

Supplementary File

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Supplemental Table 1 Atrial Fibrillation and Renal Disease–related Deaths, Stratified by Sex and Race, in Adults in the United States, 1999 to 2023.

Year	Overall	Women	Men	NH White	NH Black
1999	5718	2934	2784	5067	417
2000	6766	3547	3219	5955	529
2001	7397	3852	3545	6610	501
2002	8021	4158	3863	7083	574
2003	8782	4558	4224	7744	629
2004	9213	4736	4477	8132	673
2005	10058	5273	4785	8846	715
2006	10535	5461	5074	9291	696
2007	10856	5617	5239	9497	731
2008	11128	5808	5320	9754	775
2009	11300	5827	5473	9840	796
2010	11545	5888	5657	10101	808
2011	17541	9060	8481	15174	1275
2012	19226	9714	9512	16480	1405
2013	13338	6736	6602	11581	943
2014	13685	6819	6866	11896	894
2015	15029	7440	7589	13071	1002
2016	15761	7680	8081	13510	1149
2017	17247	8377	8870	14714	1257
2018	18429	8879	9550	15693	1375
2019	19601	9491	10110	16599	1433
2020	23663	11026	12637	19677	1960
2021	28716	13150	15566	23888	2314
2022	30352	14318	16034	25439	2427
2023	28745	13673	15072	24058	2388
Total	372,652	184,022	188,630	319,700	27,666

NH, non-Hispanic

Supplemental Table 2: Atrial Fibrillation and Renal Disease –Related Mortality, Stratified by Place of Death in Adults in the United States, 1999 to 2023.

Place of Death	Deaths
Medical Facility - Inpatient	192,348
Medical Facility - Outpatient or ER	10,200
Medical Facility - Dead on Arrival	574
Medical Facility - Status unknown	170
Decedent's home	63,690
Hospice facility	18,356
Nursing home/long-term care	75,650
Other	11,133
Place of death unknown	525
Total	372,646

Supplemental Table 3 Annual Percent Change (APC) in Age-Adjusted Mortality Rates (per 100,000) for Atrial Fibrillation and Renal Disease in U.S. Adults, 1999–2023.

Year Interval	APC (95% CI)
Overall	
1999-2012	5.88 (4.49 to 10.32)
2012-2015	-8.43 (-13.12 to -1.80)
2015-2023	9.35 (7.01 to 16.08)
Female	
1999-2012	6.10 (4.75 to 9.66)
2012-2015	-9.26 (-13.94 to -0.96)
2015-2023	9.17 (6.83 to 15.38)
Male	
1999-2012	5.34 (3.75 to 12.93)
2012-2015	-7.93 (-12.95 to 2.24)
2015-2023	9.35 (6.88 to 15.88)
NH Black	
1999-2012	5.56 (4.05 to 9.34)
2012-2015	-11.35 (-16.46 to -0.14)
2015-2023	10.68 (8.14 to 15.59)
NH White	
1999-2012	6.08 (4.68 to 10.6)
2012-2015	-7.77 (-12.59 to -2.27)
2015-2023	9.51 (7.14 to 16.99)
Metropolitan	
1999-2012	5.86 (4.43 to 8.42)
2012-2015	-8.22 (-12.50 to 0.34)
2015-2020	7.66 (3.80 to 17.51)
Non-metropolitan	
1999-2012	5.98 (4.67 to 9.10)
2012-2015	-17.61 (-12.12 to 1.53)
2015-2020	9.46 (4.85 to 21.81)
Northeast	

1999-2012	4.61 (3.32 to 9.26)
2012-2015	-9.22 (-14.05 to 1.19)
2015-2023	8.96 (6.36 to 18.37)
Midwest	
1999-2012	5.52 (4.17 to 9.49)
2012-2015	-7.78 (-12.38 to 1.75)
2015-2023	8.76 (6.51 to 14.34)
South	
1999-2012	6.14 (4.43 to 16.79)
2012-2015	-8.30 (-13.89 to 2.90)
2015-2023	10.45 (7.63 to 20.12)
West	
1999-2012	7.21 (5.51 to 11.96)
2012-2015	-9.03 (-14.14 to 1.95)
2015-2023	8.72 (6.16 to 16.24)

APC = annual percent change; NH = non-Hispanic.

