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Projections of Cardiovascular Disease Prevalence and Costs: 2015–2035

Technical Report

Prepared for

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hypertension as a risk factor should not be summed with other CVD conditions to calculate the costs of all CVD.

2.1 Projections of CVD Prevalence

Prevalence of hypertension, coronary heart disease, CHF, and stroke was estimated using data from the 2007–2014 National Health and Nutrition Examination Survey (NHANES). NHANES is a survey of a nationally representative sample administered by the National Center for Health Statistics, which is part of the Centers for Disease Control and Prevention (CDC). The survey combines an interview and a physical examination component where the interview includes demographic, socioeconomic, dietary, and health-related questions, and the examination component consists of medical, dental, and physiological measurements, as well as laboratory tests administered by highly trained medical personnel. Prevalence of hypertension was based on blood pressure measurements and the responses to interview questions about being told of having high blood pressure and taking blood pressure medications. Prevalence of coronary heart disease was based on patient self-report during an interview that asked about coronary heart disease, angina, or heart attack. Prevalence of CHF and stroke was also based on patient self-report. A list of qualifying measures and questions used to define each condition

prevalence estimates between NHANES and MEPS was that prevalence from NHANES was based on stated or lifetime prevalence of the condition because it was assessed using “have you ever been told…” questions. Prevalence from MEPS was based on treated prevalence as individuals were identified to have a condition if they sought medical care for that condition within the year.

2.2 Projections of CVD Costs

The main data source for generating projections of medical costs of CVD was the 2009 to 2013 MEPS. MEPS is a nationally representative survey of the civilian noninstitutionalized population administered by the Agency for Healthcare Research and Quality (AHRQ). MEPS provides data on participants’ utilization of medical services and the corresponding medical costs. Medical conditions are identified in MEPS Medical Condition files based on self-reports of conditions leading to medical visits or treatment within the interview year. Medical conditions are classified using International Classification of Diseases, Ninth Revision, Clinical Modifications codes based on self-reported conditions that were transcribed by professional coders. CVD conditions included in this analysis were defined using International Classification of Diseases, Ninth Revision, Clinical Modifications codes with a full list of the codes presented in Table 2-1. The MEPS data measure total annual medical spending, including payments by insurers and out-of-pocket spending (co-payments, deductibles, and payments for noncovered services). The costs captured by MEPS represent payments (not charges) from the payer to the provider. MEPS spending data are obtained through a combination of self-report and validation from payers (e.g., private insurers).

Projections of the direct medical costs of CVD were estimated by point of service. The following point-of-service categories were used (MEPS expenditure files listed in parentheses): hospital (inpatient, outpatient, emergency room), physician (office-based visits), prescription (prescription), home health (home health), and other (vision, medical supplies, dental). Nursing home costs were estimated using a combination of data sousid other(t)-10tedsdice

among alternative nonlinear estimators recommended

Fourth, to estimate projected costs, we first followed recommendations from AHRQ to inflate dollar values in the MEPS data to 2015. We then multiplied the per person

As expected, CVD prevalence increases with age (Figure 3-1). Within age groups, prevalence of CVD is expected to remain constant between 2015 and 2035. Prevalence of hypertension, CHF, and stroke is the highest among blacks (Figures 3-2 through 3-5). Prevalence of CHD and AFIB is the highest among white non-Hispanics (Figures 3-6 and 3-7). Within racial/ethnic groups, CVD prevalence is expected to grow (see Figure 3-2). For example, prevalence of hypertension among blacks is expected to increase from 46.8% in 2015 to 50.6% in 2035 (see Figure 3-3), and prevalence of AFIB among white non-Hispanics is expected to increase from 3% in 2015 to 4% in 2035 (Figure 3-7). Prevalence of total CVD is higher among males than females (Figure 3-8), however, prevalence of hypertension, CHF, stroke, and AFIB is higher among females than among males (Figures 3-9 through 3-13). Prevalence is expected to increase for all conditions among both males and females.

Figure 3-1. Stated Projected Prevalence of Any CVD by Age, 2015–2035

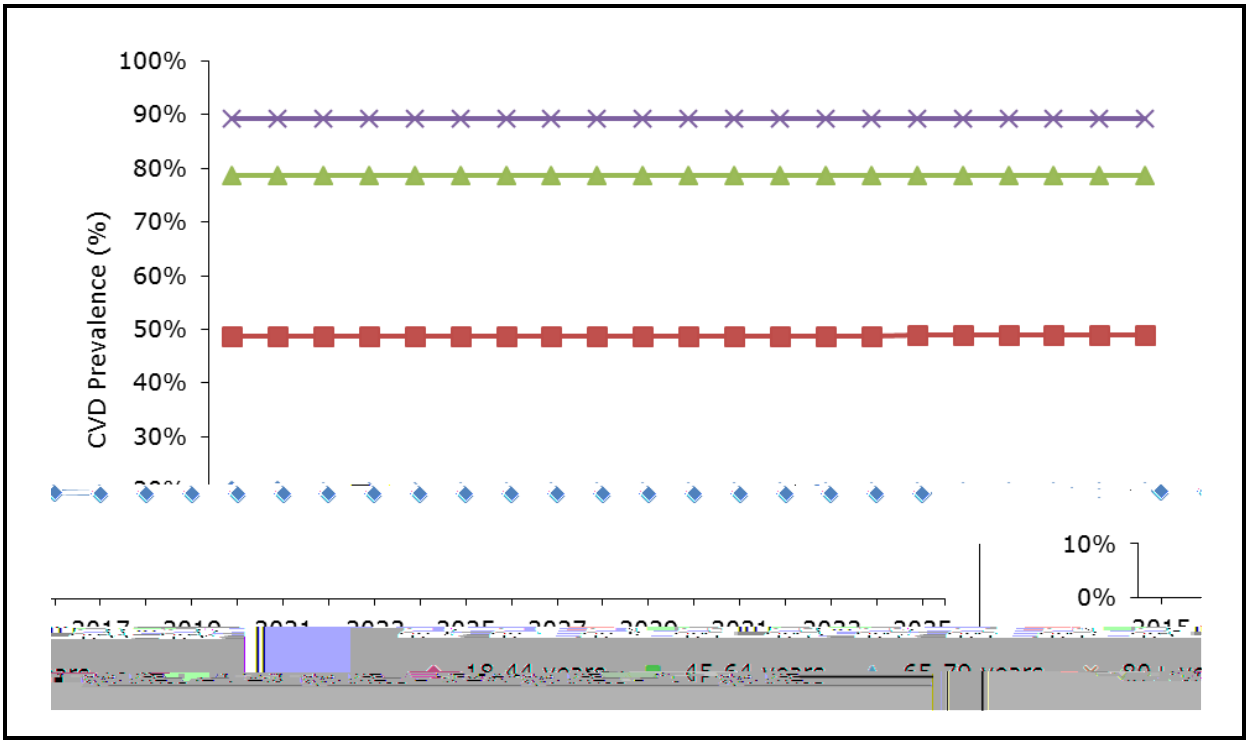

Figure 3-2. Stated Projected Prevalence of Any CVD by Race/Ethnicity, 2015–2035

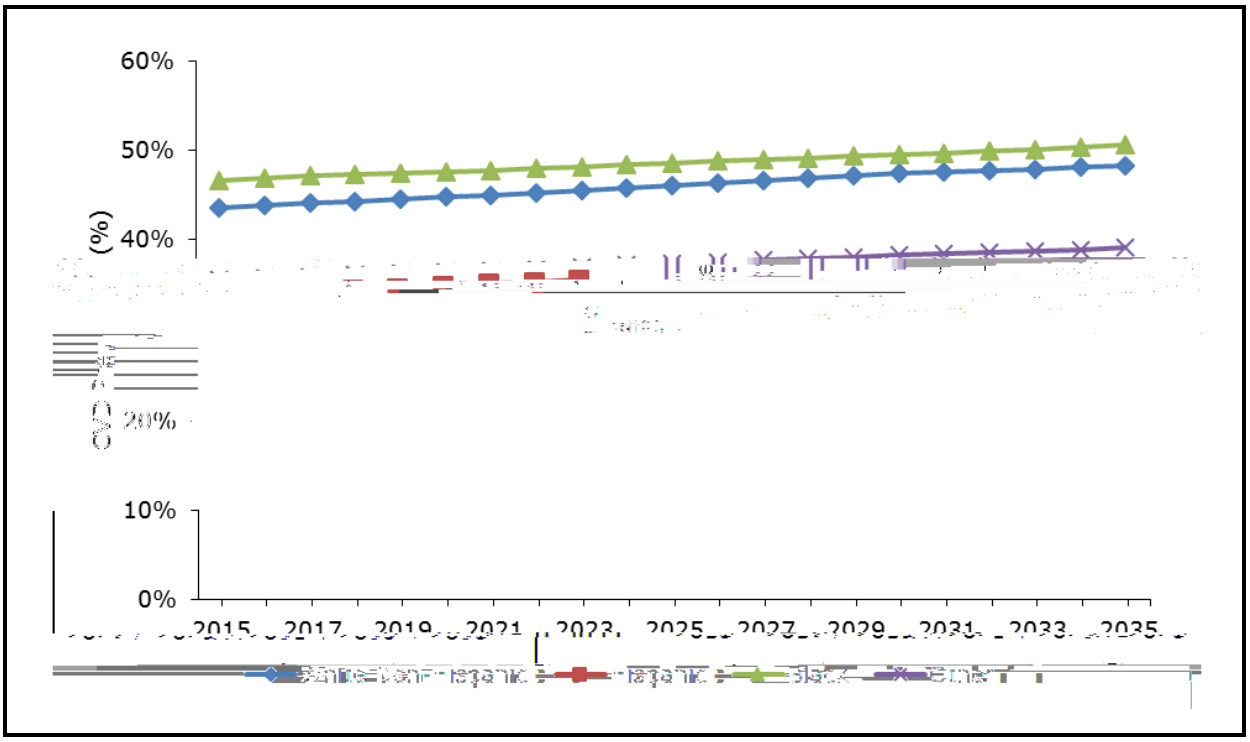

Figure 3-3. Stated Projected Prevalence of Hypertension by Race/Ethnicity, 2015–2035

