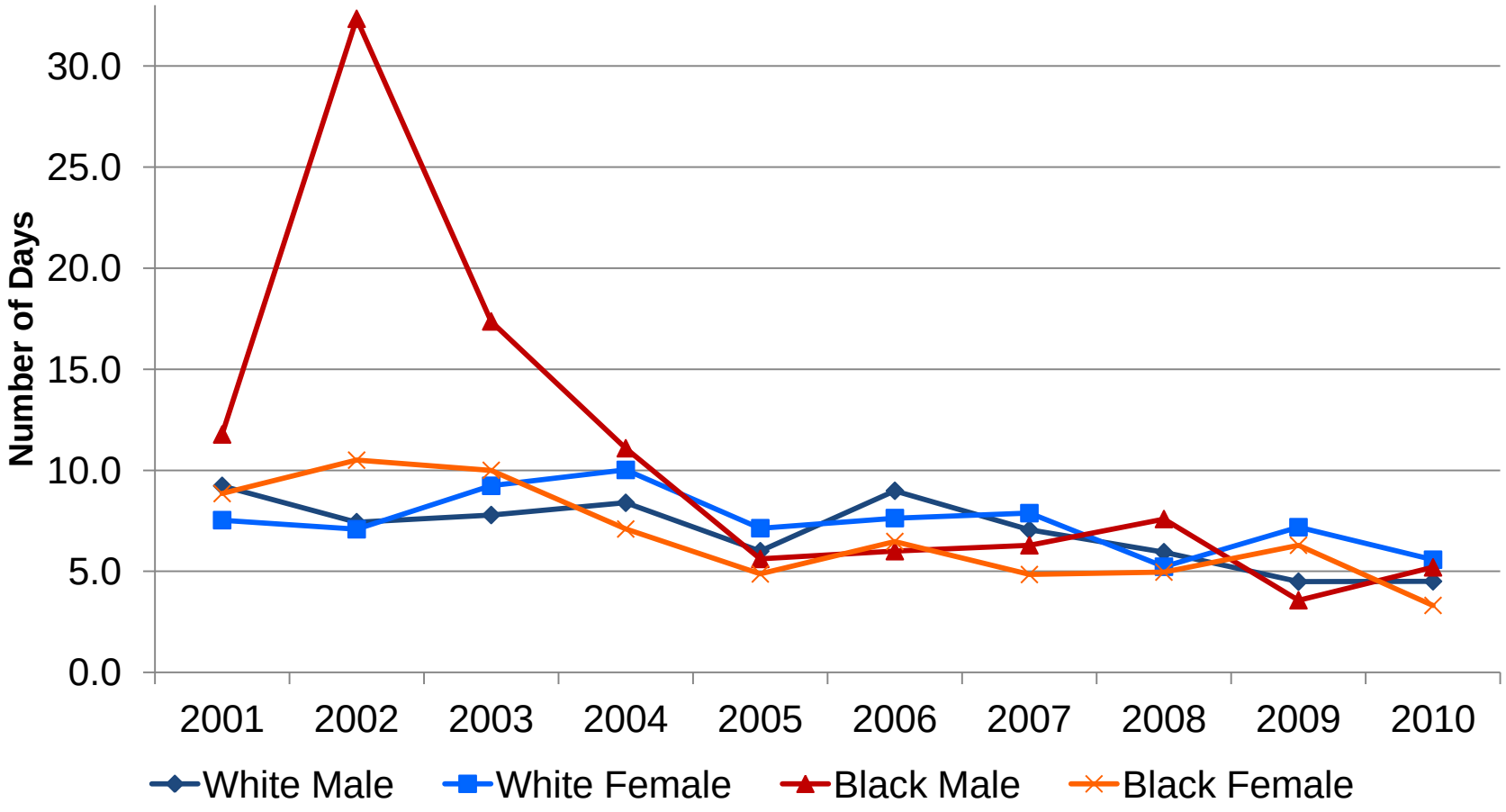
Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Congestive Heart Failure Average Length of Stay by Race & Gender Arkansas, 2001-2010



Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

Chronic Kidney Disease Average Length of Stay by Race & Gender Arkansas, 2001-2010



Source: Arkansas Center for Health Statistics, Hospital Discharge Data System.

