SUPPLEMENTAL MATERIAL

Table S1. Summary of NIS States, 1988-2015.

Year	States	Number of states
1988	CA CO FL IA IL MA NJ WA	8
1989	AZ CA CO FL IA IL MA NJ PA WA WI	11
1990	AZ CA CO FL IA IL MA NJ PA WA WI	11
1991	AZ CA CO FL IA IL MA NJ PA WA WI	11
1992	AZ CA CO FL IA IL MA NJ PA WA WI	11
1993	AZ CA CO CT FL IA IL KS MA MD NJ NY OR PA SC WA WI	17
1994	AZ CA CO CT FL IA IL KS MA MD NJ NY OR PA SC WA WI	17
1995	AZ CA CO CT FL IA IL KS MA MD MO NJ NY OR PA SC TN WA WI	19
1996	AZ CA CO CT FL IA IL KS MA MD MO NJ NY OR PA SC TN WA WI	19
1997	AZ CA CO CT FL GA HI IA IL KS MA MD MO NJ NY OR PA SC TN UT WA WI	22
1998	AZ CA CO CT FL GA HI IA IL KS MA MD MO NJ NY OR PA SC TN UT WA WI	22
1999	AZ CA CO CT FL GA HI IA IL KS MA MD ME MO NJ NY OR PA SC TN UT VA WA WI	24
2000	AZ CA CO CT FL GA HI IA IL KS KY MA MD ME MO NC NJ NY OR PA SC TN TX UT VA WA WI WV	28
2001	AZ CA CO CT FL GA HI IA IL KS KY MA MD ME MI MN MO NC NE NJ NY OR PA RI SC TN TX UT VA VT WA WI WV	33
2002	CA CO CT FL GA HI IA IL KS KY MA MD ME MI MN MO NC NE NJ NV NY OH OR PA RI SC SD TN TX UT VA VT WA WI WV	35
2003	AZ CA CO CT FL GA HI IA IL IN KS KY MA MD MI MN MO NC NE NH NJ NV NY OH OR PA RI SC SD TN TX UT VA VT WA WI WV	37
2004	AR AZ CA CO CT FL GA HI IA IL IN KS KY MA MD MI MN MO NC NE NH NJ NV NY OH OR RI SC SD TN TX UT VA VT WA WI WV	37
2005	AR AZ CA CO CT FL GA HI IA IL IN KS KY MA MD MI MN MO NC NE NH NJ NV NY OH OK OR RI SC SD TN TX UT VT WA WI WV	37
2006	AR AZ CA CO CT FL GA HI IA IL IN KS KY MA MD MI MN MO NC NE NH NJ NV NY OH OK OR RI SC SD TN TX UT VA VT WA WI WV	38
2007	AR AZ CA CO CT FL GA HI IA IL IN KS KY MA MD ME MI MN MO NC NE NH NJ NV NY OH OK OR RI SC SD TN TX UT VA VT WA WI WV WY	40
2008	AR AZ CA CO CT FL GA HI IA IL IN KS KY LA MA MD ME MI MN MO NC NE NH NJ NV NY OH OK OR PA RI SC SD TN TX UT VA VT WA WI WV WY	42
2009	AR AZ CA CO CT FL GA HI IA IL IN KS KY LA MA MD ME MI MN MO MT NC NE NH NJ NM NV NY OH OK OR PA RI SC SD TN TX UT VA VT WA WI WV WY	44
2010	AK AR AZ CA CO CT FL GA HI IA IL IN KS KY LA MA MD ME MI MN MO MS MT NC NE NJ NM NV NY OH OK OR PA RI SC SD TN TX UT VA VT WA WI WV WY	45
2011	AK AR AZ CA CO CT FL GA HI IA IL IN KS KY LA MA MD ME MI MN MO MS MT NC ND NE NJ NM NV NY OH OK OR PA RI SC SD TN TX UT VA VT WA WI WV WY	46
2012	AK AR AZ CA CO CT FL GA HI IA IL IN KS KY LA MA MD MI MN MO MT NC ND NE NJ NM NV NY OH OK OR PA RI SC SD TN TX UT VA VT WA WI WV WY	44

2013	AR AZ CA CO CT DC FL GA HI IA IL IN KS KY LA MA MD MI MN MO MT NC ND NE NJ NM NV NY OH OK OR PA RI SC SD TN TX UT VA VT WA WI WV WY	44
2014	AR AZ CA CO CT DC FL GA HI IA IL IN KS KY LA MA MD ME MI MN MO MT NC ND NE NJ NM NV NY OH OK OR PA RI SC SD TN TX UT VA VT WA WI WV WY	45
2015	AK AR AZ CA CO CT DC FL GA HI IA IL IN KS KY LA MA MD ME MI MN MO MS MT NC ND NE NJ NM NV NY OH OK OR PA RI SC SD TN TX UT VA VT WA WI WV WY	47

Supplemental Methods

Data S1. Age standardization.

Here we demonstrate age standardizing using Heart failure mortality data for 2015. Our population was all adults >=30 years of age. We used 2000 US population to create weights for each age. Then crude rates for each age was multiplied by the 2000 weights. The weighted crude rates were summed to derive the age-adjusted rate.

Table S2. Creating weights using 2000 population.

Age	Age specific 2000 population (a)	Total 2000 population (b)	2000Weights (a/b)
30	3999004	274633642	0.0145612
31	3810183	274633642	0.0138737
32	3774385	274633642	0.0137433
33	3840938	274633642	0.0139857
34	4086860	274633642	0.0148811
35	4288078	274633642	0.0156138
36	4349620	274633642	0.0158379
37	4469476	274633642	0.0162743
38	4290207	274633642	0.0156216
39	4782575	274633642	0.0174144
40	4666685	274633642	0.0169924
41	4493582	274633642	0.0163621
42	4487560	274633642	0.0163402
43	4424004	274633642	0.0161087
44	4407398	274633642	0.0160483
45	4268017	274633642	0.0155408
46	4033859	274633642	0.0146881
47	3958468	274633642	0.0144136
48	3681489	274633642	0.0134051
49	3863960	274633642	0.0140695
50	3720935	274633642	0.0135487
51	3504329	274633642	0.01276
52	3475657	274633642	0.0126556
53	3754218	274633642	0.0136699
54	2769220	274633642	0.0100833
55	2749739	274633642	0.0100124
56	2786795	274633642	0.0101473
57	2947472	274633642	0.0107324
58	2404462	274633642	0.0087552
59	2418766	274633642	0.0088072
60	2259141	274633642	0.008226
61	2179759	274633642	0.007937
62	2132873	274633642	0.0077662
63	2030730	274633642	0.0073943
64	2051769	274633642	0.0074709
65	2033933	274633642	0.007406

66	1862107	274633642	0.0067803
67	1849893	274633642	0.0067359
68	1788769	274633642	0.0065133
69	1875238	274633642	0.0068281
70	1843087	274633642	0.0067111
71	1784744	274633642	0.0064986
72	1802080	274633642	0.0065618
73	1674285	274633642	0.0060964
74	1621378	274633642	0.0059038
75	1610943	274633642	0.0058658
76	1530137	274633642	0.0055716
77	1450062	274633642	0.00528
78	1456186	274633642	0.0053023
79	1367231	274633642	0.0049784
80	1172978	274633642	0.0042711
81	1065672	274633642	0.0038803
82	963587	274633642	0.0035086
83	890893	274633642	0.0032439
84	807104	274633642	0.0029388
85+	4259173	274633642	0.0155086

Age standardization of overall 2015 HF mortality rate was performed using the weights from Table 1.

Table S3. Age standardization of overall heart failure mortality rate.

