Impact of COVID-19 on hospital admissions for acute coronary syndromes (updated analyses including admissions up to 25 April 2021)

Introduction

Researchers in the Nuffield Department of Population Health and the Radcliffe Department of Medicine, working with NHS Digital and a team of experts from other UK universities, analysed the number of admissions to hospitals in England for acute coronary syndrome (ACS) during the COVID-19 pandemic.

Results based on data collected by NHS Digital from NHS Hospital Trusts in England up to 24 May 2020 were published in The Lancet on 14 July 2020.[1] Updated monthly analyses (**Figures 1-8**) are published here.

Summary

The impact of the COVID-19 pandemic on the number of ACS admissions during the period February to May 2020 was previously described in the main publication.[1] Weekly ACS admissions had approximately returned to the 2019 expected numbers by August 2020 (Figure 1). This updated analysis suggests that, after accounting for incomplete coding by NHS hospitals (see online supplementary methods[1]), the numbers of admissions with non-ST-elevation myocardial infarction (NSTEMI) was slightly below expected levels in January 2021, but were subsequently maintained around expected levels (Figure 1). Weekly numbers of admissions with ST-elevation myocardial infarction (STEMI) have remained similar to 2019 weekly admission numbers since August 2020.

Updated analyses will be made available at https://www.ctsu.ox.ac.uk/research/covid-19-acute-coronary-syndromes.

Updated Methods

The study methods are described in the main publication and supplementary appendix, including the adjustment that was made for incomplete clinical coding for the most recent weeks.[1]

The current updated analysis includes admissions for ACS from all 147 acute hospital NHS trusts in England from 1 January 2019 to 25 April 2021. To investigate the effect of season on expected ACS admissions, weekly ACS admissions during 2019 are also shown (Figure 1). In the current updated analysis, the error bars of the weekly numbers of admissions represent plus/minus one standard deviation of the (pre-covid) 2019 weekly counts (ie, allowing for over-dispersed Poisson distribution). An additional analysis (Figure 8) was undertaken to explore changes in weekly number of ACS admissions in different regions of England. In order to account for differences in population size, weekly ACS admissions are shown as number of admissions, per week, per 100,000 people based on publicly available population demographic data.

Updated figures

Figure 4: (a) Weekly numbers and (b) weekly proportions of admissions to acute NHS hospital trusts with an acute coronary syndrome that received percutaneous coronary intervention on day of admission

Figure 5: (a) Weekly numbers and (b) weekly proportions of admissions to acute NHS hospital trusts with an acute coronary syndrome that received any percutaneous coronary intervention