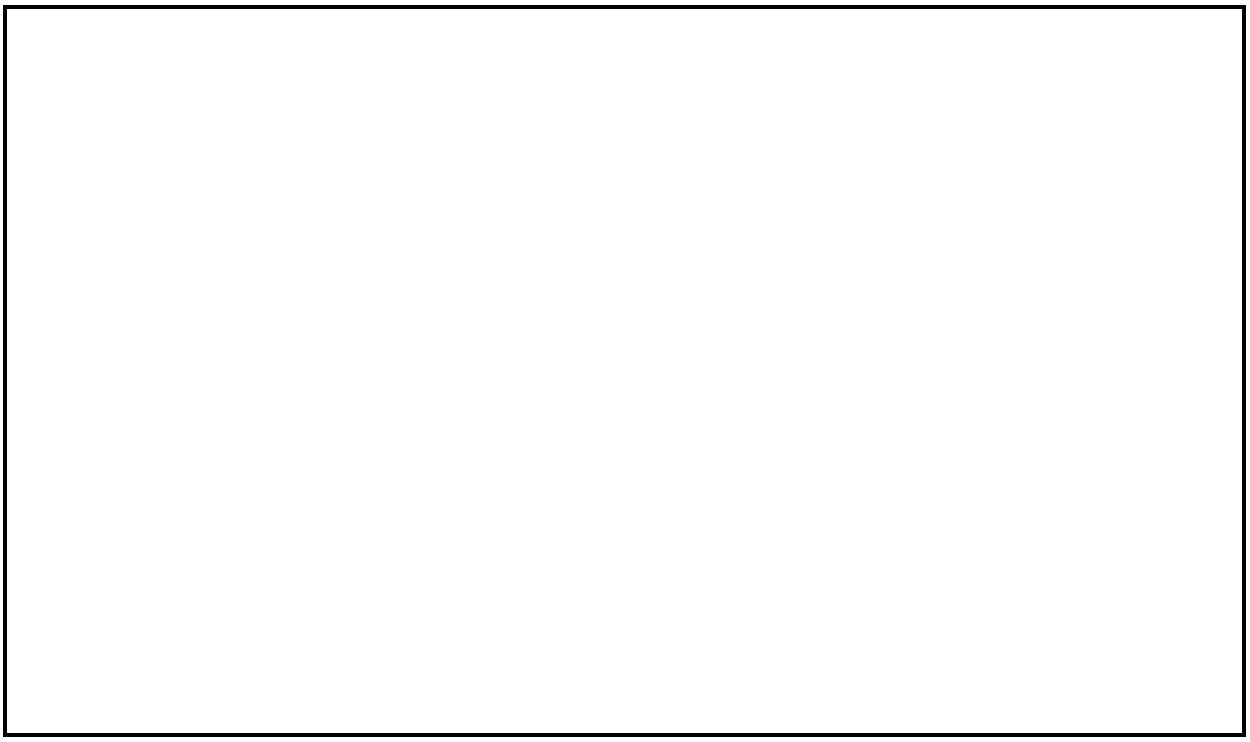

Figure 3-8. Stated Projected Prevalence of Any CVD by Sex, 2015–2035

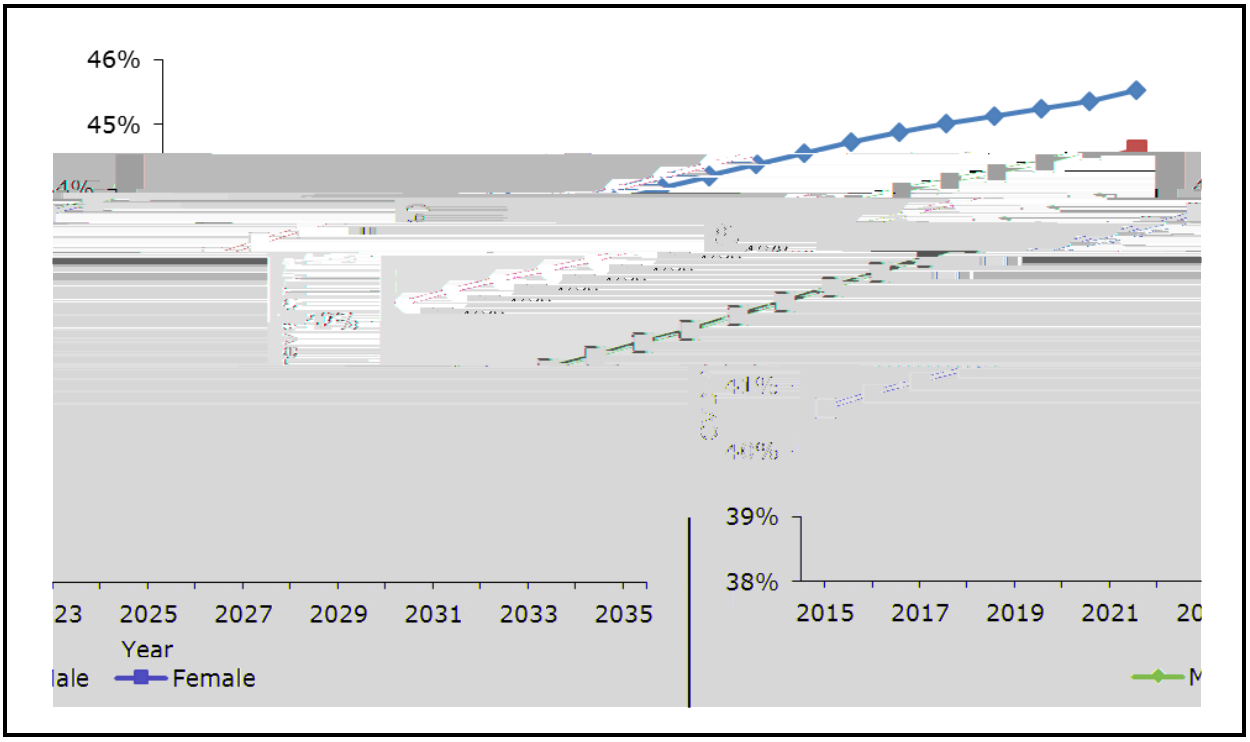

Figure 3-9. Stated Projected Prevalence of Hypertension by Sex, 2015–2035

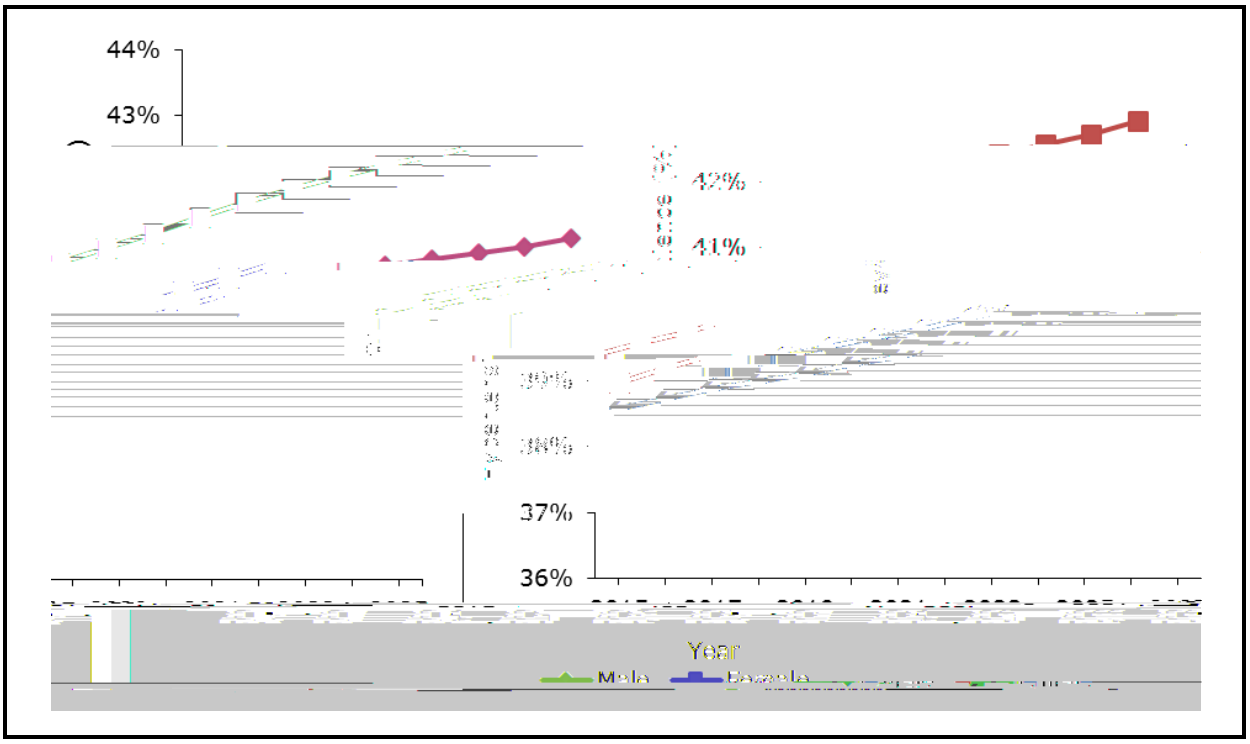

Figure 3-10. Stated Projected Prevalence of CHD by Sex, 2015–2035

Figure 3-11. Stated Projected Prevalence of CHF by Sex, 2015–2035

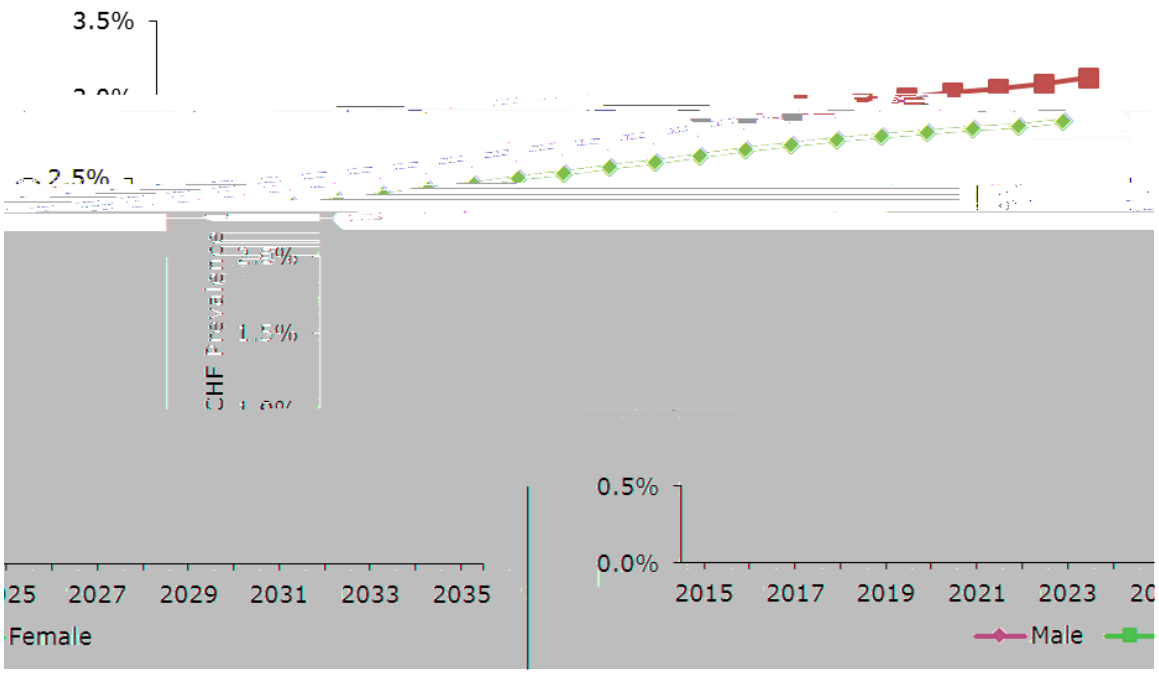

Figure 3-12. Stated Projected Prevalence of Stroke by Sex, 2015–2035

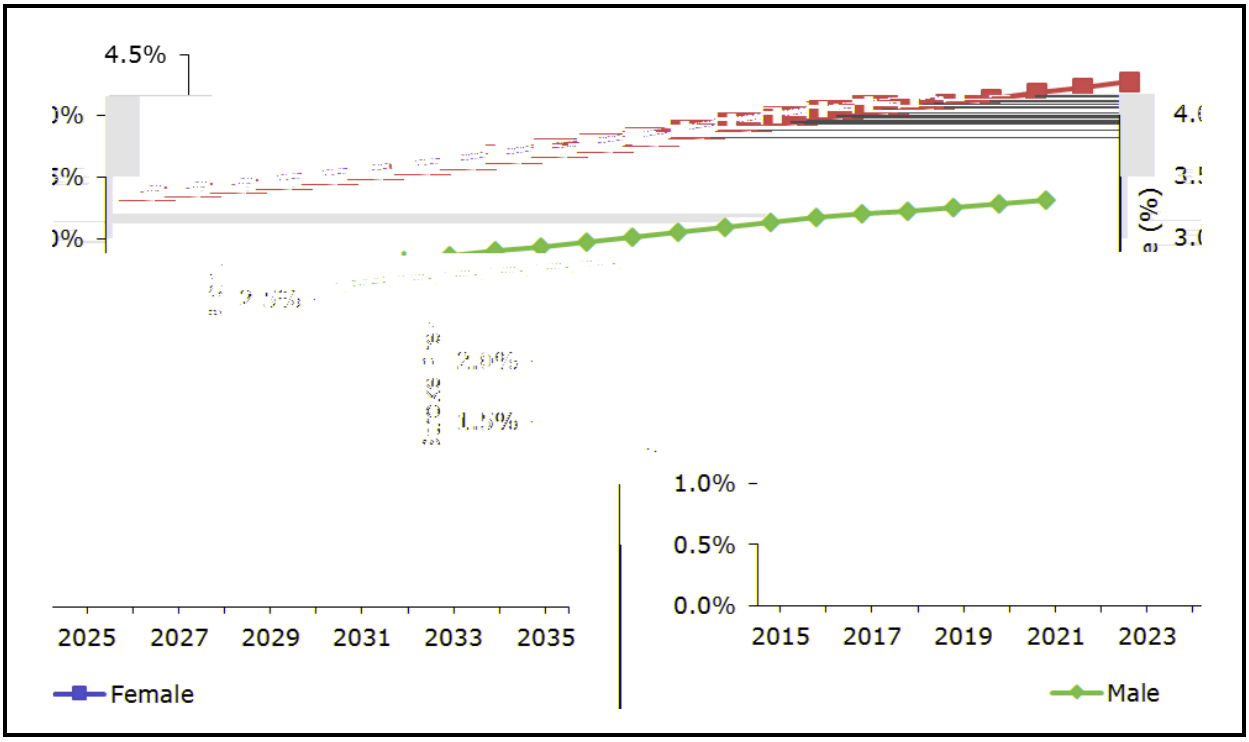

Figure 3-13. Projected Prevalence of AFIB by Sex, 2015–2035

Table 3-3. Projected Costs of Total CVD by Age (2015$ in billions)

	18–44			45–64			65–79		80+
Condition	$ 2015	$ 2035	% Change	$ 2015	$ 2035	% Change	$ 2015	$ 2035	

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Table 3-4. Projected Costs of Total CVD by Race/Ethnicity (2015$ in billions)

	White Non-Hispanic			Black			Hispanic			Other		
Condition	$ 2015	$ 2035	% Change	$ 2015	$ 2035	% Change	$ 2015	$ 2035	% Change	$ 2015	$ 2035	% Change
Total CVD												
Medical costs	241.5	514.5	113%	40.5	109.7	171%	19.7	68.9	250%	16.5	55.7	238%