VI. PROJECTED COSTS OF HYPERTENSION AND RELATED DISEASES

Costs Associated with Hypertension

Cost Models for Hypertension Present Several Challenges

•Hypertension is one underlying cause of many serious chronic diseases that have multiple causes, so accurate attribution of the impact of hypertension is difficult.

•Coding of medical events and associated charges/costs may be attributed directly to hypertension or to conditions which are strongly associated with hypertension.

•As the case for cost models for other diseases, health data sources with medical costs are typically incomplete, so costs estimates may be based only on the more serious treatment episodes, such a hospital admission.

•As the case of cost models in general, estimation of costs are based on many assumptions and the cost estimates produced are usually so large they are hard to comprehend for most of us who live in a financial world where most major events are under $100,000 or nearly everything is less than a $1,000,000.

Costs Associated with Hypertension

There are numerous models for Estimating Costs of Diseases, but generally there are two types defined by the costs being evaluated.

Direct Cost Models: Clinical Treatment (outpatient)
Hospitalizations (treatment and hospital costs)
Pharmaceutical Costs

Total Cost Models: Include Direct Costs <u>and</u> Indirect Costs

Indirect Costs typically include:

a) Lost Wages
b) Loss of Productivity
c) Years of Life Lost by Premature Death
d) Reduced Quality of Life

Costs Associated with Hypertension

Hypertension Costs Estimates for Arkansas

- **Treatment Costs for Hypertension only** (Milken Report published 2007 using 2003 data)

  $340 Million for treatment of 411,000 hypertensives at $829 per year
  (This is projected to increase to $920 Million by 2023 if hypertension prevalence trends are not reduced.)

  $3.13 Billion of Lost Wages and Productivity of Patient and Caregivers
  (This is projected to increase to $8.98 Billion if hypertension prevalence trends are not reduced.)

Arkansas Medicaid 2007 Expenditures for Hypertension only

Of the 707,792 beneficiaries, 12.5% (88,604) were treated for hypertension.
The cost per beneficiary with hypertension was $1,920 which translated to **$170 Million** for the state-wide program.

Estimates of Charges for Hospitalizations Due to Hypertension and Associated Diseases in Arkansas for 2010

1) **Hospitalizations included in this Cost Estimate had a Primary Discharge Diagnosis of one of the following conditions:**

Hypertension	**Ischemic Heart Disease**
Stroke	**Congestive Heart Failure**
Chronic Renal Disease	

2) For hospitalizations with a non-Hypertension Primary Diagnoses, the fraction of the cases and their associated medical costs that would be attributable to hypertension as a critical underlying cause were computed using the prevalence and relative risk of disease from published studies involving population groups with hypertension and population groups without hypertension.

3) The Attributable Fractions (AFs) were applied to the hospitalizations charges and these charges were then reduced by a Charge-to-Cost factor to estimate the actual charges of the hospitalizations. These costs estimates are presented in the following table.

Estimated Charges for Hospitalizations Due to Hypertension and Associated Diseases in Arkansas for 2010

Condition	Hospital Discharges	Total Charges in $1,000s	AF*	Attributable to Hypertension in $1,000s
Hypertension	3,004	$60,917	1.00	$60,917
Ischemic Heart Disease	18,467	$900,785	0.27	$243,207
Stroke	9,974	$235,795	0.426	$100,453
Congestive Heart Failure	11,222	$277,911	0.458	$127,291
Chronic Kidney Disease	159	$3,861	0.175	$680
Total	42,826			$532,548

* AF = Attributable Fraction

Conversion from Hospital Charges to Estimated Costs for Hypertension and Associated Diseases in Arkansas for 2010