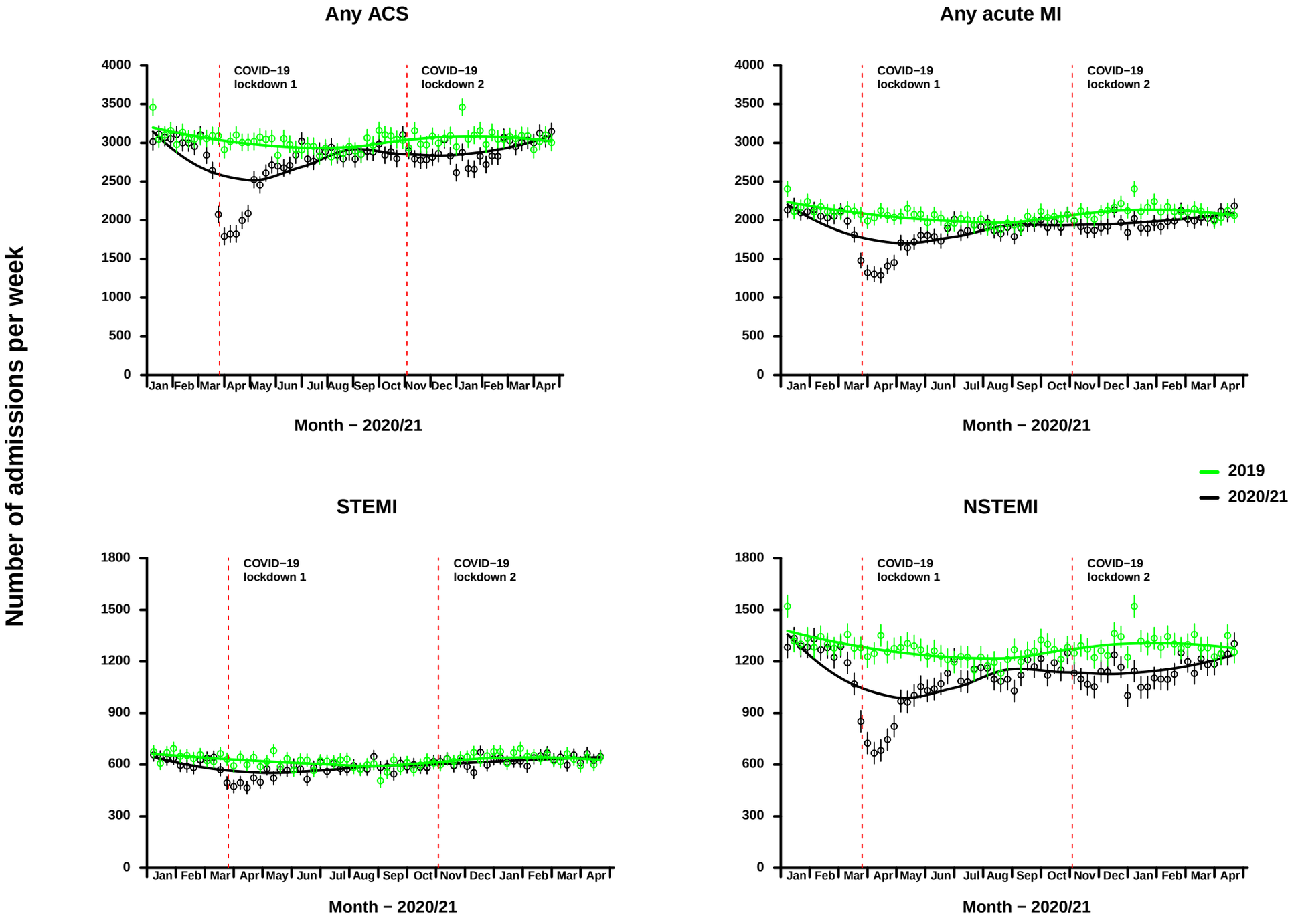
Figure 6: Weekly median and interquartile range of length of stay for admissions to acute NHS hospital trusts with an acute coronary syndrome, by type

Figure 7: Weekly number of admissions to acute NHS hospital trusts with an acute coronary syndrome, by age, sex, Charlson index and ethnicity

Figure 8: Weekly number of admissions to acute NHS hospital trusts with an acute coronary syndrome, by region