Supplemental Table 4 Overall and Sex-Stratified Age-Adjusted Mortality Rates (per 100,000) for Atrial Fibrillation and Renal Disease in U.S. Adults, 1999–2023

Year	Overall	Women	Men
1999	16.67 (16.23-17.1)	13.16 (12.69–13.64)	23.01 (22.14–23.88)
2000	19.48 (19.02-19.95)	15.77 (15.25–16.3)	26.29 (25.36–27.21)
2001	20.93 (20.45-21.41)	16.94 (16.4–17.48)	28.28 (27.34–29.23)
2002	22.49 (21.99-22.98)	18.08 (17.53–18.63)	30.38 (29.41–31.35)
2003	24.24 (23.73-24.74)	19.64 (19.07–20.21)	32.34 (31.36–33.33)
2004	25.1 (24.58-25.61)	20.3 (19.72–20.88)	33.71 (32.71–34.71)
2005	26.91 (26.39-27.44)	22.16 (21.55–22.76)	35.1 (34.1–36.1)
2006	27.57 (27.04-28.09)	22.55 (21.95–23.15)	36.27 (35.27–37.28)
2007	27.88 (27.35-28.4)	22.88 (22.28–23.49)	36.32 (35.33–37.31)
2008	27.99 (27.47-28.52)	23.27 (22.67–23.88)	35.89 (34.93–36.86)
2009	27.94 (27.42-28.46)	23.05 (22.46–23.65)	35.87 (34.91–36.82)
2010	28.08 (27.57-28.6)	22.91 (22.32–23.5)	36.3 (35.35–37.25)
2011	41.34 (40.72-41.95)	34.35 (33.63–35.07)	52.59 (51.47–53.71)
2012	44.07 (43.44-44.69)	36 (35.27–36.73)	56.9 (55.75–58.05)
2013	29.82 (29.31-30.33)	24.42 (23.82–25.01)	38.35 (37.42–39.28)
2014	29.91 (29.41-30.42)	24.36 (23.77–24.95)	38.63 (37.71–39.55)
2015	32.1 (31.58-32.61)	26.1 (25.49–26.7)	41.22 (40.29–42.16)
2016	32.91 (32.4-33.43)	26.51 (25.91–27.11)	42.66 (41.72–43.6)
2017	35.15 (34.62-35.68)	28.25 (27.64–28.87)	45.34 (44.38–46.29)
2018	36.63 (36.1-37.16)	29.35 (28.73–29.97)	47.42 (46.46–48.38)
2019	38.07 (37.53-38.6)	30.89 (30.26–31.52)	48.69 (47.74–49.65)
2020	45.06 (44.49-45.64)	35.28 (34.62–35.95)	59.1 (58.06–60.14)
2021	57.84 (57.17-58.51)	45.12 (44.34–45.9)	75.89 (74.68–77.1)
2022	57.34 (56.69-57.99)	45.59 (44.84–46.34)	74.77 (73.59–75.94)
2023	54.45 (53.82-55.08)	44.24 (43.5–44.99)	68.92 (67.8–70.04)

Supplemental Table 5 Atrial Fibrillation and Renal Disease –related Age-Adjusted Mortality Rates per 100,000, Stratified by Race in Adults in the United States, 1999 to 2023