Indirect costs	163.3	224.4	37%	44.9	75.9	69%	16.0	39.0	145%	12.7	28.7	126%
Total costs	404.8	738.8	83%	85.5	185.5	117%	35.6	107.9	203%	29.1	84.3	190%
Hypertension												
Medical costs	47.4	93.3	97%	10.8	26.6	14[illegible]MCI						

Table 3-5. Projected Costs of Total CVD by Sex (2015$ in billions)

Condition	Total			Male			Female		
	$ 2015	$ 2035	% Change	$ 2015	$ 2035	% Change	$ 2015	$ 2035	% Change
Total CVD									
Medical costs	318.2	748.7	135%	169.6	352.7	108%	170.7	395.9	132%
Indirect costs	236.8	368.0	55%	155.2	238.5	54%	81.6	129.5	59%
Total costs	555.0	1,116.6	101%	324.8	591.2	82%	252.2	525.4	108%
Hypertension									
Medical costs	68.4	153.7	125%	33.0	73.7	124%	35.5	80.0	126%
Indirect costs	42.2	67.2	59%	27.2	43.1	59%	15.0	24.1	61%
Total costs	110.6	220.9	100%	60.2	116.8	94%	50.4	104.1	106%
CHD									
Medical costs	89.0	214.5	141%	47.9	117.0	144%	41.0	97.5	138%
Indirect costs	98.9								

Table 3-6. Projected Total Costs by Year (2015$ in billions)

Year	Total	Hyper-tension	CHD	CHF	Stroke	Other

Figure 3-14. Projected Total (Direct + Indirect) Costs of Total CVD by Age, 2015–2035 (2015$ in billions)