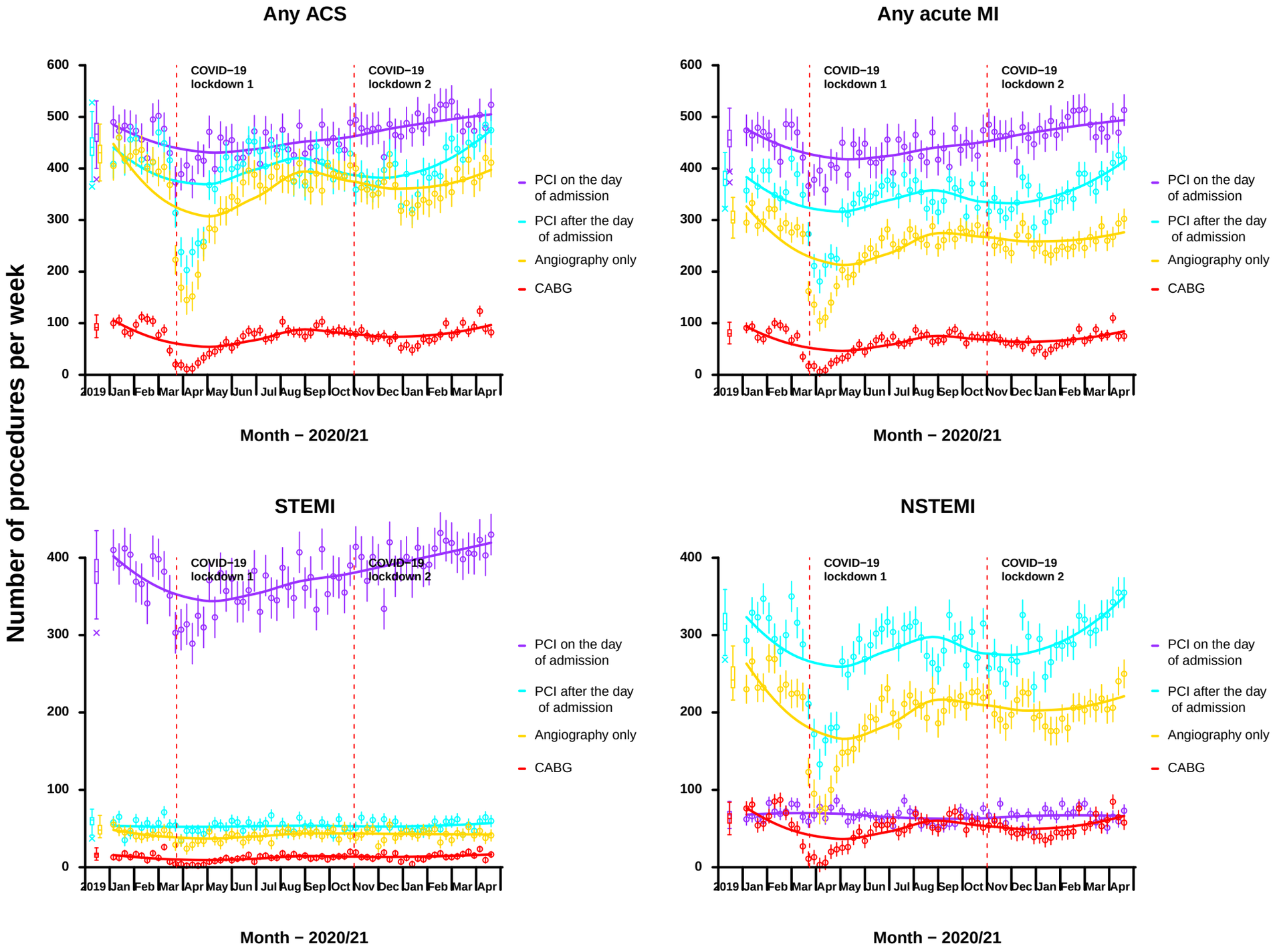
[1] Mafham MM, Spata E, Goldacre R, Gair D, Curnow P, Bray M, Hollings S, Roebuck C, Gale CP, Mamas MA, Deanfield JE, de Belder MA, Luescher TF, Denwood T, Landray MJ, Emberson JR, Collins R, Morris EJA, Casadei B, Baigent C. COVID-19 pandemic and admission rates for and management of acute coronary syndromes in England. Lancet. 2020 Aug 8;396(10248):381-389.

Figure 1: Weekly numbers of admissions to acute NHS hospital trusts with an acute coronary syndrome, by type



For both 2019 and 2020/21, a LOESS smoothing spline is fitted through the weekly reported counts, with datapoints and SEs plotted. The dates of the UK COVID−19 lockdowns (23 March & 05 November, 2020) are shown with a vertical dotted line. ACS=acute coronary syndrome. STEMI=ST−elevation myocardial infarction. NSTEMI=non−ST−elevation myocardial infarction. LOESS=locally estimated scatterplot smoothing.