Year	NH White	NH Black
1999	17.12 (16.65–17.59)	15.71 (14.2–17.22)
2000	19.93 (19.42–20.43)	19.78 (18.09–21.48)
2001	21.83 (21.3–22.35)	18.52 (16.9–20.15)
2002	23.18 (22.64–23.72)	21.23 (19.49–22.98)
2003	25.06 (24.5–25.62)	22.9 (21.1–24.7)
2004	26.06 (25.49–26.63)	24.21 (22.37–26.05)
2005	27.91 (27.33–28.5)	25.2 (23.34–27.05)
2006	28.81 (28.22–29.4)	24.08 (22.28–25.87)
2007	28.99 (28.41–29.58)	24.75 (22.94–26.55)
2008	29.28 (28.69–29.86)	25.38 (23.59–27.18)
2009	29.21 (28.63–29.79)	25.58 (23.8–27.37)
2010	29.64 (29.06–30.22)	25.36 (23.6–27.12)
2011	43.31 (42.62–44.01)	38.63 (36.5–40.76)
2012	46.05 (45.34–46.76)	40.61 (38.47–42.75)
2013	31.8 (31.21–32.38)	26.42 (24.72–28.12)
2014	32.11 (31.53–32.69)	23.9 (22.32–25.48)
2015	34.81 (34.21–35.42)	25.92 (24.3–27.55)
2016	35.43 (34.83–36.03)	28.54 (26.86–30.21)
2017	37.92 (37.3–38.54)	30.1 (28.42–31.79)
2018	39.69 (39.06–40.31)	31.6 (29.9–33.29)
2019	41.3 (40.67–41.93)	31.76 (30.09–33.43)
2020	48.27 (47.59–48.95)	41.78 (39.9–43.66)
2021	62.62 (61.82–63.42)	50.66 (48.55–52.77)
2022	62.43 (61.66–63.19)	51.22 (49.14–53.29)
2023	59.63 (58.87–60.39)	49.1 (47.09–51.11)

NH = non-Hispanic

Supplemental Table 6 Age-Adjusted Mortality Rates per 100,000 for Atrial Fibrillation and Renal Disease, Stratified by Census Region in U.S. Adults, 1999–2023.

Census Region	Year	Age-Adjusted Rate
Northeast	1999	17.61 (16.65–18.56)
Northeast	2000	21.57 (20.52–22.62)
Northeast	2001	22.81 (21.74–23.88)
Northeast	2002	22.89 (21.82–23.96)
Northeast	2003	23.95 (22.86–25.03)
Northeast	2004	25.85 (24.72–26.97)
Northeast	2005	26.48 (25.34–27.61)
Northeast	2006	27.23 (26.09–28.37)
Northeast	2007	26.63 (25.51–27.76)
Northeast	2008	27.25 (26.13–28.38)
Northeast	2009	26.54 (25.43–27.66)
Northeast	2010	27.83 (26.7–28.96)
Northeast	2011	38.33 (37.01–39.65)
Northeast	2012	39.99 (38.66–41.32)
Northeast	2013	28.06 (26.95–29.17)
Northeast	2014	27.92 (26.82–29.02)
Northeast	2015	28.82 (27.71–29.93)
Northeast	2016	29.5 (28.38–30.62)
Northeast	2017	31.73 (30.59–32.87)
Northeast	2018	32.47 (31.33–33.62)
Northeast	2019	32.85 (31.71–33.99)
Northeast	2020	40.31 (39.05–41.56)
Northeast	2021	48.31 (46.9–49.71)
Northeast	2022	50.98 (49.58–52.38)
Northeast	2023	48.97 (47.59–50.35)
Midwest	1999	19.09 (18.15–20.03)
Midwest	2000	21.23 (20.25–22.21)
Midwest	2001	22.43 (21.42–23.43)
Midwest	2002	24.84 (23.79–25.89)

Midwest	2003	26.95 (25.86–28.04)
Midwest	2004	28.03 (26.92–29.13)
Midwest	2005	30.19 (29.05–31.33)
Midwest	2006	29.71 (28.59–30.83)
Midwest	2007	30.46 (29.33–31.59)
Midwest	2008	31.18 (30.04–32.32)
Midwest	2009	31.09 (29.96–32.22)
Midwest	2010	29.62 (28.52–30.72)
Midwest	2011	44.66 (43.33–46)
Midwest	2012	47.09 (45.73–48.44)
Midwest	2013	31.52 (30.42–32.62)
Midwest	2014	32.12 (31.02–33.23)
Midwest	2015	34.63 (33.49–35.77)
Midwest	2016	35.17 (34.03–36.31)
Midwest	2017	38.04 (36.86–39.21)
Midwest	2018	40.17 (38.97–41.36)
Midwest	2019	42.27 (41.06–43.49)
Midwest	2020	50.3 (48.99–51.62)
Midwest	2021	61.43 (59.92–62.93)
Midwest	2022	58.55 (57.13–59.97)
Midwest	2023	56.54 (55.14–57.94)
South	1999	14.27 (13.59–14.95)
South	2000	17.36 (16.61–18.10)
South	2001	19.44 (18.65–20.22)
South	2002	21.54 (20.72–22.36)
South	2003	22.17 (21.34–22.99)
South	2004	22.13 (21.31–22.95)
South	2005	25.01 (24.15–25.87)
South	2006	25.47 (24.61–26.33)
South	2007	25.94 (25.08–26.80)
South	2008	25.79 (24.95–26.64)
South	2009	26.09 (25.25–26.93)