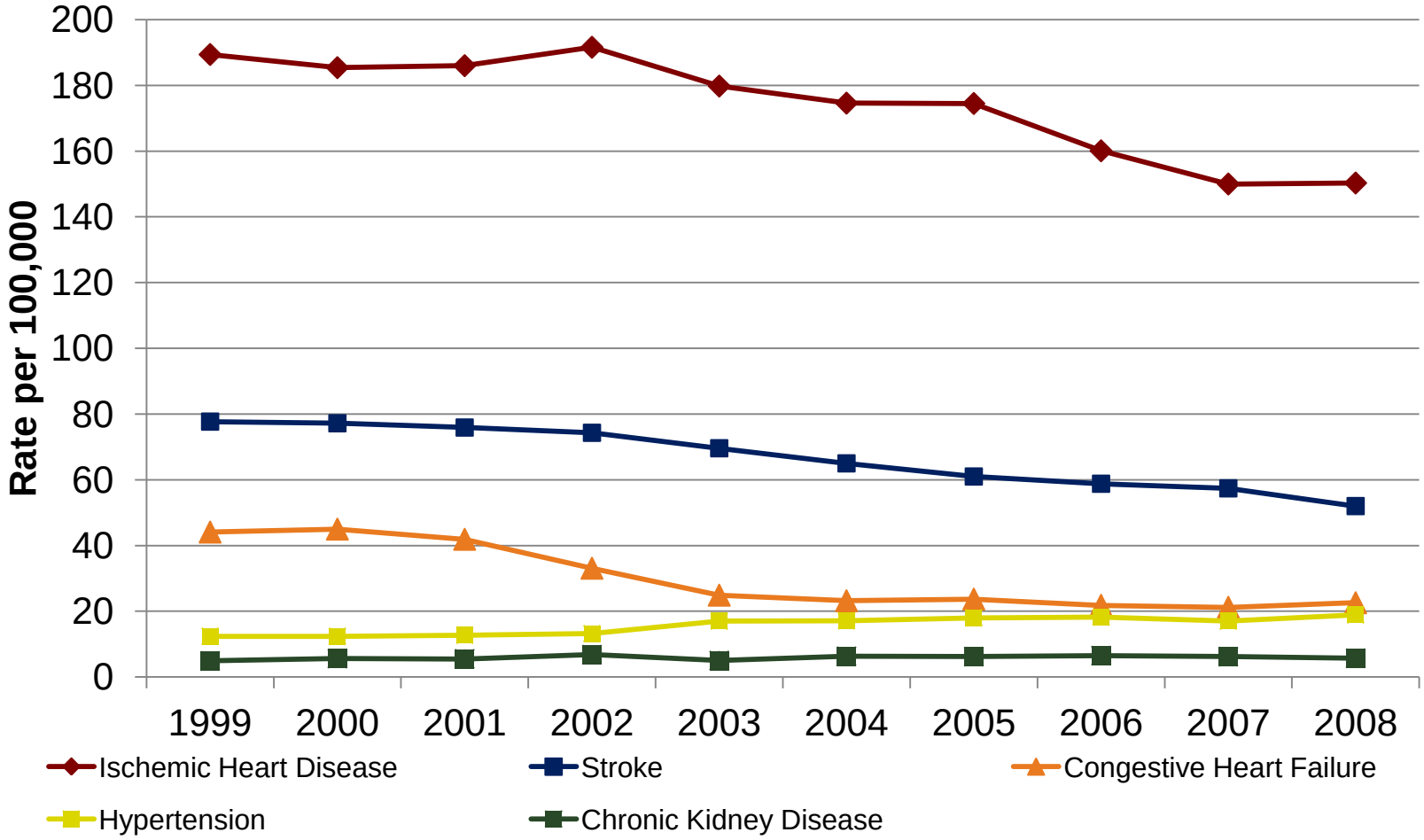
Condition	Hospital Discharges	Attributable Charges to Hypertension in $1,000s	Cost to Charge Ratio	Attributable Costs to Hypertension in $1,000s
Hypertension	3,004	$60,917	55%	$33,504
Ischemic Heart Disease	18,467	$243,207	55%	$133,763
Stroke	9,974	$100,453	55%	$55,249
Congestive Heart Failure	11,222	$127,291	55%	$70,010
Chronic Kidney Disease	159	$680	55%	$374
Total				$292,900