Age	# of hf deaths (a)	Population (b)	Rate (a*100000/b)	2000Weights (Table 1)	Rate*2000Weights
30	14	4417209	0.3169422	0.0145612	0.0046151
31	16	4278233	0.3739862	0.0138737	0.0051886
32	15	4343614	0.3453346	0.0137433	0.0047461
33	17	4341754	0.3915468	0.0139857	0.005476
34	24	4294838	0.5588104	0.0148811	0.0083157
35	15	4379404	0.3425124	0.0156138	0.0053479
36	25	4108775	0.6084539	0.0158379	0.0096366
37	24	4028403	0.5957696	0.0162743	0.0096957
38	28	3987141	0.7022576	0.0156216	0.0109704
39	30	3870862	0.7750212	0.0174144	0.0134965
40	24	3989839	0.601528	0.0169924	0.0102214
41	42	3865228	1.086611	0.0163621	0.0177792
42	42	3924258	1.070266	0.0163402	0.0174883
43	72	4100708	1.755794	0.0161087	0.0282836
44	72	4335165	1.660836	0.0160483	0.0266536
45	74	4389345	1.685901	0.0155408	0.0262002
46	72	4160573	1.730531	0.0146881	0.0254183
47	85	4073685	2.086563	0.0144136	0.0300749

48	100	4077689	2.452369	0.0134051	0.0328742
49	116	4152552	2.793463	0.0140695	0.0393027
50	146	4400288	3.317965	0.0135487	0.0449542
51	154	4479664	3.437758	0.01276	0.0438658
52	193	4474344	4.313481	0.0126556	0.0545898
53	227	4463494	5.085702	0.0136699	0.0695211
54	232	4516527	5.13669	0.0100833	0.0517949
55	252	4553385	5.534344	0.0100124	0.055412
56	255	4399120	5.796614	0.0101473	0.0588201
57	326	4371245	7.457829	0.0107324	0.0800402
58	375	4320522	8.679507	0.0087552	0.0759905
59	398	4163670	9.558875	0.0088072	0.0841874
60	444	4125792	10.76157	0.008226	0.0885249
61	452	3954601	11.42972	0.007937	0.0907174
62	502	3801935	13.2038	0.0077662	0.102544
63	576	3651393	15.7748	0.0073943	0.116644
64	542	3536156	15.32738	0.0074709	0.1145098
65	621	3450043	17.99977	0.007406	0.1333061
66	681	3344134	20.36402	0.0067803	0.1380748
67	765	3304187	23.15244	0.0067359	0.1559516
68	854	3436357	24.8519	0.0065133	0.1618677
69	745	2532747	29.4147	0.0068281	0.2008478
70	879	2492490	35.26594	0.0067111	0.2366724
71	975	2421191	40.26944	0.0064986	0.2616964
72	1061	2469605	42.96234	0.0065618	0.2819085
73	1079	2146052	50.27837	0.0060964	0.3065186
74	1121	1953711	57.37798	0.0059038	0.3387473
75	1268	1839823	68.91967	0.0058658	0.4042682
76	1284	1722041	74.56268	0.0055716	0.4154302
77	1439	1639085	87.79288	0.00528	0.4635453
78	1481	1500813	98.67985	0.0053023	0.5232288
79	1651	1422071	116.0983	0.0049784	0.5779815
80	1898	1351196	140.4682	0.0042711	0.5999486
81	1960	1201044	163.1914	0.0038803	0.633238
82	2195	1148948	191.0443	0.0035086	0.6703033
83	2460	1082562	227.2387	0.0032439	0.7371472
84	2621	1015591	258.0763	0.0029388	0.7584447
85	42178	6287161	670.8593	0.0155086	10.40406
Age-adjusted rate					19.87

Table S4. Age standardization of overall heart failure mortality rate among men.

Age	# of hf deaths (a)	Population (b)	Rate (a*100000/b)	2000Weights (Table 1)	Rate*2000Weights
30	8	2231463	0.3585092	0.0145612	0.0052203
31	12	2152765	0.5574226	0.0138737	0.0077335
32	11	2181163	0.5043181	0.0137433	0.006931
33	12	2175631	0.5515641	0.0139857	0.007714
34	16	2148717	0.7446304	0.0148811	0.0110809
35	9	2199270	0.4092267	0.0156138	0.0063896
36	19	2053297	0.9253411	0.0158379	0.0146555
37	9	2010463	0.4476581	0.0162743	0.0072853
38	21	1983816	1.058566	0.0156216	0.0165365
39	15	1926578	0.7785826	0.0174144	0.0135585
40	14	1989213	0.7037959	0.0169924	0.0119592
41	26	1919064	1.354827	0.0163621	0.0221678
42	25	1942311	1.287127	0.0163402	0.0210319
43	54	2032362	2.657007	0.0161087	0.0428011
44	52	2147203	2.421755	0.0160483	0.038865
45	51	2182484	2.336787	0.0155408	0.0363155
46	43	2064898	2.082427	0.0146881	0.030587
47	51	2019602	2.52525	0.0144136	0.036398
48	65	2015073	3.22569	0.0134051	0.0432407
49	77	2052872	3.750843	0.0140695	0.0527725
50	95	2173002	4.371832	0.0135487	0.0592327
51	92	2202725	4.176645	0.01276	0.053294
52	111	2195088	5.056745	0.0126556	0.0639962
53	136	2186448	6.220134	0.0136699	0.0850287
54	149	2206584	6.752519	0.0100833	0.0680878
55	163	2228498	7.314343	0.0100124	0.0732341
56	173	2143285	8.071722	0.0101473	0.0819063
57	205	2124551	9.649097	0.0107324	0.1035578
58	241	2092228	11.51882	0.0087552	0.1008491
59	244	2009005	12.14532	0.0088072	0.1069668
60	291	1987008	14.64513	0.008226	0.1204711
61	302	1893657	15.94798	0.007937	0.1265786
62	310	1815914	17.07129	0.0077662	0.1325799
63	372	1741514	21.36072	0.0073943	0.1579481
64	325	1679087	19.35576	0.0074709	0.1446055
65	360	1637936	21.97888	0.007406	0.1627753
66	419	1583339	26.46306	0.0067803	0.1794283
67	460	1562960	29.43134	0.0067359	0.1982453
68	518	1623929	31.89795	0.0065133	0.2077606
69	422	1188026	35.52111	0.0068281	0.2425432

70	487	1162672	41.88628	0.0067111	0.281102
71	548	1123102	48.79343	0.0064986	0.3170907
72	598	1140651	52.4262	0.0065618	0.3440081
73	614	983641	62.42115	0.0060964	0.3805462
74	620	886092	69.97016	0.0059038	0.4130888
75	689	829659	83.04617	0.0058658	0.4871313
76	696	774758	89.8345	0.0055716	0.5005181
77	809	728549	111.0426	0.00528	0.5863037
78	781	659853	118.3597	0.0053023	0.6275769
79	855	618087	138.33	0.0049784	0.6886598
80	986	578240	170.5174	0.0042711	0.728291
81	972	507988	191.3431	0.0038803	0.7424764
82	1065	477629	222.9764	0.0035086	0.7823411
83	1167	442175	263.9227	0.0032439	0.8561474
84	1257	406633	309.124	0.0029388	0.9084655
85	15511	2174298	713.3797	0.0155086	11.06349
Age-adjusted rate					22.60

Data S2. Differentiating primary (Underlying cause of death) and secondary (multiple conditions).

In order to delineate HF deaths with and without AF and vice versa, we performed additional sensitivity analysis for overall HF and AF mortality. For the current analysis we use only "ucod" or "Underlying cause of death" which is presented as a single ICD-9 or ICD-10 code. In the revised manuscript, we considered the "ucod" as primary variable (say for example record 1 died of HF as per ucod), then we also created a secondary diagnosis using part/line number on death certificate, sequence of condition within part/ line, and condition code for presence of AF in these secondary codes. There were none to 20 other conditions to identify secondary diagnosis. We created the three groups using both primary and secondary diagnosis:

G1= have a primary diagnosis of HF but no secondary diagnosis of AF.
G2= have a primary diagnosis of AF but no secondary diagnosis of HF.
G3= have a primary diagnosis of HF and a secondary diagnosis of AF.

Each year of mortality data is different and some sort of a harmonization is required. With regards to multiple conditions associated with death, the years 1991-2004 is similar where they provide 20 different options of ICD-9 and ICD-10 codes as secondary diagnoses. 1991 to 1998 used ICD-9 codes and 1999-2004 used ICD-10 codes. Now from 2004-2004, there is only 1 variable with very few secondary diagnoses from which we had to identify the secondary diagnoses. The table below provides all the counts per year and the three groups. HF and AF are based on "ucod" or the underlying codes which is the primary diagnosis. There is obvious data discrepancy in group 3. Group 2 (primary diagnosis of AF without a secondary diagnosis of HF) demonstrates a 5X increase in counts from 1991 to 2015 and 6X increase in counts from 1991 to 2015. Group 1 (primary diagnosis of HF without a secondary diagnosis of AF) demonstrates a 2X increase in counts from 1991 to 2015 and 2X increase in counts from 1991 to 2015. While there is an apparent increase in gp1-3, there are wide changes in secondary diagnosis measurement that may introduce a bias in such sensitivity analysis. There is lack of uniformity in data collection and measurement of multiple conditions. The use of biased measurements to identify "secondary analysis" may yield incorrect results. Additionally, we assessed published "global burden of Diseases studies manuscripts [PMID: 30497964, 30507459, 30553848 etc.] and found they use systematic review and majority of the published scientific literature and surveys use single estimates. Therefore, using multiple conditions variable(s) to remove those with secondary HF or AF may yield incorrect results. Accordingly, we limited our analyses to using HF and AF as primary diagnoses as underlying cause of death.