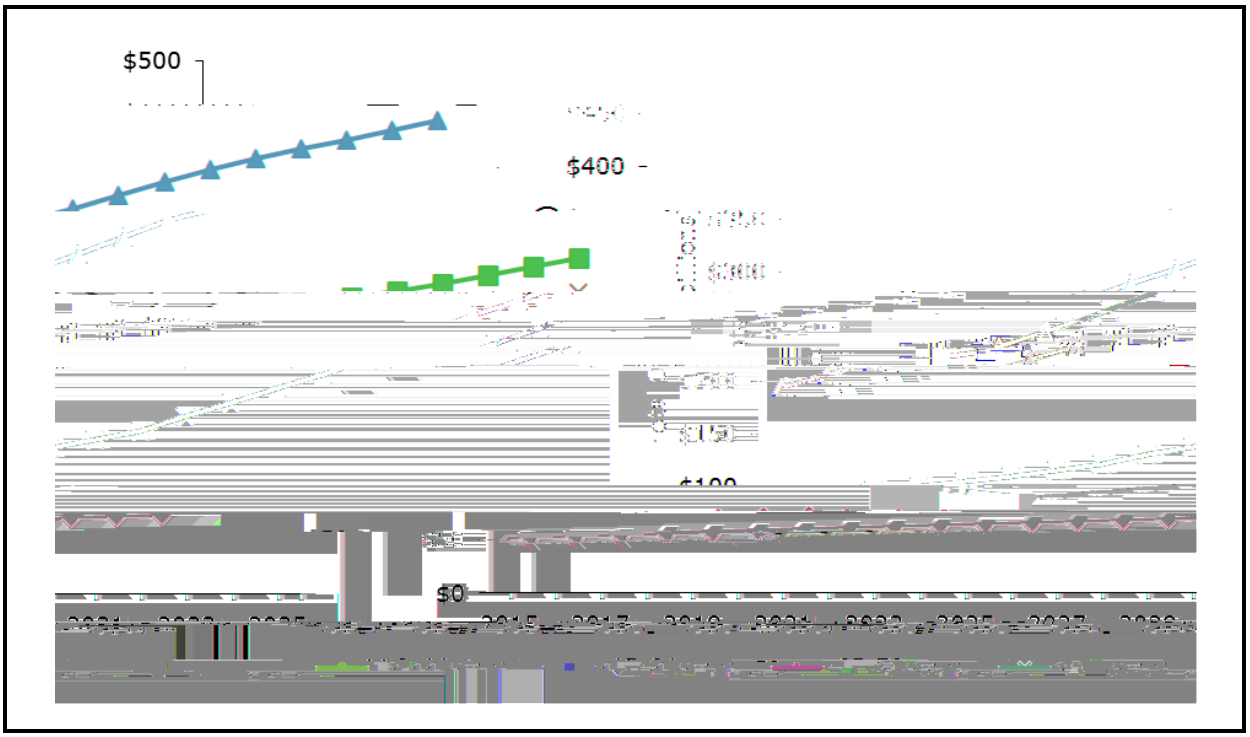


Figure 3-15. Projected Total (Direct + Indirect) Costs of CHF by Age, 2015–2035 (2015$ in billions)

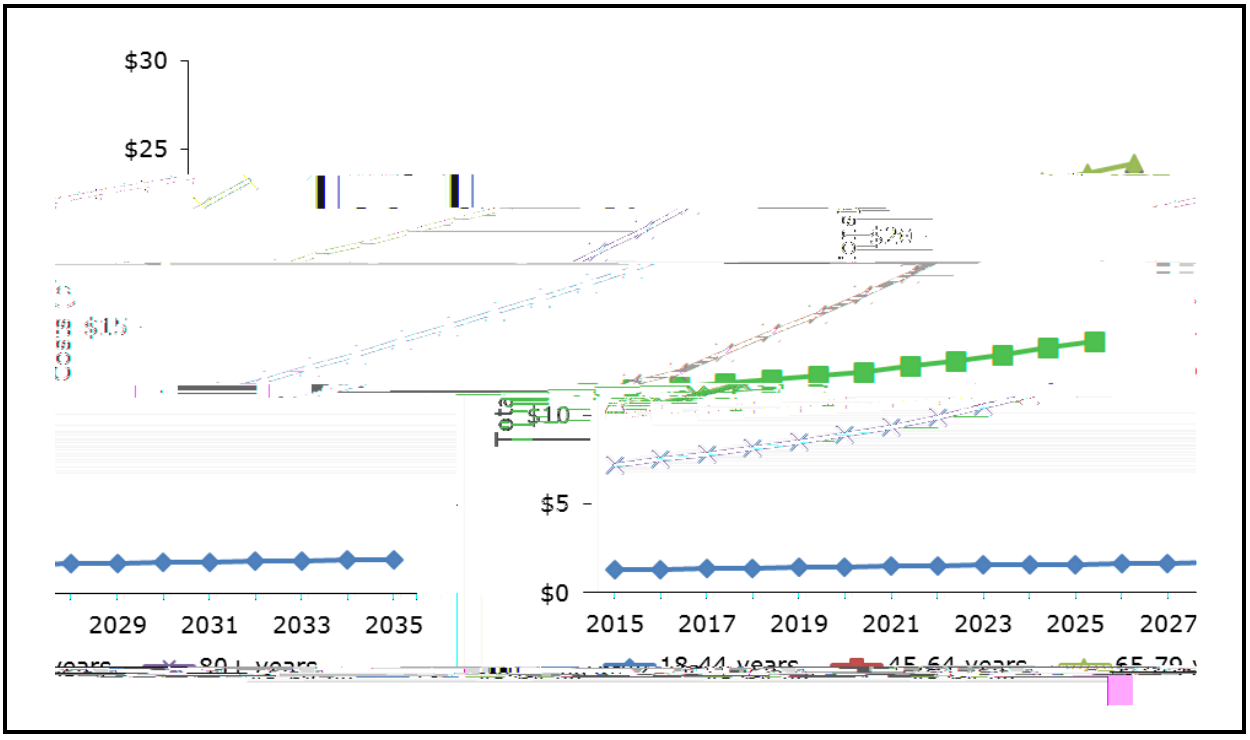


Figure 3-16. Projected Total (Direct + Indirect) Costs of Stroke by Age, 2015–2035 (2015$ in billions)

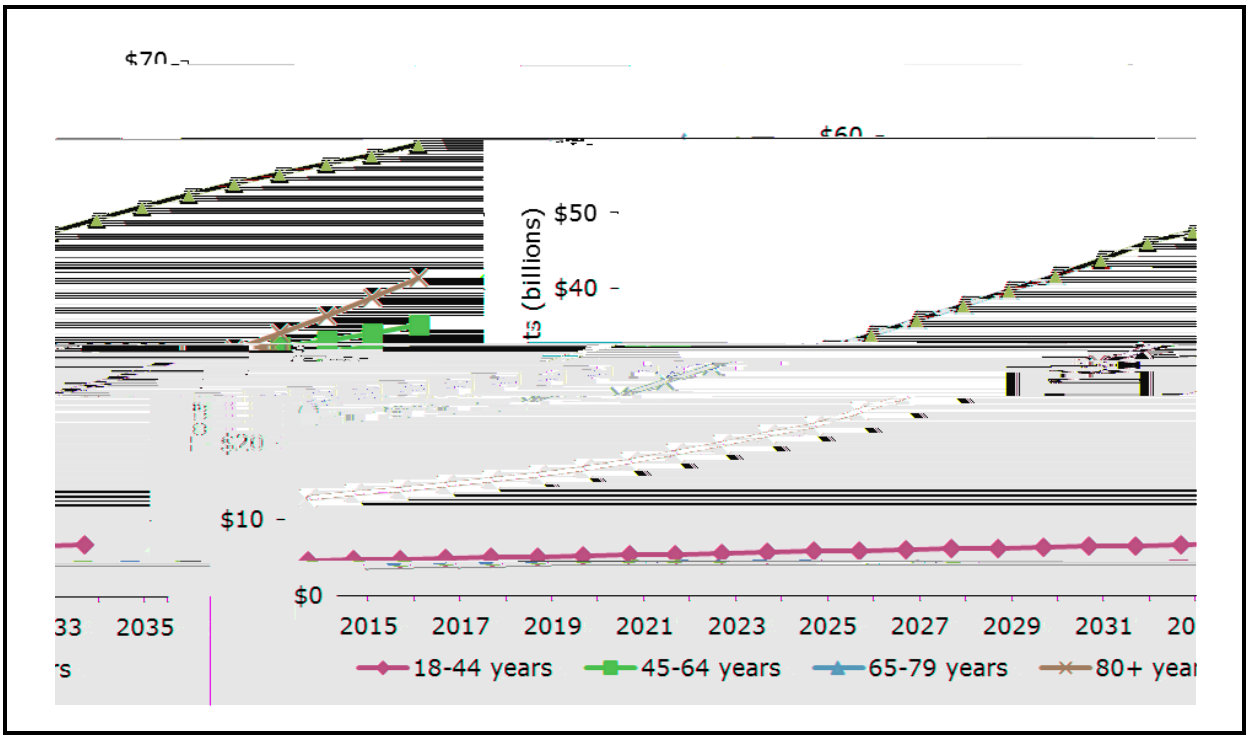


Figure 3-17. Projected Total (Direct + Indirect) Costs of AFIB by Age, 2015–2035 (2015$ in billions)