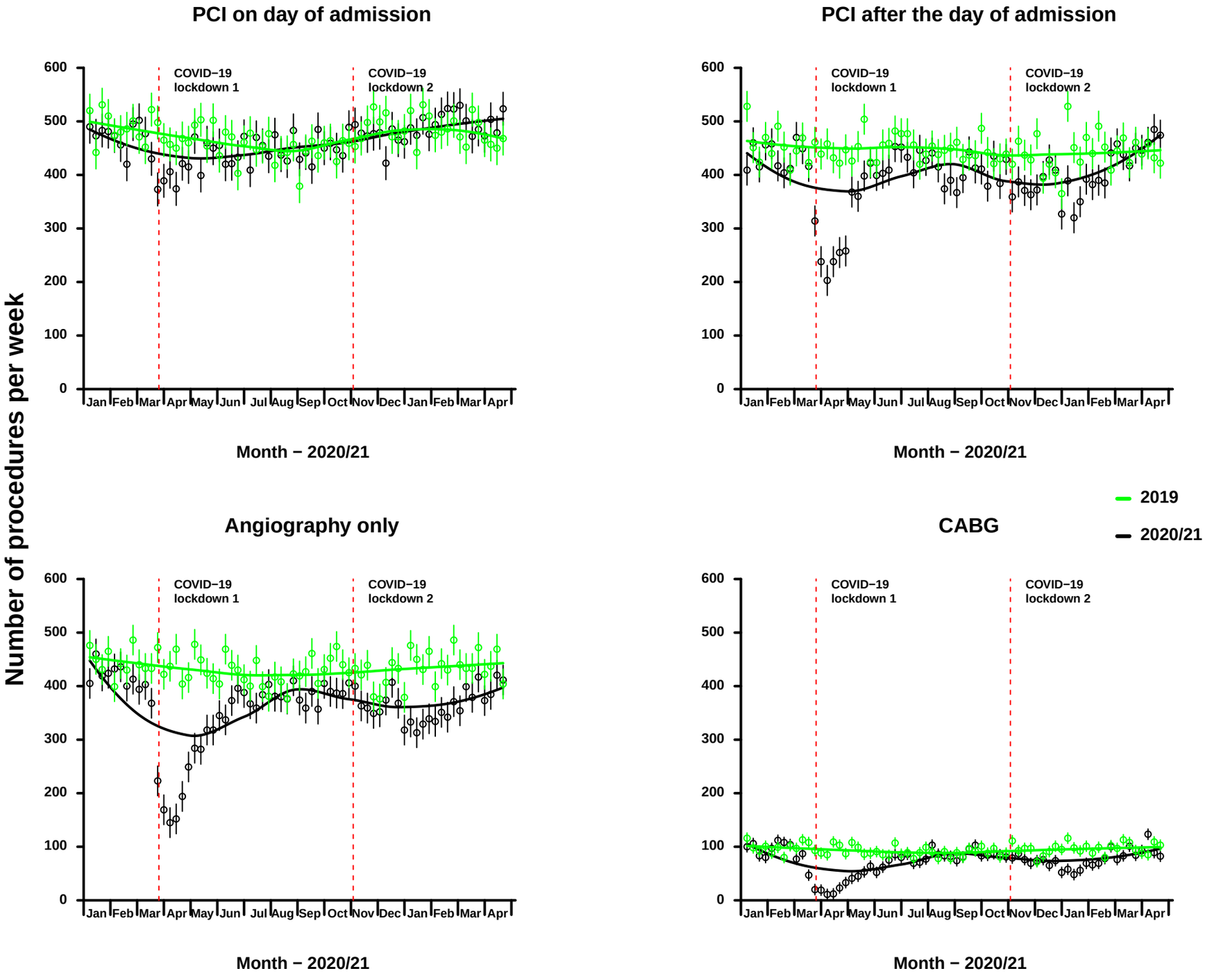
Figure 2: Weekly admissions to acute NHS hospital trusts with an acute coronary syndrome that received a particular coronary procedure



For weekly admissions in 2019, boxplots shows the median and IQR, with whiskers extending (up to) 1.5 times the IQR above the upper quartile and below the lower quartile, with any weekly counts beyond those ranges indicated by x. For 2020/21, a LOESS smoothing spline is fitted through the weekly reported counts, with datapoints and SEs plotted. The dates of the UK COVID−19 lockdowns (23 March & 05 November, 2020) are shown with a vertical dotted line. ACS=acute coronary syndrome. STEMI=ST−elevation myocardial infarction. NSTEMI=non−ST−elevation myocardial infarction. LOESS=locally estimated scatterplot smoothing.

PCI=Percutaneous Coronary Intervention , CABG=Coronary Artery Bypass Graft.