South	2010	26.95 (26.10–27.80)
South	2011	37.78 (36.79–38.76)
South	2012	40.90 (39.88–41.91)
South	2013	28.40 (27.57–29.23)
South	2014	28.21 (27.39–29.03)
South	2015	30.71 (29.87–31.55)
South	2016	31.18 (30.34–32.01)
South	2017	33.08 (32.23–33.92)
South	2018	35.35 (34.48–36.21)
South	2019	36.34 (35.48–37.20)
South	2020	43.56 (42.63–44.49)
South	2021	58.75 (57.64–59.86)
South	2022	58.49 (57.42–59.56)
South	2023	54.68 (53.65–55.71)
West	1999	16.79 (15.81–17.78)
West	2000	18.67 (17.64–19.70)
West	2001	19.73 (18.68–20.77)
West	2002	20.58 (19.52–21.63)
West	2003	24.66 (23.51–25.80)
West	2004	25.75 (24.59–26.91)
West	2005	26.57 (25.41–27.73)
West	2006	28.94 (27.74–30.13)
West	2007	29.28 (28.09–30.46)
West	2008	28.77 (27.61–29.93)
West	2009	28.83 (27.68–29.98)
West	2010	28.32 (27.19–29.45)
West	2011	46.43 (45.02–47.85)
West	2012	49.70 (48.26–51.14)
West	2013	31.77 (30.63–32.90)
West	2014	31.83 (30.71–32.95)
West	2015	34.49 (33.34–35.64)
West	2016	36.30 (35.13–37.46)

West	2017	38.54 (37.36–39.73)
West	2018	38.67 (37.50–39.83)
West	2019	41.23 (40.04–42.42)
West	2020	46.23 (44.98–47.47)
West	2021	60.82 (59.35–62.30)
West	2022	59.48 (58.08–60.88)
West	2023	56.47 (55.11–57.84)

Supplemental Table 7 Age-Adjusted Mortality Rates per 100,000 for Atrial Fibrillation and Renal Disease, Stratified by Urban–Rural Classification in U.S. Adults, 1999–2020.

Year	Metropolitan	Non-metropolitan
1999	16.35 (15.87-16.83)	17.95 (16.94–18.97)
2000	18.91 (18.4-19.42)	21.79 (20.68–22.90)
2001	20.42 (19.90-20.95)	23.28 (22.13–24.42)
2002	21.93 (21.39-22.47)	24.73 (23.55–25.91)
2003	23.35 (22.79-23.90)	27.90 (26.65–29.15)
2004	24.41 (23.85-24.97)	28.26 (27.00–29.51)
2005	26.02 (25.45-26.60)	30.61 (29.31–31.90)
2006	26.86 (26.29-27.44)	30.74 (29.45–32.03)
2007	27.22 (26.65-27.80)	30.78 (29.49–32.06)
2008	27.02 (26.45-27.59)	32.55 (31.23–33.86)
2009	27.07 (26.51-27.63)	31.58 (30.29–32.87)
2010	27.06 (26.50-27.62)	32.71 (31.40–34.02)
2011	40.08 (39.41-40.75)	47.09 (45.53–48.64)
2012	43.11 (42.42-43.79)	48.68 (47.12–50.25)
2013	29.07 (28.52-29.63)	33.44 (32.16–34.72)
2014	28.89 (28.35-29.44)	34.59 (33.29–35.88)
2015	30.99 (30.43-31.55)	37.34 (36.00–38.68)
2016	31.83 (31.27-32.39)	38.22 (36.87–39.57)
2017	33.93 (33.36-34.50)	41.08 (39.70–42.46)
2018	35.27 (34.69-35.84)	43.42 (42.02–44.83)
2019	36.32 (35.75-36.89)	46.72 (45.27–48.17)
2020	42.89 (42.27-43.50)	55.66 (54.09–57.23)