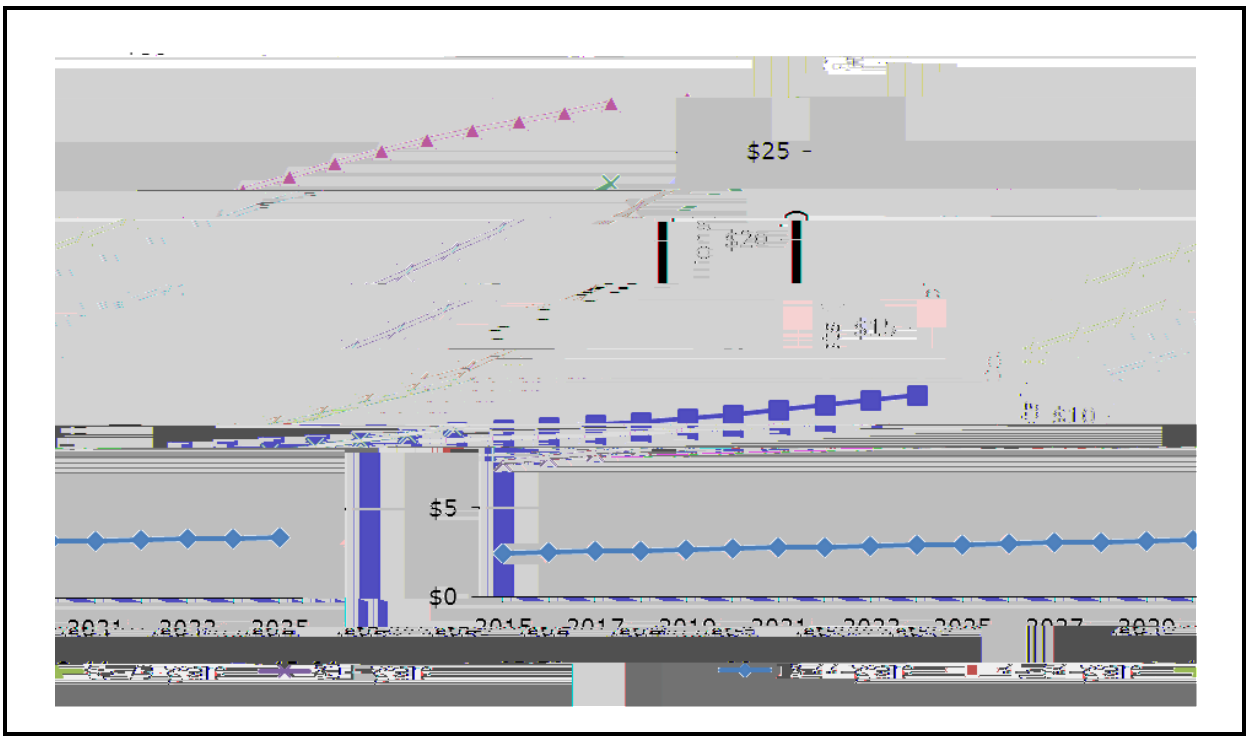


Figure 3-18. Projected Total (Direct + Indirect) Costs of Total CVD by Race/Ethnicity, 2015–2035 (2015$ in billions)

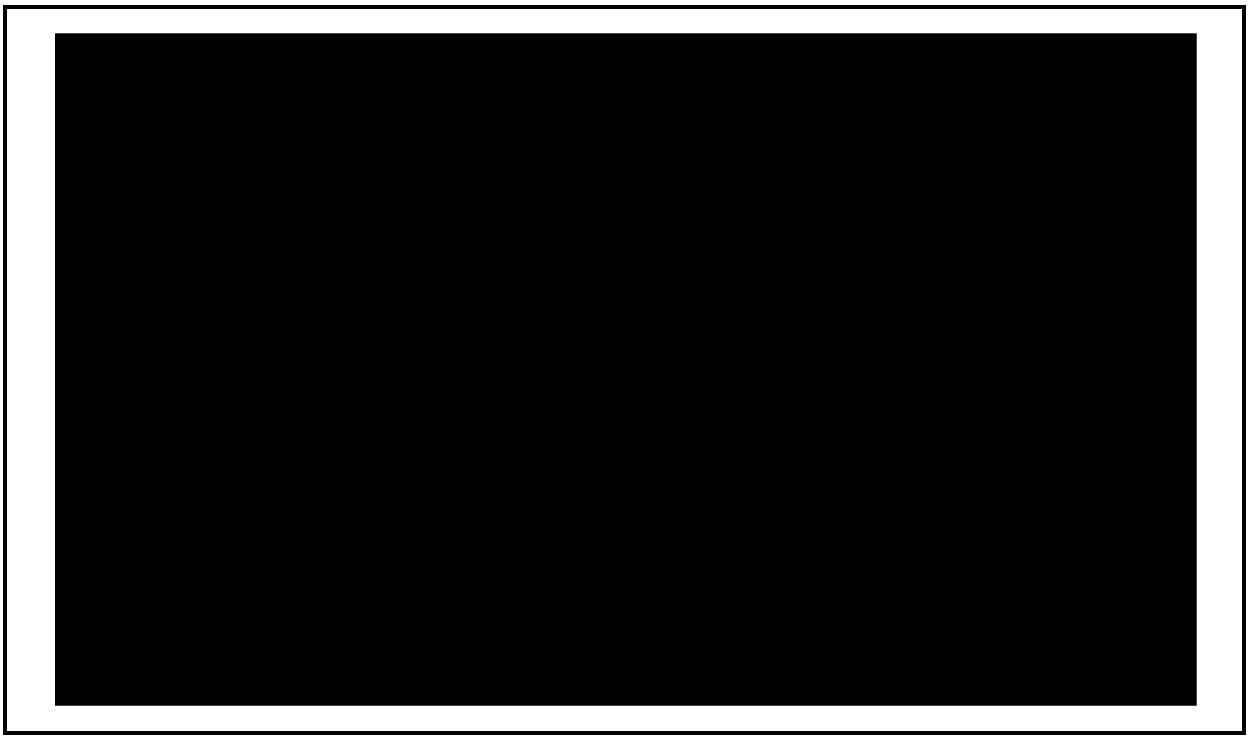


Figure 3-19. Projected Total (Direct + Indirect) Costs of Total CVD by Sex, 2015–2035 (2015$ in billions)