Figure 3: Weekly numbers of admissions to acute NHS hospital trusts with an acute coronary syndrome that received a particular coronary procedure



For both 2019 and 2020/21, a LOESS smoothing spline is fitted through the weekly reported counts, with datapoints and SEs plotted. The date of the UK COVID−19 lockdown (March 23, 2020) is shown with a vertical dotted line. PCI=Percutaneous Coronary Intervention , CABG=Coronary Artery Bypass Graft. LOESS=locally estimated scatterplot smoothing.

Figure 4: (a) Weekly numbers and (b) weekly proportions of admissions to acute NHS hospital trusts with an acute coronary syndrome that received percutaneous coronary intervention on day of admission

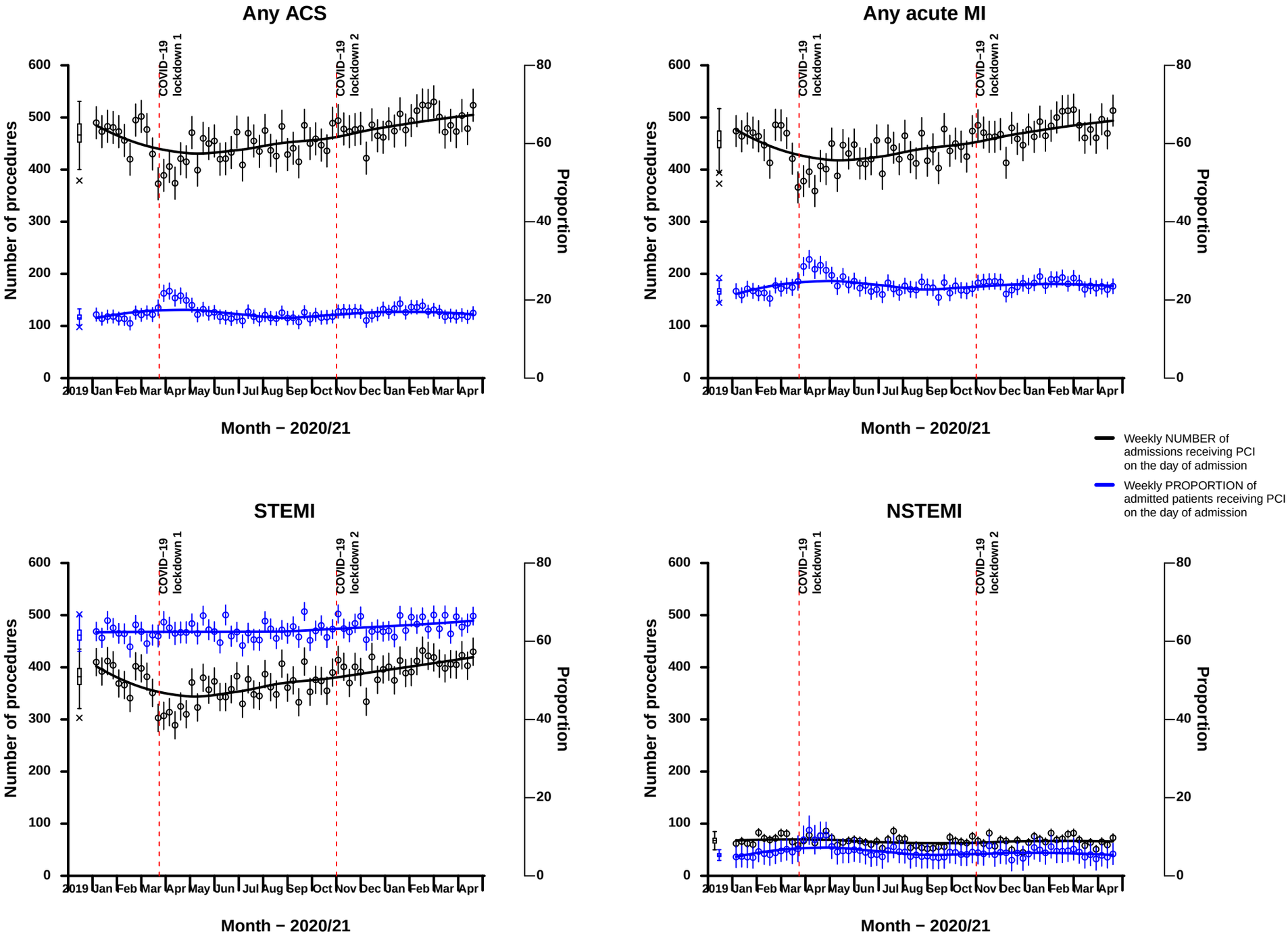


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Figure 5: (a) Weekly numbers and (b) weekly proportions of admissions to acute NHS hospital trusts with an acute coronary syndrome that received any percutaneous coronary intervention

