

SUPPLEMENTAL MATERIAL

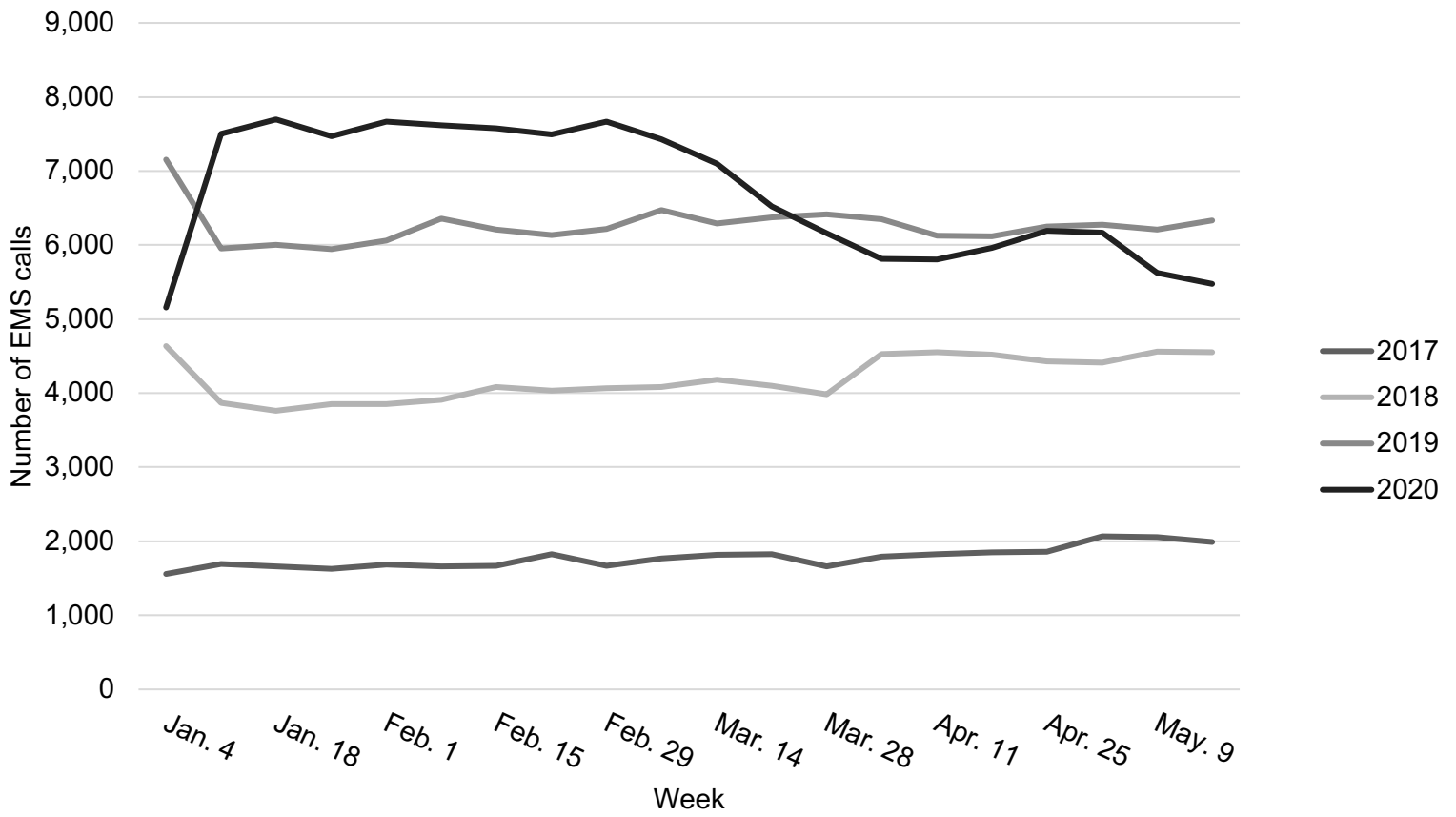
Supplement to: **Excess cerebrovascular mortality in the U.S. during the COVID-19 pandemic**