year	hf	af	gp1	gp2	gp3
1991	39077	3678	38142	2509	935
1992	39987	4056	38946	2759	1041
1993	45494	4657	44248	3162	1246
1994	45049	5082	43677	3430	1372
1995	46404	5661	44951	3877	1453
1996	47129	6204	45566	4314	1563
1997	48836	6484	47056	4564	1780
1998	50155	7188	48341	4941	1814
1999	54841	8339	54841	6006	0
2000	55597	8738	55597	6272	0

2001	56827	9456	56827	6798	0
2002	56404	10098	56404	7169	0
2003	57352	10533	57352	7478	0
2004	57028	10616	57028	7461	0
2005	58843	11560	55812	8086	3031
2006	60272	11445	57052	8022	3220
2007	56481	14496	55724	8541	757
2008	56739	15386	55850	9118	889
2009	56312	15438	55412	9155	900
2010	57649	16465	56703	9683	946
2011	58235	17738	57324	10386	911
2012	60247	19499	59152	11416	1095
2013	65048	20752	64021	12002	1027
2014	68553	21722	67456	12266	1097
2015	75197	23882	74018	13032	1179

Table S5. Temporal trends of primary heart failure and atrial fibrillation hospitalizations among national hospitalization aged ≥30 years in the United States, NIS 1993-2014.

Year	Total, N	Heart failure			Atrial fibrillation	
		N	Age standardized Rate		N	Age standardized Rate
Total	3,735,946,974	22,828,980	348.59		7,378,978	112.47
1993	146,289,284	1,000,255	407.45		228,101	91.71
1994	149,051,556	986,428	394.83		235,668	93.40
1995	151,652,520	1,003,220	394.21		240,642	93.66
1996	154,029,428	1,037,718	400.50		254,334	97.41
1997	156,352,718	1,045,352	396.59		258,416	97.40
1998	158,563,193	1,082,654	403.54		278,252	103.23
1999	160,833,712	1,041,248	381.48		283,712	103.67
2000	163,190,685	1,077,228	387.89		311,370	111.97
2001	165,485,781	1,099,906	391.09		334,335	118.69
2002	167,516,688	1,087,919	380.05		334,800	116.83
2003	169,318,844	1,136,437	391.08		330,435	113.67
2004	171,098,329	1,118,443	378.12		320,220	108.28
2005	173,016,674	1,088,020	361.51		337,013	111.86
2006	174,909,348	1,089,125	355.00		363,401	118.44
2007	176,861,079	1,022,347	326.34		358,189	114.46
2008	178,892,422	1,014,376	317.90		404,343	126.98
2009	181,028,788	1,032,642	316.90		414,512	127.37
2010	183,312,017	988,664	297.01		402,501	121.01
2011	185,415,602	996,146	293.40		437,295	128.83
2012	187,598,387	944,615	271.86		434,645	125.02
2013	189,706,903	953,554	269.03		420,360	118.39
2014	191,823,016	982,680	271.25		396,435	109.05
Change (SE)			-7.02 (0.58)			1.48 (0.22)
% change			-1.72%			1.61%
p-trend			<0.0001			<0.0001

HF- heart failure, AF- atrial fibrillation. Total denotes the survey-weighted counts of all hospitalizations >30 years old. All rates are use survey-weighted counts per 100,000 population and age standardized. Change denotes annual change in rate per 100,000 population and is calculated from random effects meta-regression model with year as a continuous covariate. A negative value indicates decline and positive value indicates increase in annual change per 100,000 and standard error (SE) from 1993 to 2014. % change denotes percent change (100*slope)/rate in 1991. P-trend calculated using meta-regression indicates the significance of the decline or the increase in hospitalization rates of primary heart failure hospitalizations from 1993 to 2014.

Table S6. Temporal trends and annual change of all primary heart failure and atrial fibrillation hospitalizations in each region and division from 1993 to 2014.

	Heart Failure, rates per 100,000						Atrial fibrillation, rates per 100,000				
	1993	**2014**	**Change (SE)**	**%**	**p-trend**		**1993**	**2014**	**Change (SE)**	**%**	**p-trend**
R1: Northeast	423.7	279.9	-7.80 (0.50)	-1.84%	<0.0001		96.1	119.6	1.33 (0.29)	1.39%	<0.0001
D1: New England	336.0	267.3	-1.77 (1.70)	-0.53%	0.31		92.1	114.4	2.51 (0.64)	2.72%	0.001
D2: Middle Atlantic	454.0	284.6	-9.89 (0.99)	-2.18%	<0.0001		97.5	121.5	0.93 (0.47)	0.95%	0.064
R2: Midwest	373.2	242.4	-7.09 (0.47)	-1.90%	<0.0001		84.9	102.9	1.02 (0.26)	1.20%	0.001
D3: East North central	373.0	304.2	-1.31 (1.33)	-0.35%	0.34		77.0	125.5	3.81 (0.40)	4.95%	<0.0001
D4: West North central	351.3	247.0	-9.75 (1.86)	-2.77%	<0.0001		102.4	109.1	0.50 (0.55)	0.49%	0.38
R3: South	475.1	302.0	-9.23 (0.78)	-1.94%	<0.0001		103.1	118.4	1.28 (0.23)	1.24%	<0.0001
D5: South Atlantic	881.4	293.5	-27.86 (1.53)	-3.16%	<0.0001		190.8	119.8	-2.59 (0.37)	-1.36%	<0.0001
D6: East South Central											
D7: West South Central											
R4: West	319.8	194.6	-5.65 (0.33)	-1.77%	<0.0001		75.6	73.2	0.74 (0.19)	0.98%	0.001
D8: Mountain	220.5	167.2	0.68 (0.76)	0.31%	0.38		57.4	80.5	2.97 (0.39)	5.18%	<0.0001
D9: Pacific	356.5	206.9	-8.01 (0.54)	-2.25%	<0.0001		82.4	69.8	-0.17 (0.21)	-0.21%	0.42

All rates are survey-weighted, per 100,000 population and age-standardized. Change denotes annual change in rate per 100,000 population and is calculated from survey weighted counts, population sizes and a random effects meta-regression model with year as a continuous covariate. A negative value indicates decline and positive value indicates increase in annual change per 100,000 and standard error (SE) from 1993 to 2011. P-trend calculated using meta-regression indicates the significance of the decline or the increase in hospitalization rates of primary HFU hospitalizations from 1993 to 2014.
D6 is missing years 1993 and 1994. D7 is missing years 1993 to 1999.

Table S7. Temporal trends and annual change of YPLL at 75 for heart failure and atrial fibrillation, 1991-2015.

	1991	1998	2007	2015	Change (SE)	%	P-trend	P-interaction
Heart failure								
Overall	27.9	27.2	28.9	34.5	0.11 (0.05)	0.4	0.022	
By sex								0.038
Women	21.7	21.7	22.2	25.3	0.03 (0.04)	0.1	0.464	
Men	34.9	33.3	36.1	44.4	0.18 (0.06)	0.5	0.004	
By race/ ethnicity								<0.0001
White	24.4	24.3	25.1	30.4	0.10 (0.04)	0.4	0.038	
Black	61.5	61.2	69.9	81.1	0.49 (0.12)	0.8	0.001	
Hispanic	14.4	16.8	17.6	20.6	0.13 (0.03)	0.9	0.001	
Other	40	11.4	10.7	15.2	-0.97 (0.19)	-2.4	<0.0001	
ATRIAL FIBRILLATION								
Overall	1.9	2.3	3.9	6.3	0.18 (0.01)	9.8	<0.0001	
By sex								<0.0001
Women	1.5	1.8	3.1	4.5	0.12 (0.01)	8.1	<0.0001	
Men	2.2	2.8	4.7	8.3	0.24 (0.02)	10.9	<0.0001	
By race/ ethnicity								<0.0001
White	1.7	2.3	3.9	6.6	0.20 (0.01)	11.5	<0.0001	
Black	3.1	3.1	5.4	8.2	0.22 (0.02)	7.3	<0.0001	
Hispanic	1.2	1	2.7	3.2	0.10 (0.01)	8.4	<0.0001	
Other	3.4	1.3	1.8	3.3	0.04 (0.02)	1.0*	0.107	

For each death, $YPLL_{k.i}$=((number of death at a given age)*(weight for that age))=$D_{k.i}w_i$. k is the particular cause of death and i is age group or age of death. For each age group, these YPLL per person/ deaths is summated. Weight of each age is calculated by weight for that age as W_i=Sum (weight for each year of life remaining) =å w_j, where j is in range i..x.
We then discounted the total years of life lost by 1.5%. YPLL rate is then calculated per age by (Number of YPLLs/Population under end point age) x 100,000, and then age standardized. Change denotes annual change in rate per 100,000 population and is calculated from observed rates using a random effects meta-regression model with year as a continuous covariate. A negative value indicates decline and positive value indicates increase in annual change per 100,000 and standard error (SE) from 1991 to 2015. P-trend calculated using Poisson models indicates the significance of the decline or the increase in death rates of from 1991 to 2015. P-interaction was calculated by adding an interactive term between the covariate and year in the model.