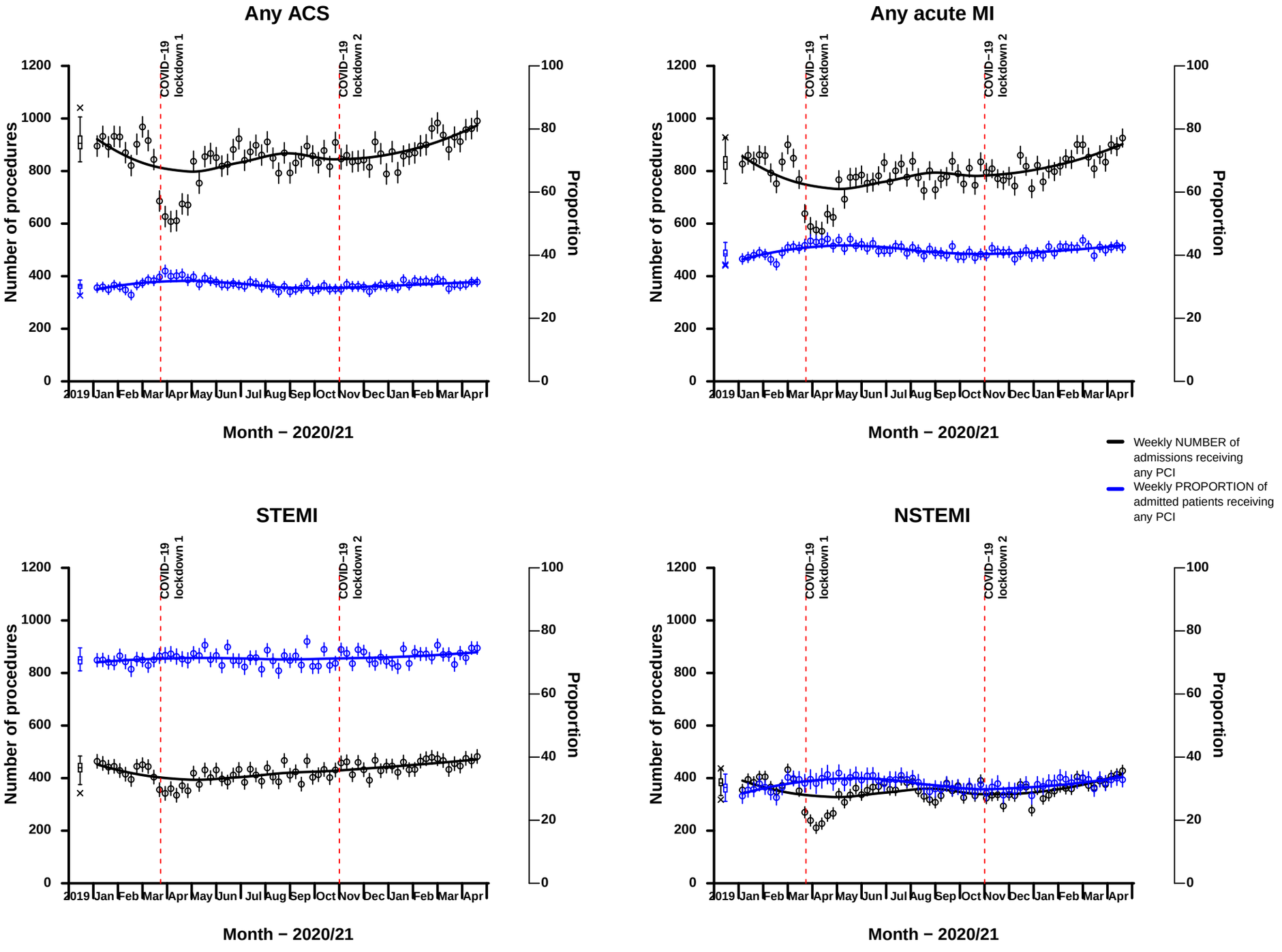

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Figure 6: Weekly median and interquartile range of length of stay for admissions to acute NHS hospital trusts with an acute coronary syndrome, by type