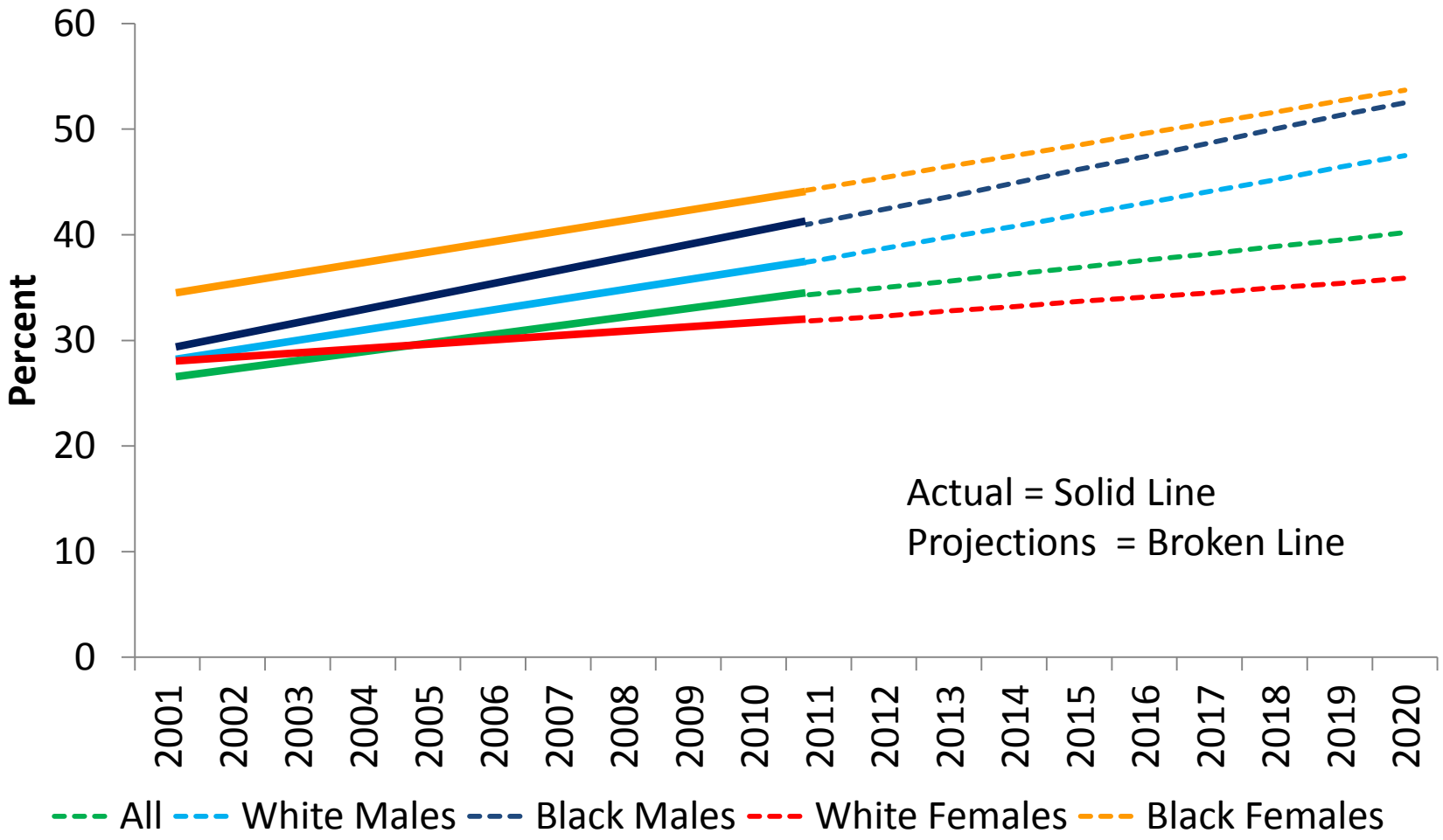
Risk of Future Increases In Hypertension-Related Disorders

The U.S. and Arkansas are poised for significant increases in hypertension-related conditions. Although there have been consistent and significant decreases in the mortality rates for two important hypertension-related conditions, ischemic heart disease and stroke, these decreases have occurred during a time when prevalence of hypertension continued to increase. (See Charts on pages 165 and 166.) This would support a conclusion that these decreases in mortality were due to other factors, such as a general reduction in smoking, wide-spread use of statins to control cholesterol, and improved surgical interventions for heart disease (PTCAs and CABGs).

At some point the favorable impact of these prevention and intervention measures will plateau. When this happens, which could be very soon, hypertension will be ready to take center stage at its current prevalence and at the projected increased trends in prevalence from 2012 to 2020. (See Chart on page 166.) The probable increases in hypertension, ischemic heart disease, stroke, congestive heart failure and kidney diseases will be a major public health challenge to reverse and will be very costly in terms of lives and treatment dollars for some time to come.

Mortality Rates for Hypertension & Related Diseases Arkansas, 1999 - 2008



Source: CDC Wonder Detailed Mortality File
Rates are age-adjusted to the 2000 U.S. standard population and are calculated per 100,000.

Projected Trends of Hypertension Prevalence By Race and Sex Arkansas, 2001 - 2020