Table S8. Temporal trends and annual change of YPLL at 75 years due to heart failure and atrial fibrillation in states, 1991-2015.

	YPLL per 100,000 due to Heart Failure							YPLL per 100,000 due to Atrial Fibrillation						
	Age-adjusted rate per 100,000				Annual			Age-adjusted rate per 100,000				Annual		
State	**1991**	**1998**	**2007**	**2015**	Change (SE)	%	p-trend	**1991**	**1998**	**2007**	**2015**	Change (SE)	%	p-trend
Alabama	100.7	77.6	105.1	**101.6**	0.56 (0.35)	**0.6**	0.118	1.5	3.9	4.5	**10.3**	0.29 (0.03)	18.8	<0.0001
Alaska	34.7	11.8	16.1	18.9	-0.02 (0.24)	0	0.946	9.1	5.9	1.3	4.5	0.05 (0.08)	0.5	0.568
Arizona	52.4	18.3	12.9	9.3	**-1.38 (0.21)**	-2.6	<0.0001	1.2	3.5	1.5	6.1	0.11 (0.03)	9.1	0.001
Arkansas	57.5	68.8	42.5	48.6	-0.73 (0.36)	-1.3	0.052	1.9	1.7	1.8	7.2	0.19 (0.03)	9.7	<0.0001
California	15.4	12.5	16.9	26.1	0.37 (0.06)	**2.4**	<0.0001	1.6	0.9	3.2	5.4	0.19 (0.02)	12.1	<0.0001
Colorado	12.9	32.5	13.2	17.1	-0.12 (0.13)	-0.9	0.369	0.8	3.7	3	3.9	0.11 (0.02)	13.4	<0.0001
Connecticut	16.4	21.2	16.3	16.6	-0.19 (0.07)	-1.1	0.011	1	1.7	5.8	7	0.19 (0.03)	20.3	<0.0001
Delaware	30.1	15.7	24.3	32.7	-0.10 (0.16)	-0.3	0.509	3.4	5	9.4	0.4	0.10 (0.08)	3	0.185
District of Columbia	60.1	57	33.8	40.9	**-2.26 (0.43)**	-3.8	<0.0001	3.6	1.4	0.8	**13.7**	0.14 (0.10)	4	0.173
Florida	8.9	7.3	15.9	23.4	0.55 (0.05)	**6.2**	<0.0001	1.9	2	4.4	3.8	0.15 (0.01)	8	<0.0001
Georgia	49.9	58.5	59.4	64.8	0.55 (0.14)	**1.1**	0.001	2	3	4.6	9.1	0.23 (0.02)	11.5	<0.0001
Hawaii	14.2	9.6	10.9	31.4	0.46 (0.15)	**3.3**	0.006	5	2.4	2.9	4.3	0.16 (0.07)	3.1	0.03
Idaho	20.6	19.4	19.9	22	-0.07 (0.11)	-0.4	0.496	1.7	5.9	3.2	5.3	0.14 (0.05)	8.5	0.009
Illinois	28.3	33.7	33.8	39.2	0.24 (0.05)	**0.9**	<0.0001	2	1.5	3.5	5.8	0.17 (0.02)	8.4	<0.0001
Indiana	36.8	38.6	41.9	35.8	0.01 (0.13)	0	0.957	1.1	2.1	4.2	6.5	0.25 (0.02)	23	<0.0001
Iowa	10.4	7.1	9.9	11.4	0.23 (0.06)	**2.2**	<0.0001	0.2	0.5	2.5	3.7	0.18 (0.03)	**108.4**	<0.0001
Kansas	32.8	25.4	40.6	37.1	0.46 (0.12)	**1.4**	0.001	0.1	1.1	3.5	2.3	0.16 (0.03)	**138.2**	<0.0001
Kentucky	48.9	49.6	54.2	68.8	-0.09 (0.21)	-0.2	0.674	1.5	2.1	5	**13.1**	0.32 (0.04)	22.2	<0.0001
Louisiana	54.8	52.5	67.9	**104.1**	**1.42 (0.21)**	**2.6**	<0.0001	4.4	3.2	6.9	7.5	0.15 (0.03)	3.3	<0.0001
Maine	19	19.7	15.1	15.5	-0.21 (0.07)	-1.1	0.011	2.8	3.1	4.6	7.2	0.13 (0.04)	4.6	0.002
Maryland	27.1	17.4	15.4	19.5	-0.42 (0.08)	-1.5	<0.0001	3.1	2.3	4.2	6	0.10 (0.02)	3.2	<0.0001
Massachusetts	29	25	19.6	26.8	-0.30 (0.08)	-1	0.002	2.1	3.5	4	4.9	0.11 (0.02)	5.2	<0.0001
Michigan	23.5	27.7	28.4	37	0.24 (0.07)	**1**	0.001	2.1	1.8	3.5	6.4	0.18 (0.01)	8.4	<0.0001
Minnesota	15.9	18.8	14.1	17.3	-0.10 (0.05)	-0.6	0.071	1.2	3.5	2.8	4.6	0.15 (0.02)	12.3	<0.0001
Mississippi	72.6	87.8	108.3	**111.5**	0.44 (0.33)	**0.6**	0.196	2.4	3.6	3.9	8.8	0.26 (0.04)	10.8	<0.0001
Missouri	36.5	29.8	33.8	54.8	0.32 (0.14)	**0.9**	0.03	2.2	2.4	3.8	5.6	0.22 (0.02)	9.9	<0.0001
Montana	27.4	31	22.3	31	-0.38 (0.18)	-1.4	0.046	3.1	0.2	2.9	8.3	0.09 (0.06)	2.8	0.162
Nebraska	40.4	46.1	35.2	43.5	-0.64 (0.25)	-1.6	0.019	1.9	2.9	6.4	6.9	0.24 (0.04)	12.4	<0.0001
Nevada	33.9	50.9	32.4	27	-0.97 (0.23)	-2.9	<0.0001	0.7	2.7	3.7	5.9	0.14 (0.04)	19.6	0.006
New Hampshire	17.7	6.6	9.4	13.9	0.28 (0.12)	**1.6**	0.032	0.4	1	6.4	4.9	0.15 (0.05)	41	0.005
New Jersey	18.8	16	15.4	18.9	-0.03 (0.05)	-0.1	0.567	1.4	2.3	2.4	5.8	0.17 (0.02)	12	<0.0001
New Mexico	23.6	13	25.3	26	-0.30 (0.14)	-1.3	0.039	0.9	2.1	1	5.5	0.09 (0.04)	10.8	0.032