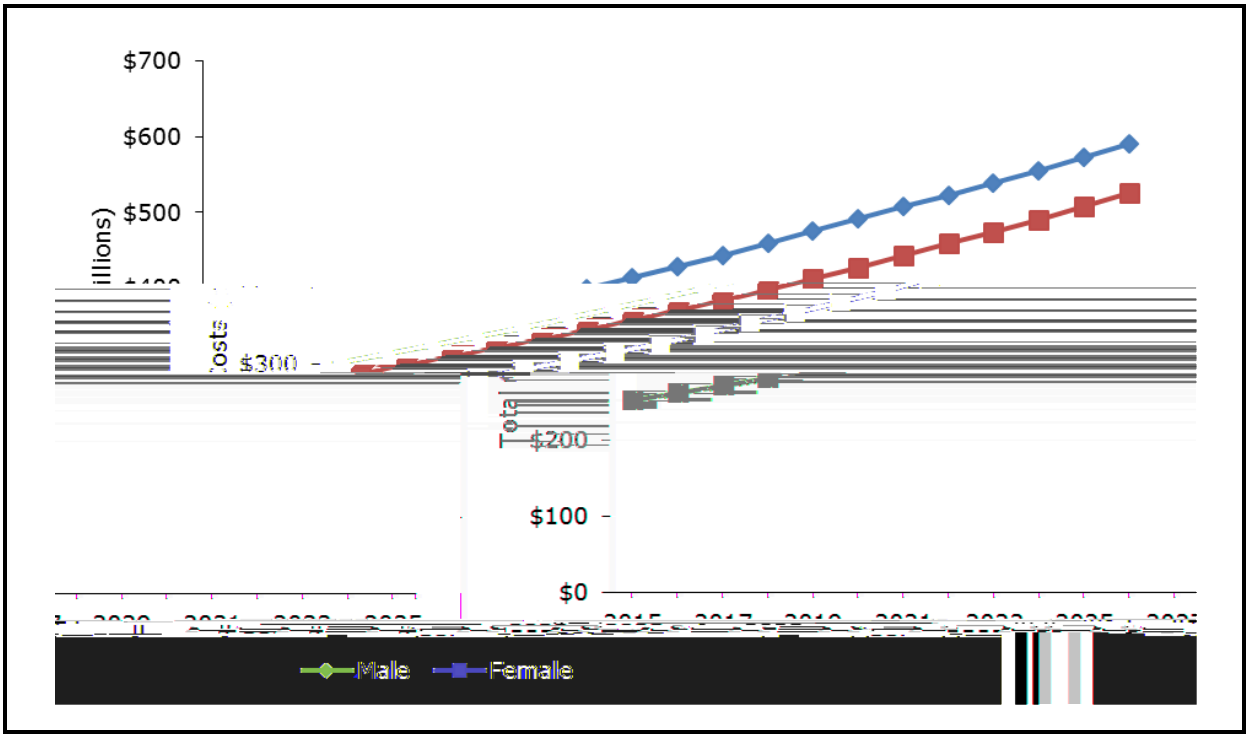


Figure 3-20. Medical and Indirect Costs, 2015 and 2035

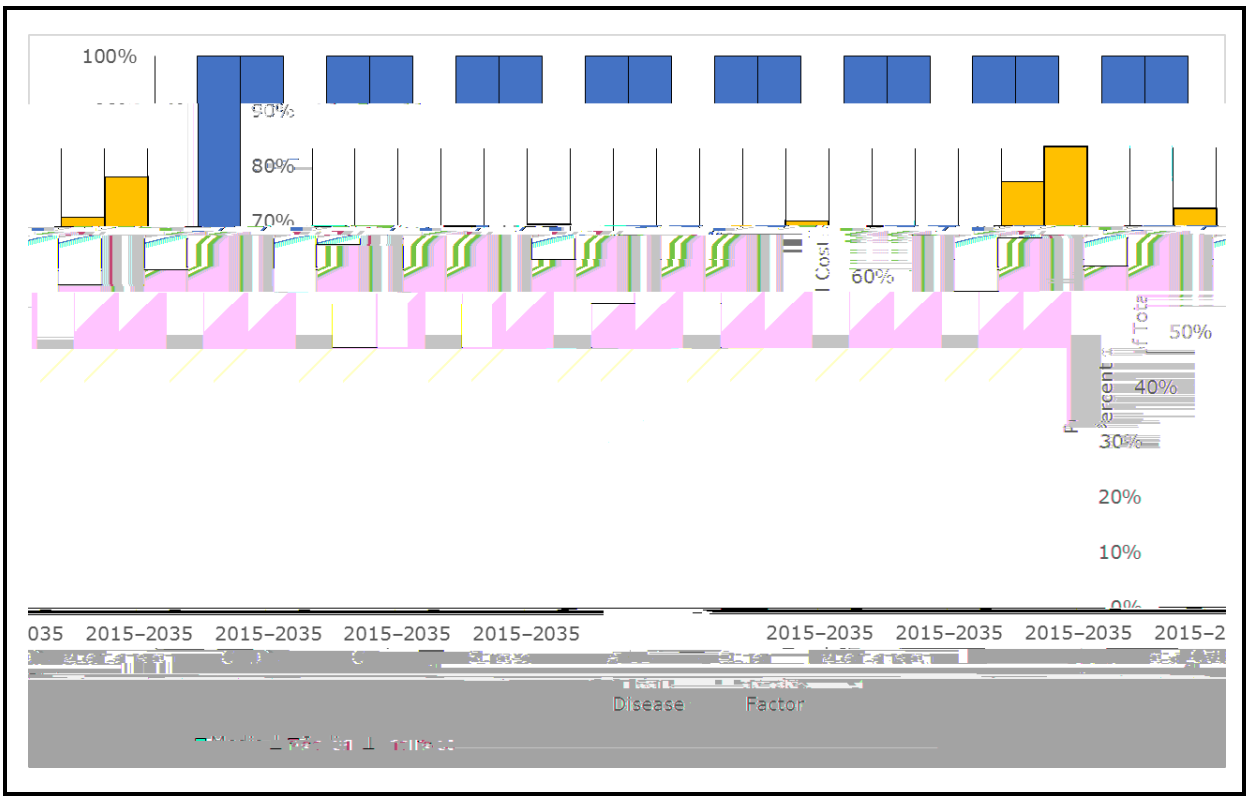


Table 3-7 reports projected medical costs for each CVD condition for 2015 through 2035, and Figures 3-21 through 3-29 present projected medical costs for individual CVD conditions by age, race/ethnicity, and sex. We include separate graphs by age, race/ethnicity, and sex only for those conditions where the patterns are different from those estimated for total CVD. Medical costs of CVD are expected to increase by 135% from 2015 ($318 billion) to 2035 ($749 billion) (see Table 3-6). When costs of hypertension are expanded to include how much the presence of hypertension adds to the treatment of sequelae (i.e., costs of hypertension as a risk factor), the medical costs of hypertension are estimated at $112 billion in 2015 increasing to $261 billion in 2035. Not considering costs of hypertension as a risk factor, costs are the highest for coronary heart disease ($89 billion in 2015, increasing to $215 billion in 2035).

By age, medical costs of CVD are the lowest among persons aged 18 to 44 (because of the lower prevalence of CVD in this age group) and the highest among persons aged 65 to 79 (Figure 3-21). In 2015, medical costs of CVD are lower among persons aged 80 or older than among those aged 45 to 64. However, after 2023, costs among persons aged 80 or older begin to exceed costs among persons aged 45 to 64. This result is likely driven by the

Figure 3-23. Projected Total Costs of CHD by Age, 2015–2035 (2015$ in billions)

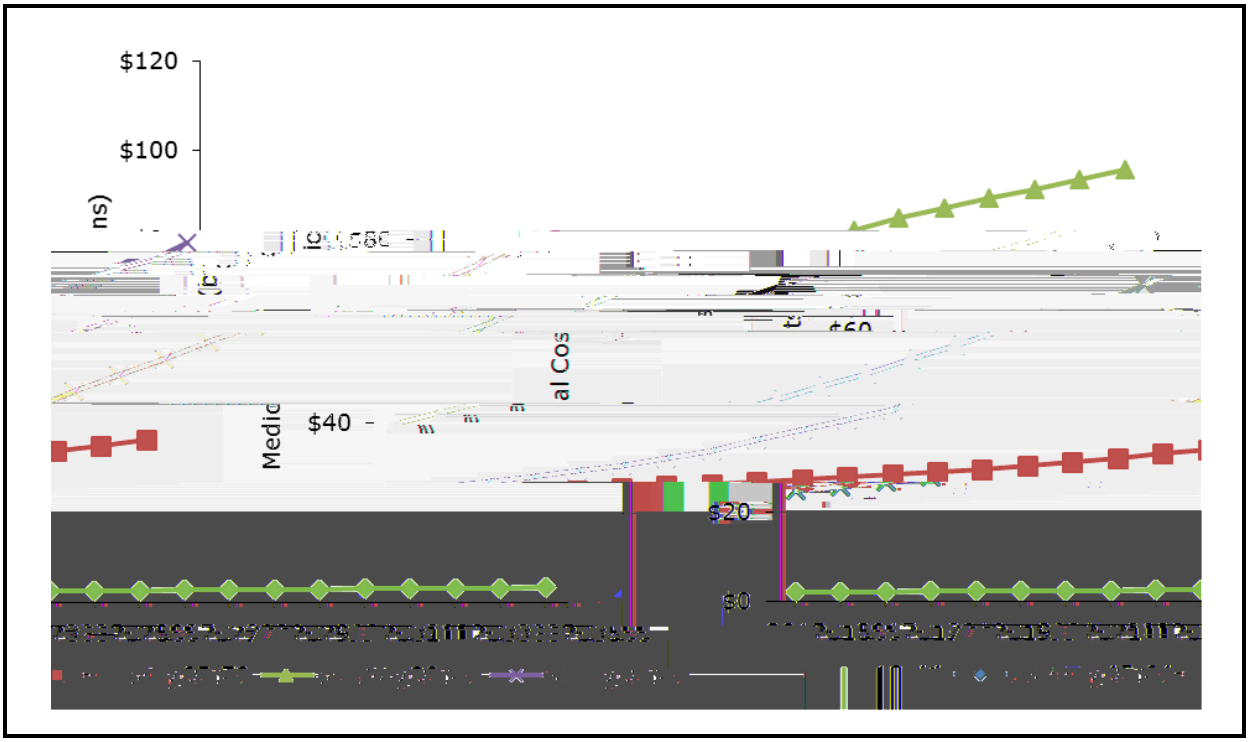


Figure 3-24. Projected Medical Costs of CHF by Age, 2015–2035 (2015$ in billions)

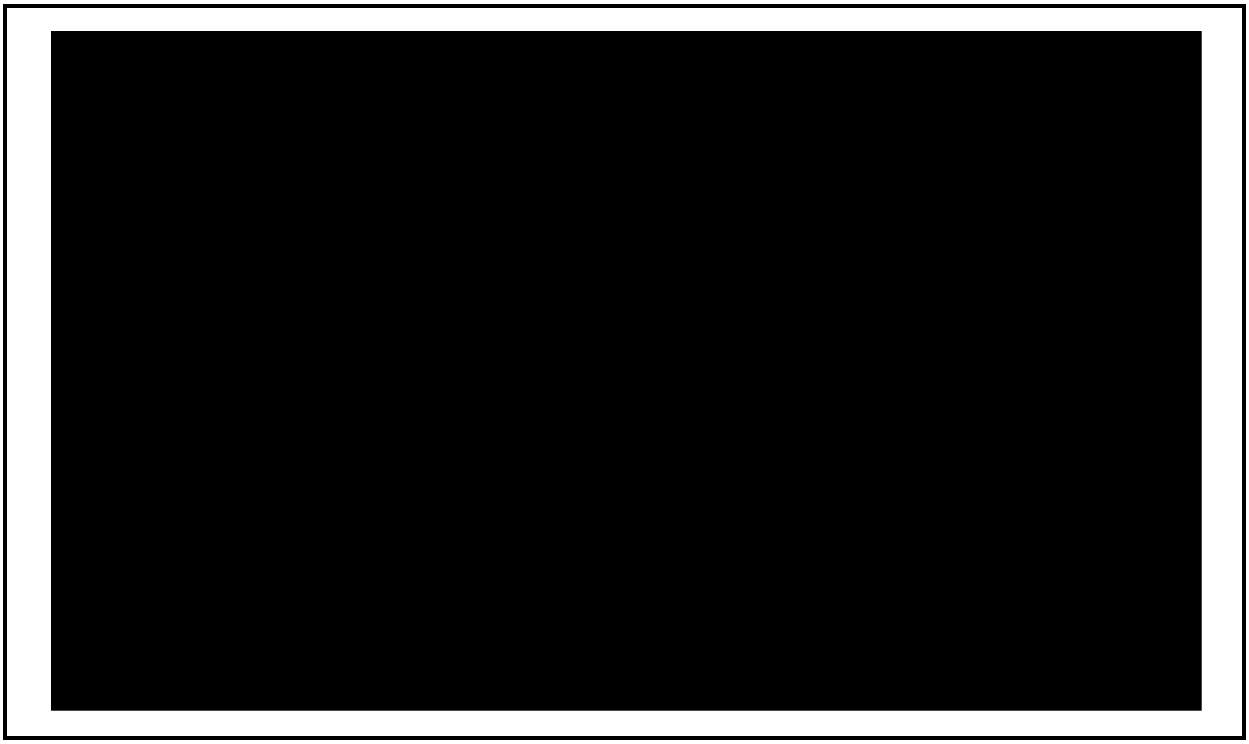


Figure 3-27. Projected Medical Costs of Total CVD by Race/Ethnicity, 2015–2035 (2015$ in billions)