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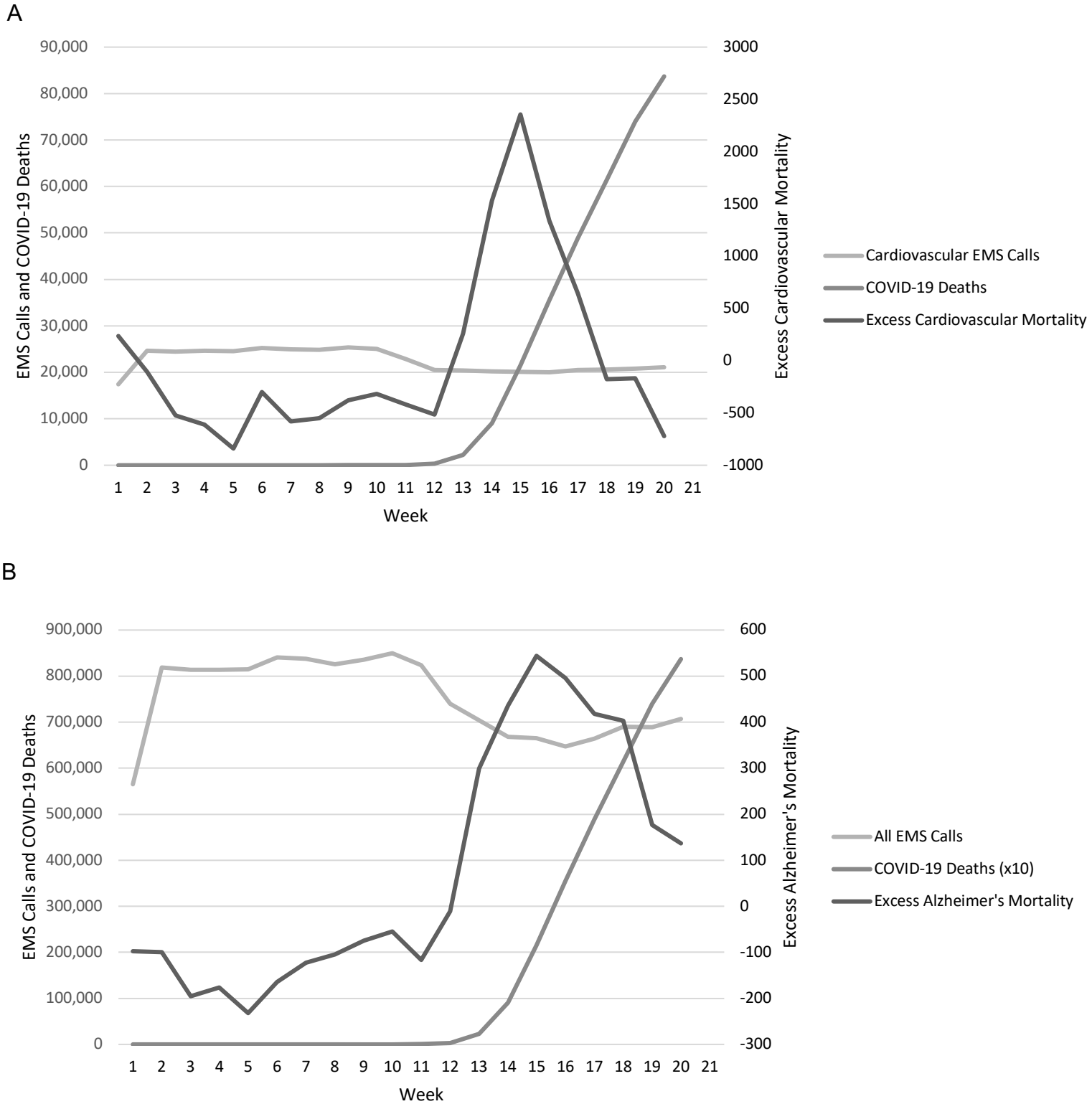
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**Supplemental Figure I.** Weekly counts of EMS calls for cerebrovascular disease from January 1-May 16 in years 2017–2020.



**Supplemental Figure II.** (A) Cardiovascular-related EMS calls and cumulative COVID-19 deaths are plotted on the primary y-axis, while excess cardiovascular-related deaths are plotted on the secondary y-axis. (B) All EMS calls and cumulative COVID-19 deaths (transformed by multiplying by 10) are plotted on the primary y-axis, and excess Alzheimer's deaths are plotted on the secondary y-axis.



**Supplemental Table I.** National weekly counts of cerebrovascular deaths from 2014-2020 with weekly estimates of expected cerebrovascular mortality in 2020.