New York	18.3	20.6	15.2	19.8	-0.13 (0.07)	-0.7	0.066	2	2.1	2.9	4.1	0.09 (0.01)	4.5	<0.0001
North Carolina	27.9	21.3	29.9	43.2	0.50 (0.10)	**1.8**	<0.0001	0.9	3.1	4.9	6.2	0.20 (0.02)	21.3	<0.0001
North Dakota	29.3	13.3	22.6	20.7	-0.02 (0.22)	-0.1	0.93	0	4.6	3.2	7.8	0.14 (0.07)	.	0.069
Ohio	28.7	25.1	17.6	35.2	0.03 (0.12)	**0.1**	0.832	1.8	2.5	5.1	8.1	0.23 (0.02)	13.1	<0.0001
Oklahoma	42	43.5	81.1	52.8	1.17 (0.42)	**2.8**	0.01	0.5	1.5	5.1	9.7	0.38 (0.04)	84.3	<0.0001
Oregon	14.3	21.3	20.4	28.5	0.18 (0.11)	**1.3**	0.103	0.9	3.4	6.9	9.3	0.29 (0.03)	32.2	<0.0001
Pennsylvania	32.2	27.7	31.9	34.2	-0.20 (0.08)	-0.6	0.022	2.8	2.5	3.4	6.7	0.18 (0.02)	6.5	<0.0001
Rhode Island	26.2	9.6	6	18.6	-0.08 (0.17)	-0.3	0.653	2.9	3.4	3.4	3.3	0.06 (0.04)	2	0.144
South Carolina	45.1	60.7	46.4	53.1	0.17 (0.23)	**0.4**	0.455	5.7	5.2	6.3	9.4	0.19 (0.04)	3.4	<0.0001
South Dakota	10.7	22.4	7.9	4.4	**-1.04 (0.30)**	-9.7	0.002	1.5	2.7	3.3	1.9	0.03 (0.05)	1.7	0.623
Tennessee	17.6	22.7	26.2	39.6	**0.66 (0.13)**	**3.7**	<0.0001	1.2	3.4	4.9	9	0.31 (0.04)	26.2	<0.0001
Texas	23.7	34.1	41	40.6	0.39 (0.11)	**1.6**	0.002	1.4	1.8	3.6	7.6	0.21 (0.02)	14.8	<0.0001
Utah	23.6	18.7	34.2	33.1	**0.57 (0.15)**	**2.4**	0.001	1.6	3.4	3.4	8.2	0.14 (0.05)	9	0.012
Vermont	5.5	3.1	7.7	0.6	-0.57 (0.13)	-10.4	<0.0001	3.4	4.4	5.5	5.7	0.08 (0.06)	2.4	0.188
Virginia	50.5	37.6	36.4	42.1	-0.38 (0.13)	-0.7	0.009	1.9	2.8	4.6	6.2	0.16 (0.02)	8.7	<0.0001
Washington	15.5	11.7	6.6	16.2	-0.30 (0.09)	-2	0.002	1.6	1.1	1.9	6	0.15 (0.02)	9.1	<0.0001
West Virginia	42.5	40.6	42.9	45	-0.19 (0.13)	-0.4	0.171	2.9	4.9	5.4	**10**	0.30 (0.04)	10.4	<0.0001
Wisconsin	30.5	22.1	22.7	16.2	-0.41 (0.06)	-1.3	<0.0001	2.5	1.9	4.8	4.8	0.14 (0.02)	5.5	<0.0001
Wyoming	18.9	24.8	12.8	53.1	0.30 (0.27)	**1.6**	0.279	0.3	5.1	3.5	5.8	0.08 (0.06)	29.4	0.228
Bolded				**>=100**		**+ & >0**					**>=10**		**>=100**	

Figure S1A. Temporal trends of YPLL due to heart failure in the United States, 1991-2015.

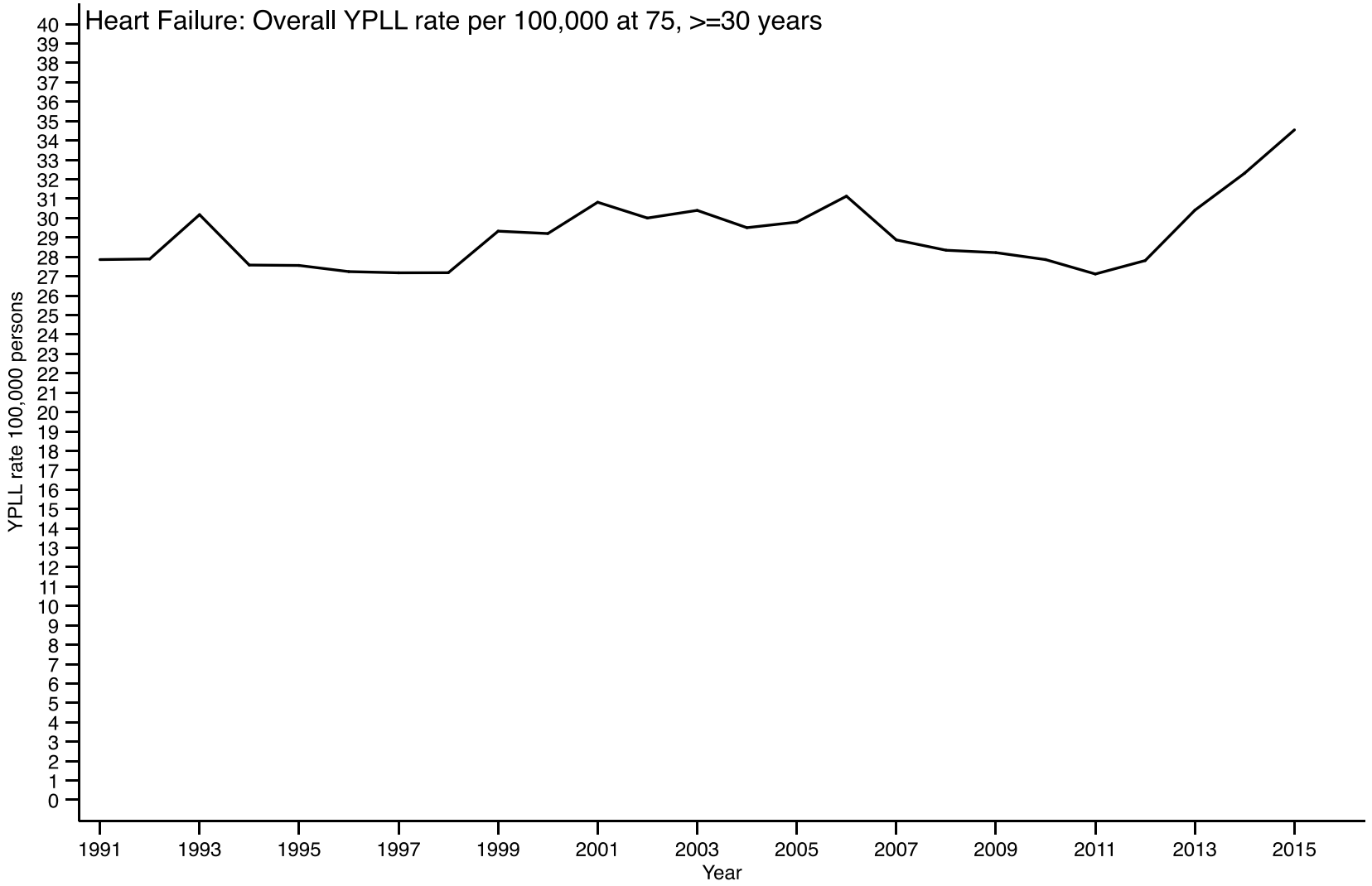


Figure S1B. Temporal trends of sex-specific YPLL due to heart failure in the United States, 1991-2015.