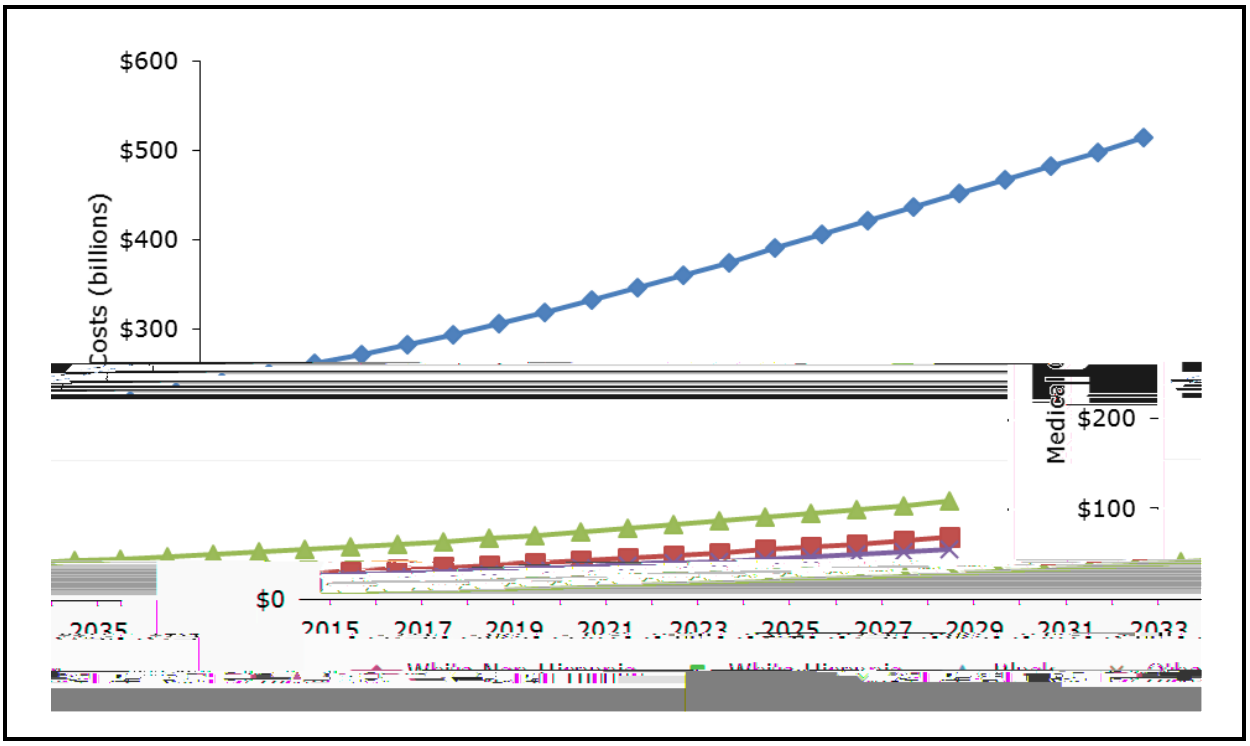


Figure 3-28. Projected Medical Costs of Total CVD by Sex, 2015–2035 (2015$ in billions)

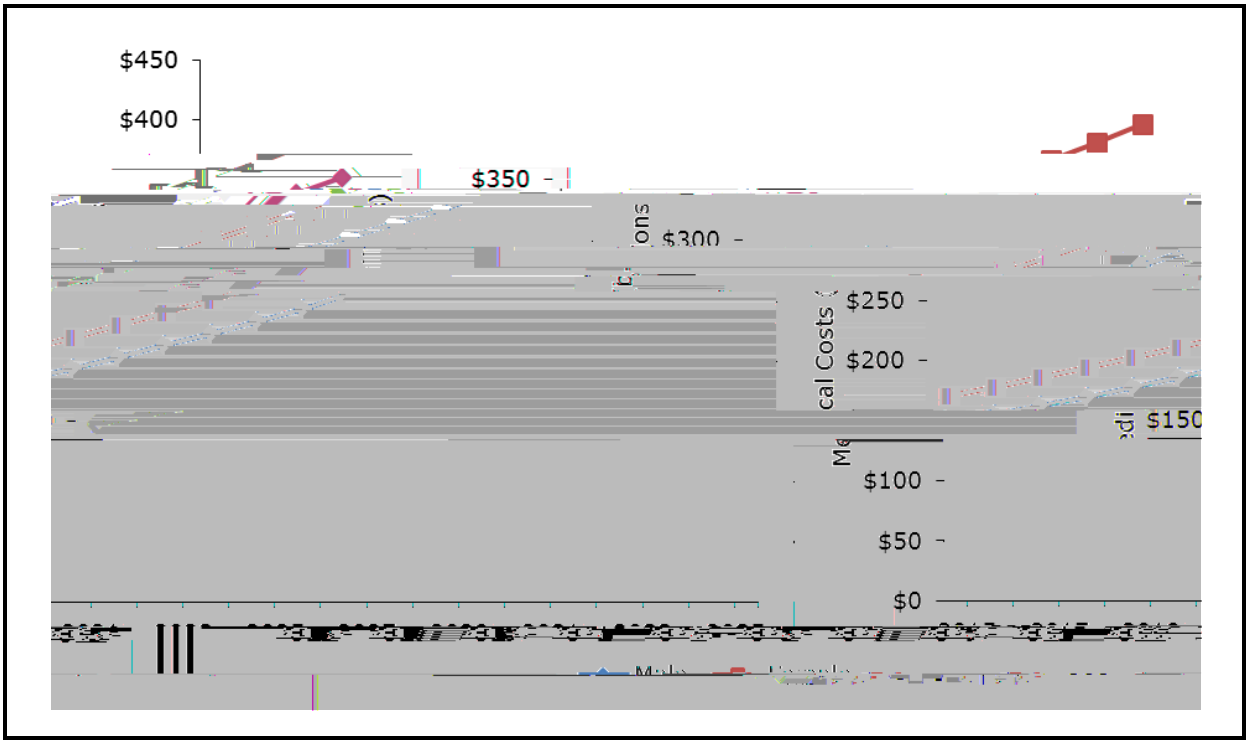


Figure 3-30. Projected Indirect Costs of Total CVD by Age, 2015–2035 (2015$ in billions)

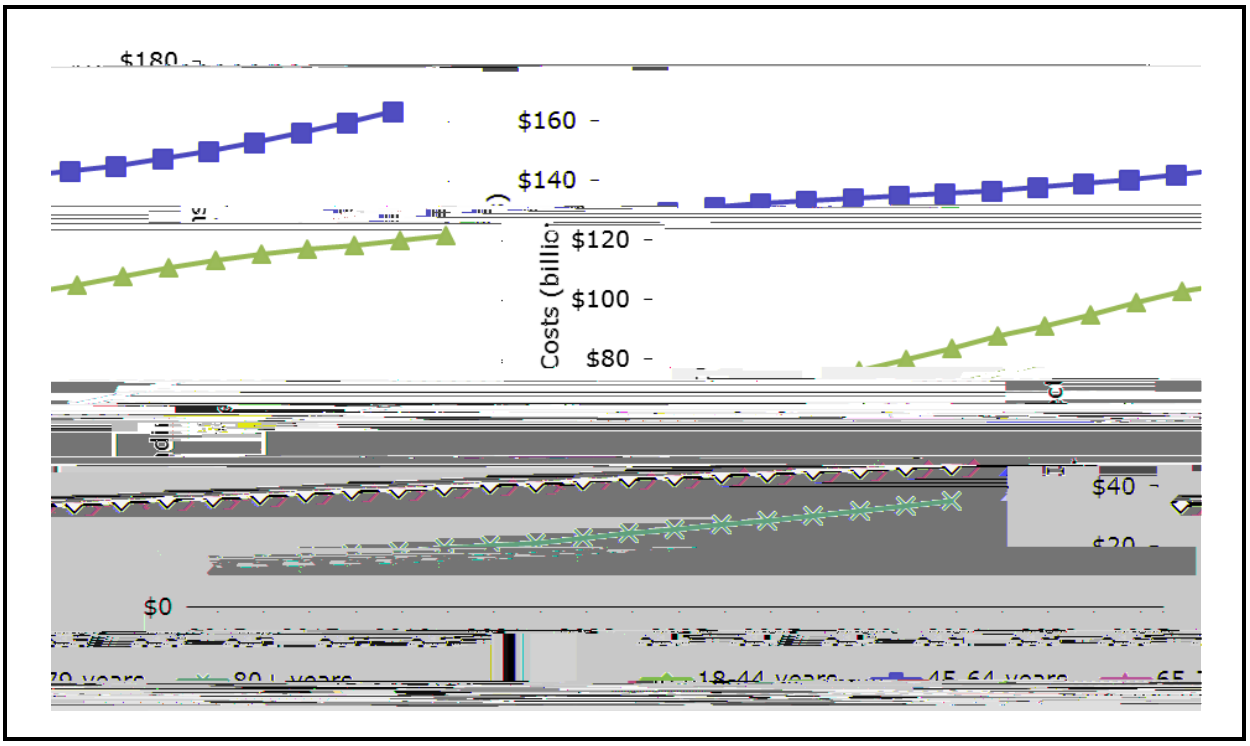


Figure 3-31. Projected Indirect Costs of CHF by Age, 2015–2035 (2015$ in billions)