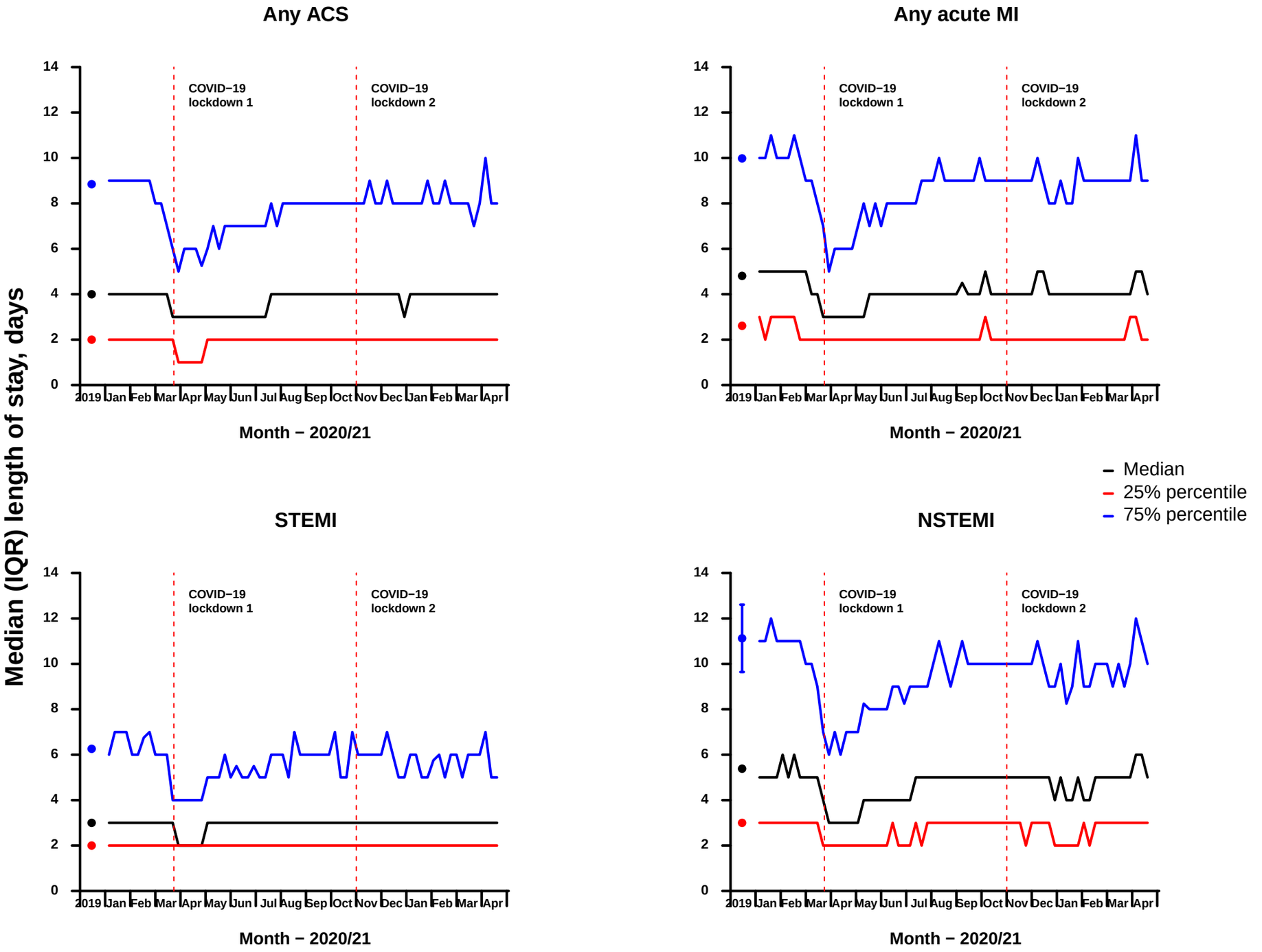

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Figure 7: Weekly number of admissions to acute NHS hospital trusts with an acute coronary syndrome, by age, sex, Charlson index and ethnicity