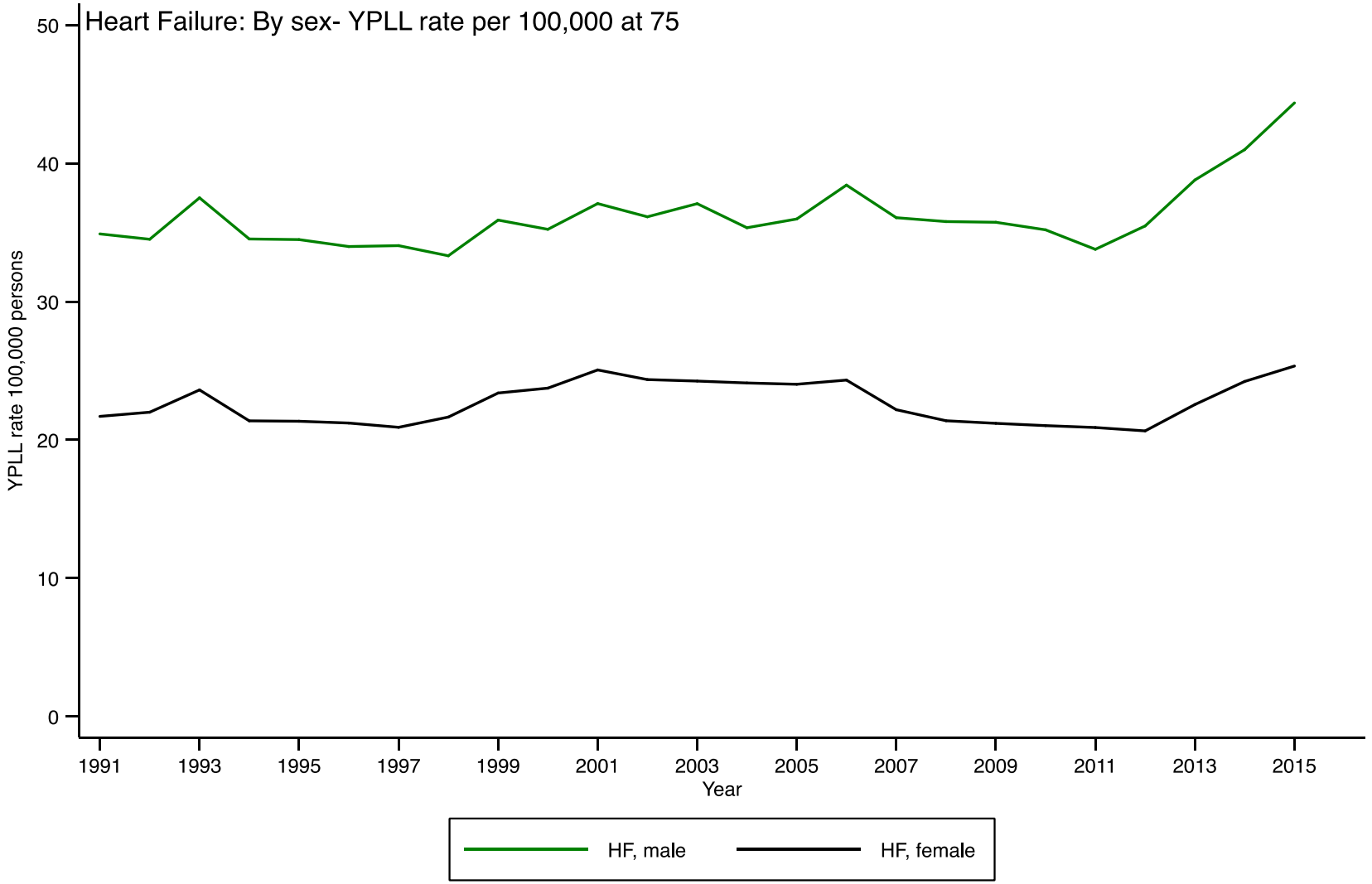


Figure S1C. Temporal trends of race-specific YPLL due to heart failure in the United States, 1991-2015.

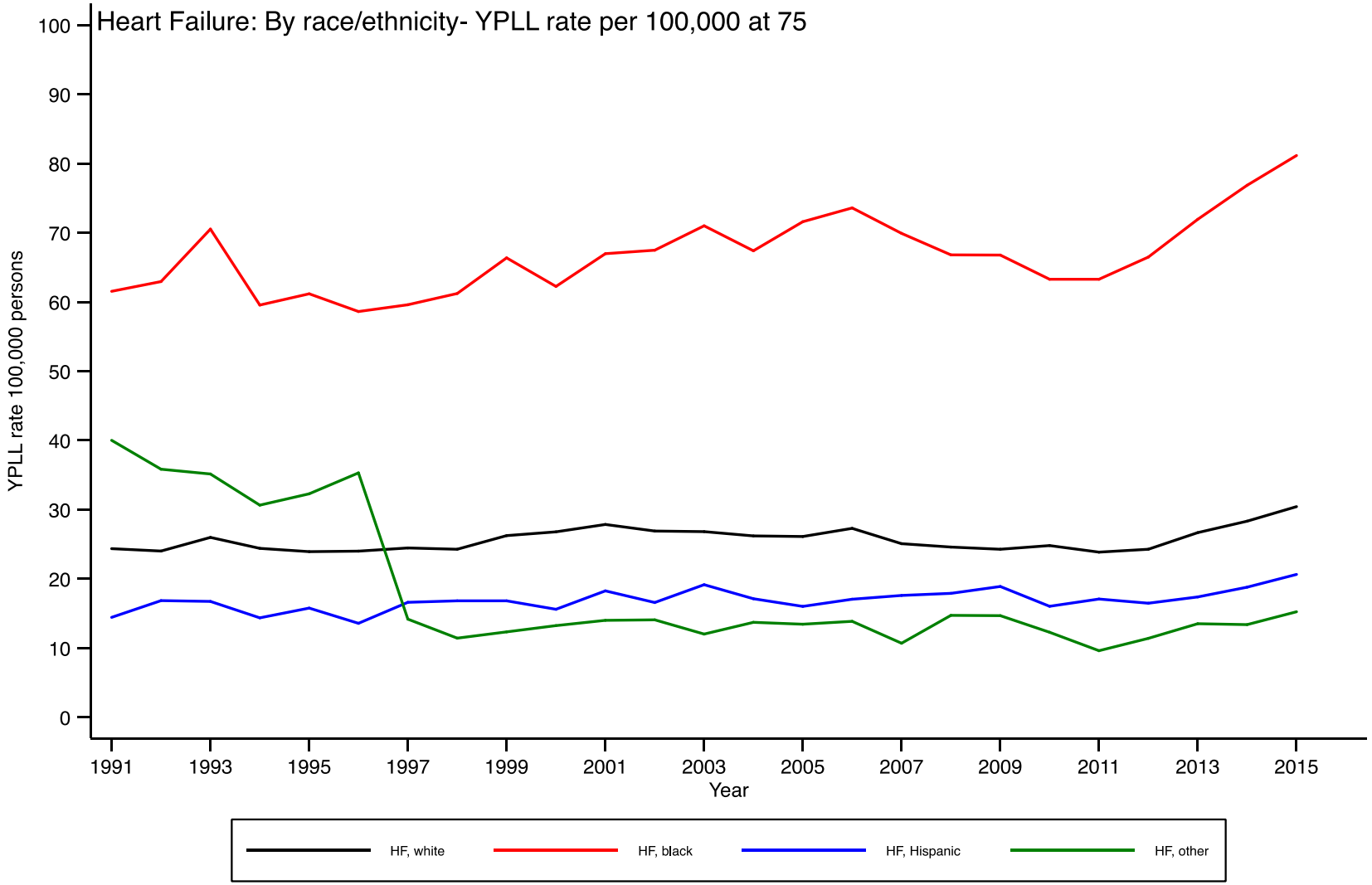


Figure S2A. Temporal trends of YPLL due to AF in the United States, 1991-2015.

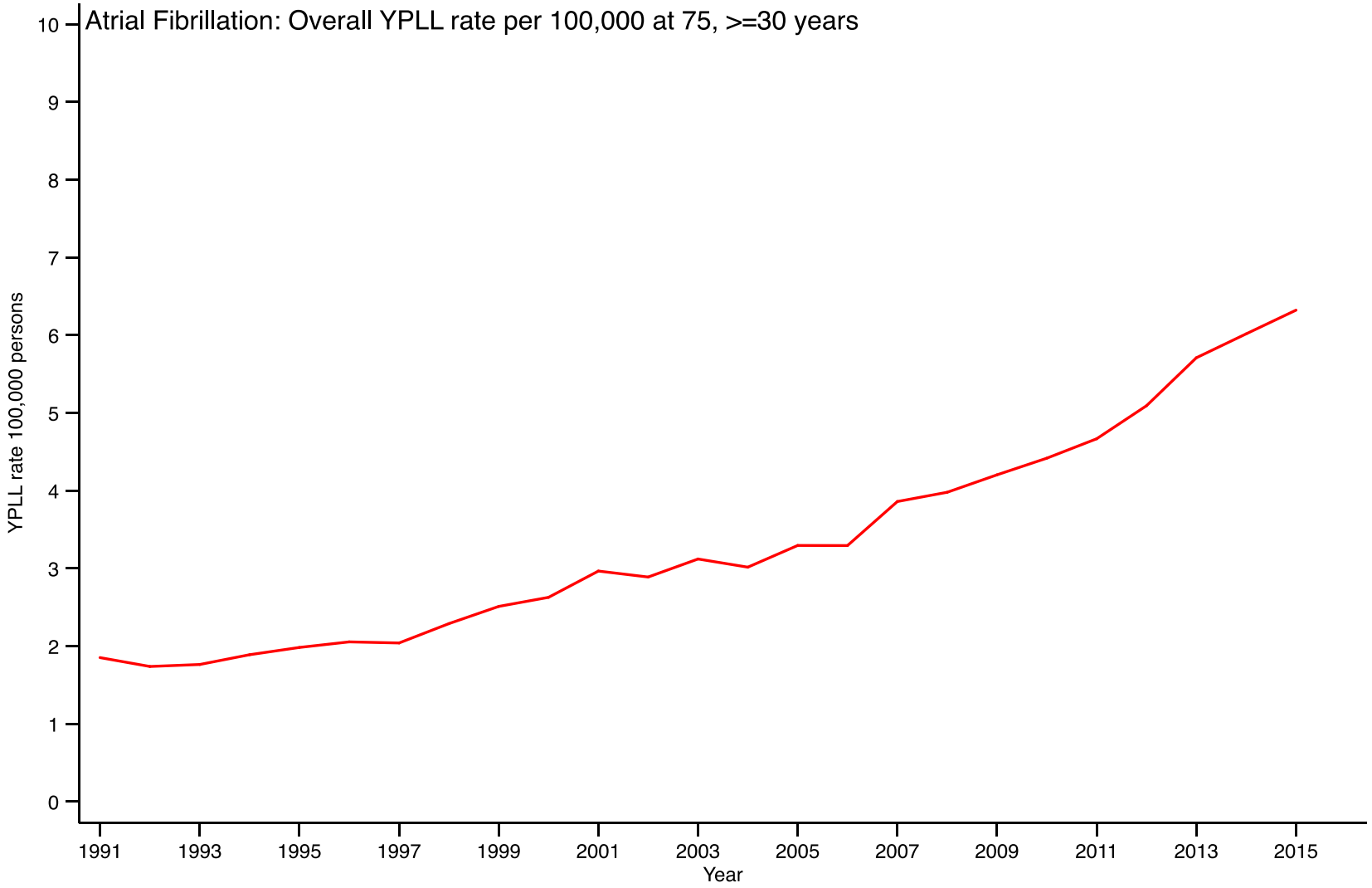


Figure S2B. Temporal trends of sex-specific YPLL due to AF in the United States, 1991-2015.