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Week End Date	4-Jan	11-Jan	18-Jan	25-Jan	1-Feb	8-Feb	15-Feb	22-Feb	29-Feb	7-Mar	14-Mar	21-Mar	28-Mar	4-Apr	11-Apr	18-Apr	25-Apr	2-May	9-May	16-May
<b>2014</b>	1428	2515	2501	2534	2501	2476	2468	2602	2452	2345	2337	2448	2349	2386	2379	2269	2360	2298	2374	2253
<b>2015</b>	2949	2860	2801	2799	2710	2715	2675	2737	2682	2592	2683	2562	2504	2459	2513	2388	2417	2440	2482	2380
<b>2016</b>	2809	2675	2682	2806	2668	2590	2700	2600	2670	2663	2587	2631	2581	2595	2604	2492	2432	2493	2469	2449
<b>2017</b>	2976	2887	2885	2789	2801	2793	2840	2754	2845	2750	2661	2709	2633	2625	2703	2623	2531	2535	2531	2575
<b>2018</b>	3139	3163	3152	3067	2878	2910	2857	2753	2811	2734	2730	2765	2693	2723	2785	2592	2660	2610	2406	2492
<b>2019</b>	2714	2898	2930	2788	2904	2779	2791	2861	2769	2901	2874	2786	2839	2778	2774	2646	2619	2722	2602	2583
<b>2020 Observed</b>	2907	2961	3019	2922	2825	2801	2816	2815	2868	2854	2888	2795	2828	2925	2949	2960	2803	2808	2579	2661
<b>2020 Expected* 95% CI</b>	2942 2811, 3103	2951 2818, 3114	2933 2824, 3123	2941 2825, 3122	2940 2818, 3118	2945 2811, 3107	2909 2792, 3098	2912 2776, 3079	2894 2754, 3064	2873 2737, 3044	2842 2714, 3023	2831 2693, 3005	2799 2670, 2984	2790 2650, 2960	2756 2630, 2944	2747 2609, 2914	2726 2585, 2893	2709 2569, 2875	2671 2544, 2849	2631 2523, 2826
<b>2020 Excess Deaths 95% CI</b>	-35 -196, 96	10 -153, 143	86 -104, 195	-19 -200, 97	-115 -293, 7	-144 -306, -10	-93 -282, 24	-97 -264, 39	-26 -196, 114	-19 -190, 117	46 -135, 174	-36 -210, 102	29 -156, 158	135 -35, 275	193 5, 319	213 46, 351	77 -90, 218	99 -67, 239	-92 -270, 35	30 -165, 138
<b>Observed/Expected 95% CI</b>	0.988 0.937, 1.034	1.003 0.951, 1.051	1.029 0.967, 1.069	0.994 0.936, 1.034	0.961 0.906, 1.002	0.951 0.902, 0.996	0.968 0.909, 1.009	0.967 0.914, 1.014	0.991 0.936, 1.041	0.993 0.938, 1.043	1.016 0.955, 1.064	0.987 0.930, 1.038	1.010 0.948, 1.059	1.048 0.988, 1.104	1.070 1.002, 1.121	1.078 1.016, 1.135	1.028 0.969, 1.084	1.037 0.977, 1.093	0.966 0.905, 1.014	1.011 0.942, 1.055

\*Expected counts are calculated using the ExcessILI package, which fits Poisson regression models to the weekly counts of cerebrovascular deaths in 2014-2019.  
Abbreviations: CI=confidence interval

**Supplemental Table II.** Estimated slopes of weekly cerebrovascular-related EMS calls in each year from 2017 to 2020 from linear regression models.

<b>Year</b>	<b><math>\beta</math> (95% CI)</b>	<b>p</b>
2020	-92.83 (-151.58, -34.08)	0.004
2019	-1.69 (-23.24, 19.87)	0.9
2018	32.90 (14.47, 51.33)	0.001
2017	20.53 (14.58, 26.49)	<0.001

Abbreviations: CI=confidence intervals

**Supplemental Table III.** Summary of the variability among counties in the percent change in time spent at home on the date of the projected peak in each state.

State	First Quartile	Median	Third Quartile
Alabama	14	15	18
Arizona	11	13.5	16
California	9	12	15
Colorado	10	12	13
Delaware	17.5	20	22
Florida	10	11	12
Georgia	8	10	12
Hawaii	20	22	23
Idaho	15	15	16
Illinois	15	17	22
Indiana	18	19	22
Iowa	8	9.5	13
Kansas	12	15	17
Kentucky	16	17	20
Louisiana	14	17	19
Maine	5	6.5	8
Maryland	18.5	22	24
Massachusetts	10	11.5	12.5
Michigan	21	23	26
Minnesota	13	15	18
Mississippi	10	11	12
Missouri	11	15	17
Nebraska	11	14.5	16.5
Nevada	15	18	20.5
New Jersey	22	26	29
New Mexico	14	15	18
New York	18	19	25
New York City	32	32	32
Ohio	8	9	10
Oklahoma	11	13	15
Oregon	7	9	10
Pennsylvania	17	19	22
South Carolina	16	18	20
Tennessee	10	11	12
Texas	11	15	18
Utah	12	15	18
Virginia	16	18.5	21
Washington	10	11	12
West Virginia	10	11	11
Wisconsin	11	12	13

**Supplemental Table IV.** Adjusted negative binomial regression models of excess geography-level cardiovascular mortality estimates from March 1<sup>st</sup> through May 16<sup>th</sup>.  
Abbreviations: CI=confidence interval.

<b>Covariate</b>	<b>Adjusted Model</b>	
	<b>Incidence Rate Ratio</b>	<b>95% CI</b>
Change in time spent home (per 10% increase)	1.05	1.01, 1.08
Total COVID-19 deaths per capita	1.04	1.03, 1.06
COVID-19 mortality data completeness	0.97	0.84, 1.12

**Supplemental Table V.** Adjusted negative binomial regression models of excess state-level Alzheimer’s related mortality estimates from March 1<sup>st</sup> through May 16<sup>th</sup>.  
Abbreviations: CI=confidence interval.

<b>Covariate</b>	<b>Adjusted Model</b>	
	<b>Incidence Rate Ratio</b>	<b>95% CI</b>
Change in time spent home (per 10% increase)	1.03	0.97, 1.10
Total COVID-19 deaths per capita	1.05	1.01, 1.09
COVID-19 mortality data completeness	0.86	0.65, 1.13