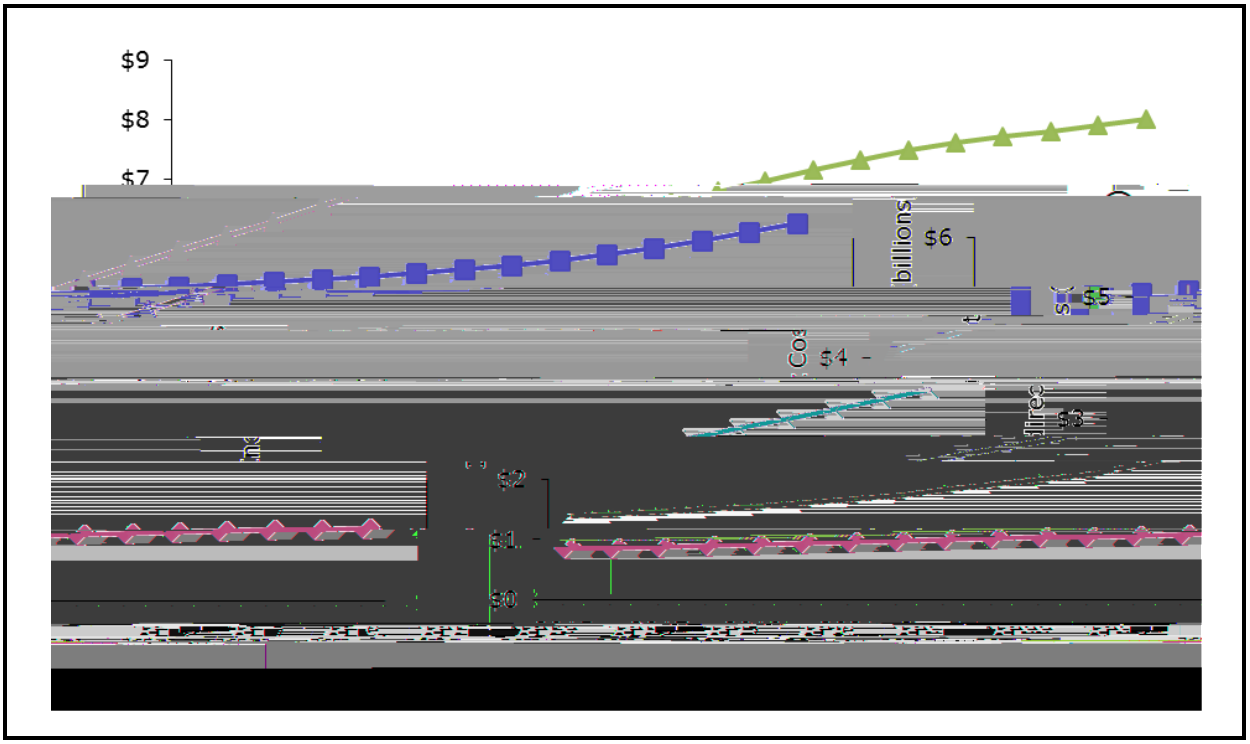


Figure 3-33. Projected Indirect Costs of Total CVD by Race/Ethnicity, 2015–2035 (2015$ in billions)

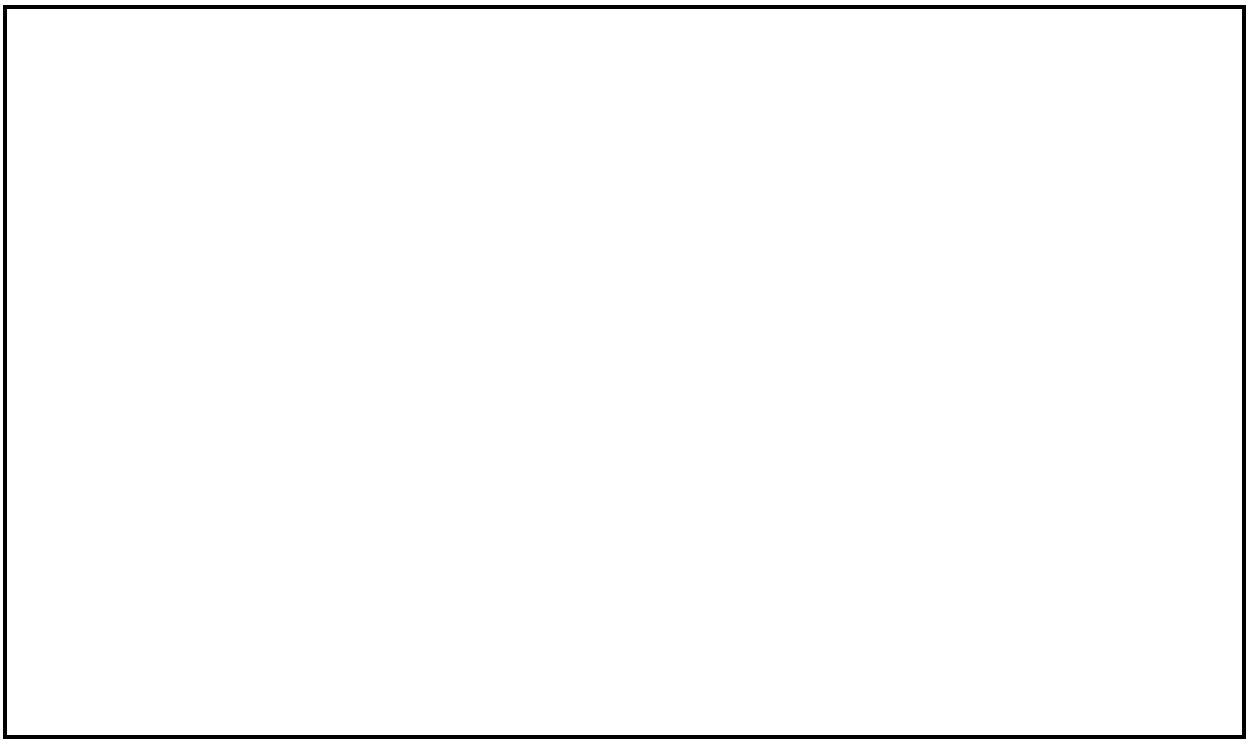
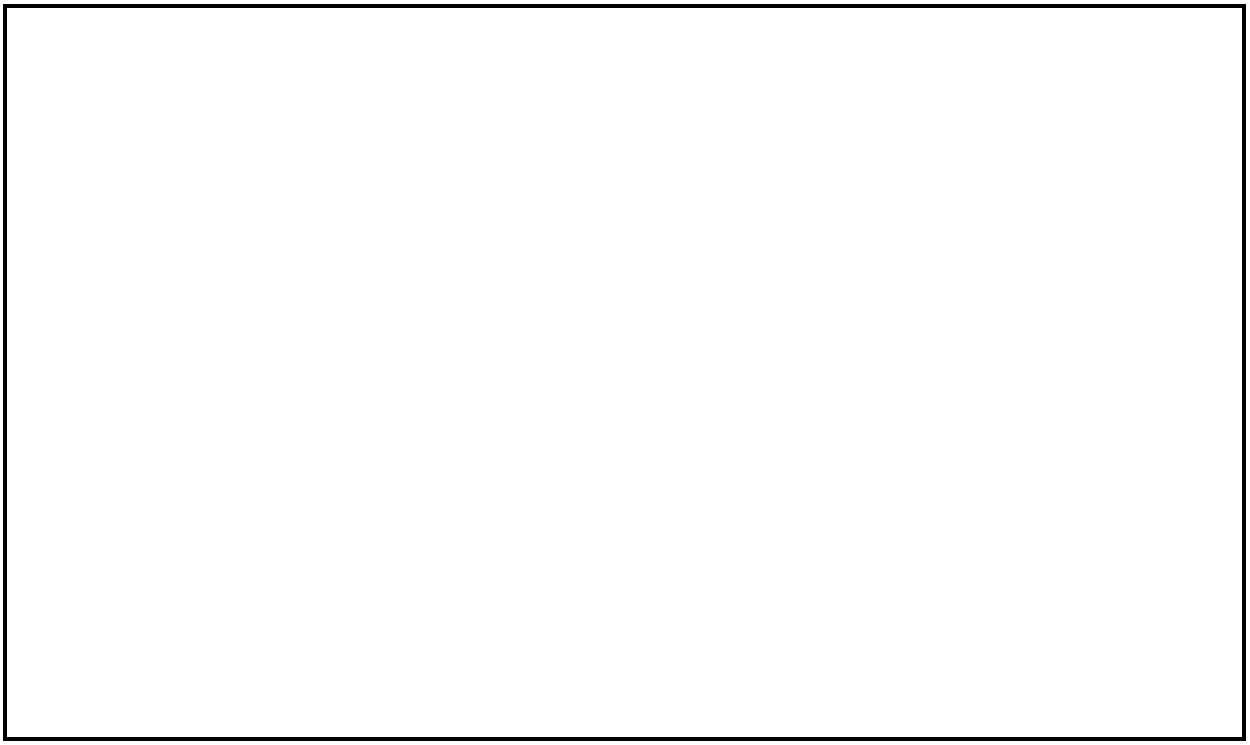


Figure 3-34. Projected Indirect Costs of Total CVD by Sex, 2015–2035 (2015$ in billions)



4. DISCUSSION

4.1 Prevalence and Costs of CVD in 2015

The current study demonstrates the magnitude of the health and economic burden of

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