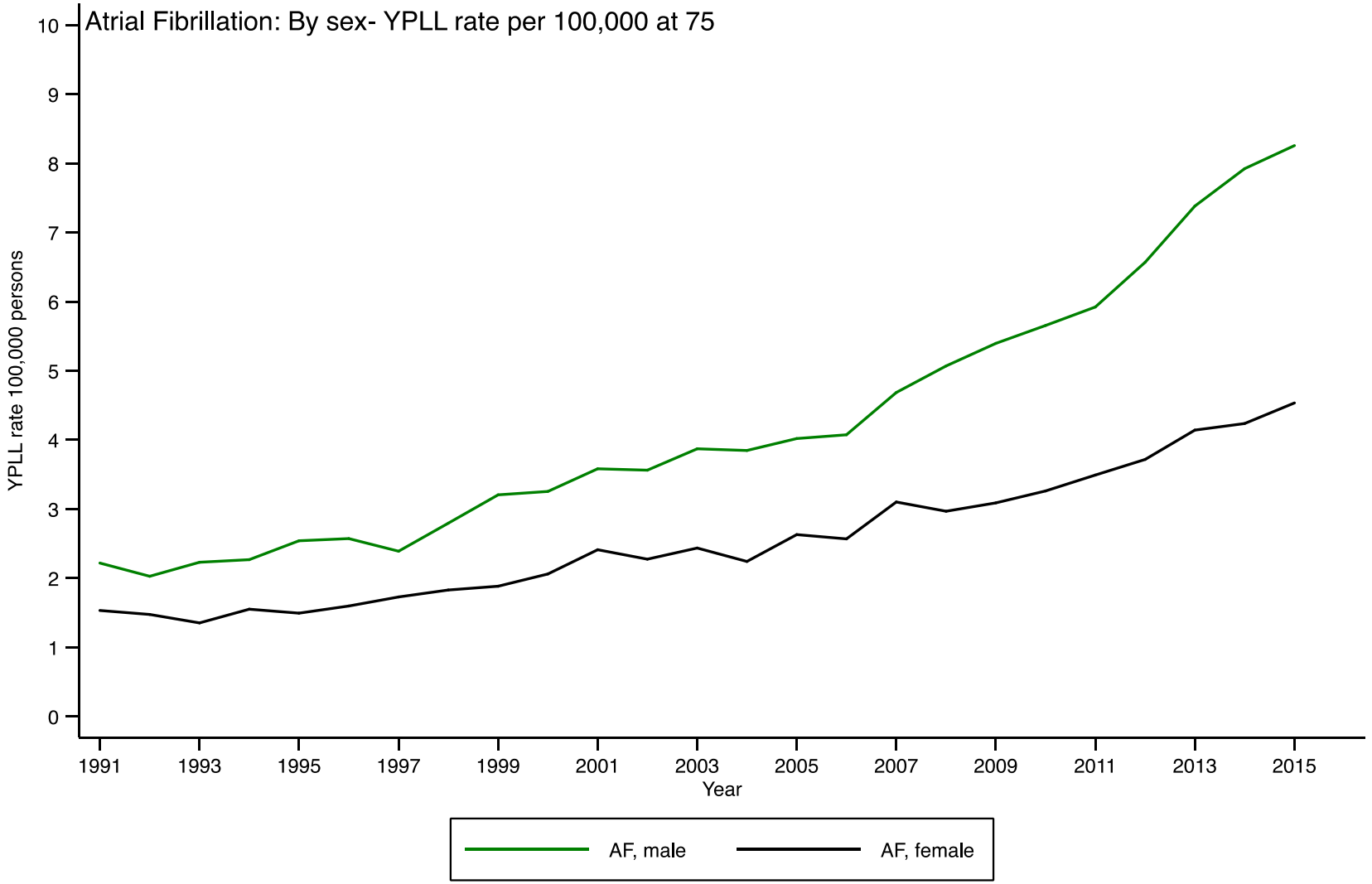


Figure S2C. Temporal trends of race-specific YPLL due to AF in the United States, 1991-2015.

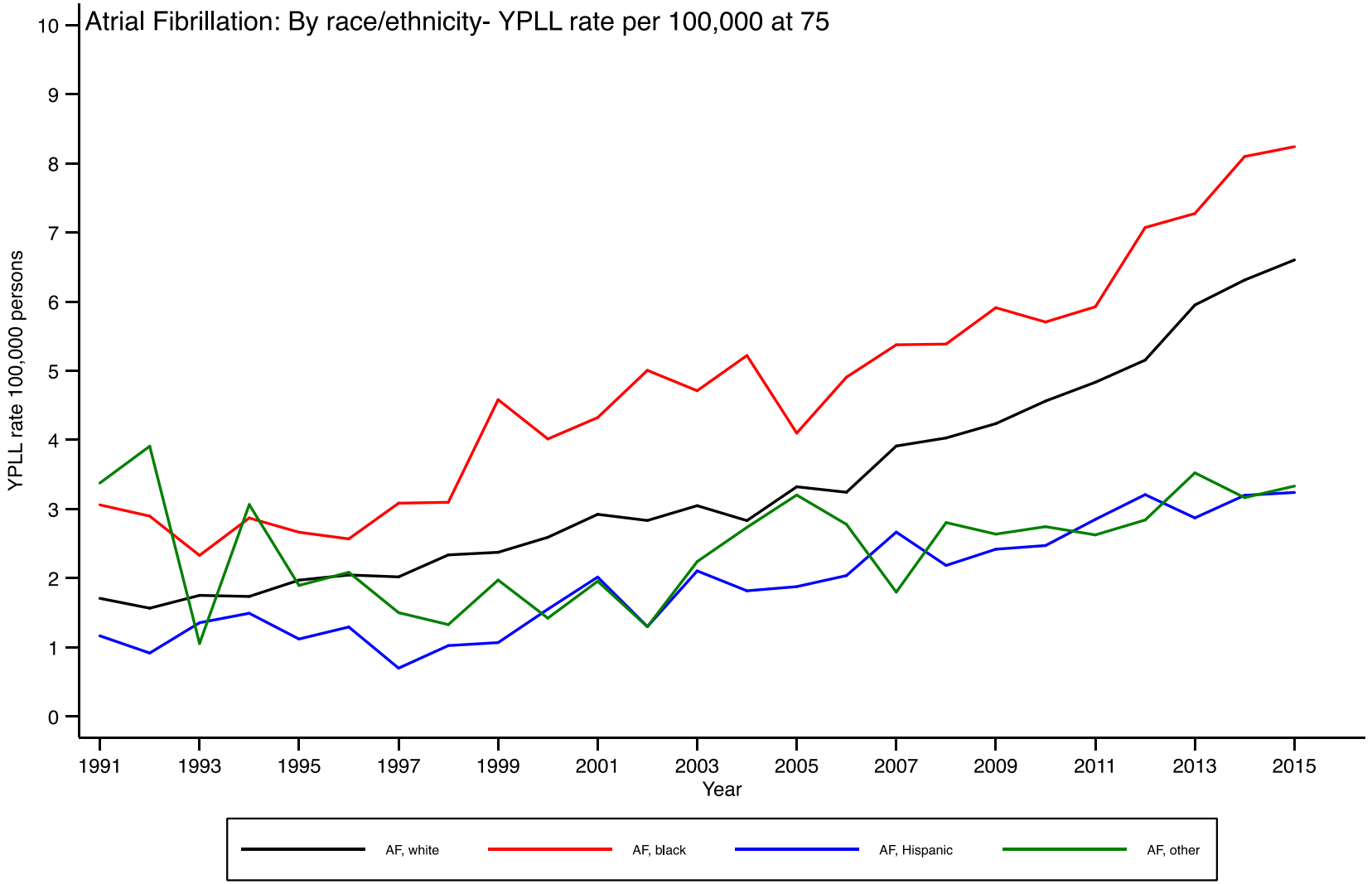


Figure S3. Mean age of heart failure deaths by race/ethnicity in the United States, 1991-2015.

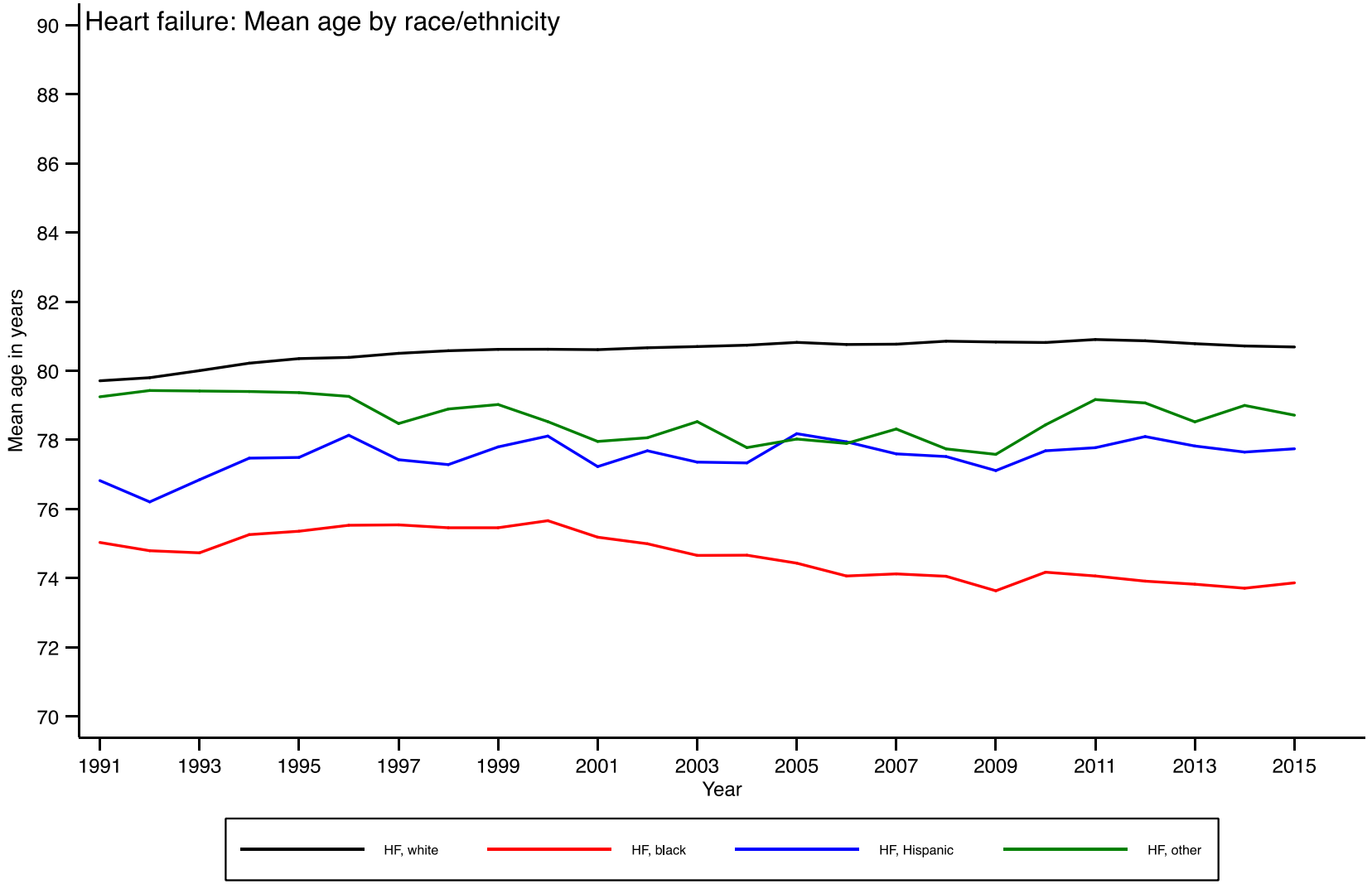
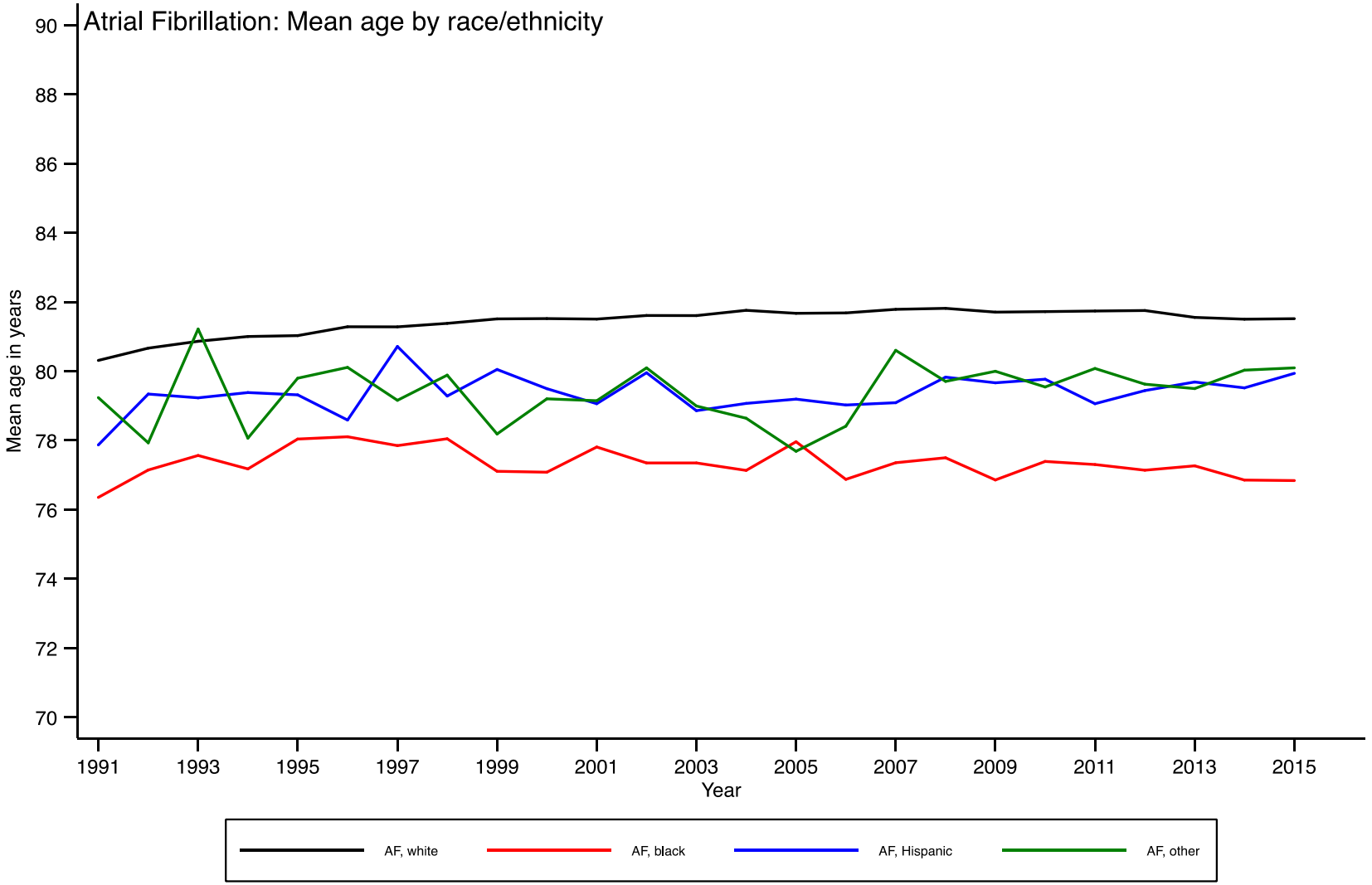


Figure S4. Mean age of atrial fibrillation deaths by race/ethnicity in the United States, 1991-2015.



Supplemental Video Legends:

Video S1. Transitioning chloropleth map showing spatiotemporal changes in the mortality rates due to heart failure, 1990-2015. Best viewed with Windows Media Player.

Video S2. Transitioning choropleth map showing spatiotemporal changes in mortality rates due to AF, 1990-2015. Best viewed with Windows Media Player.