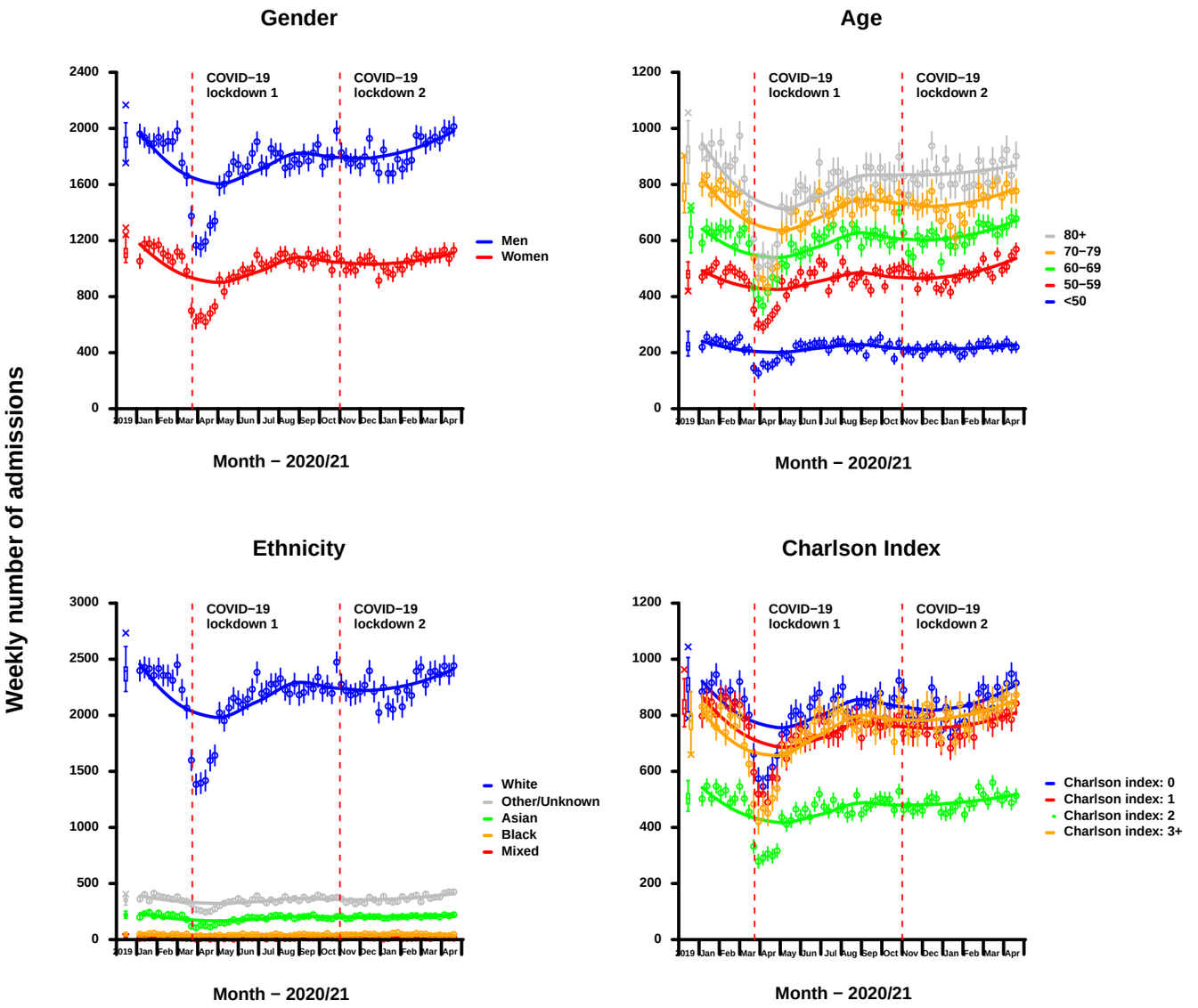

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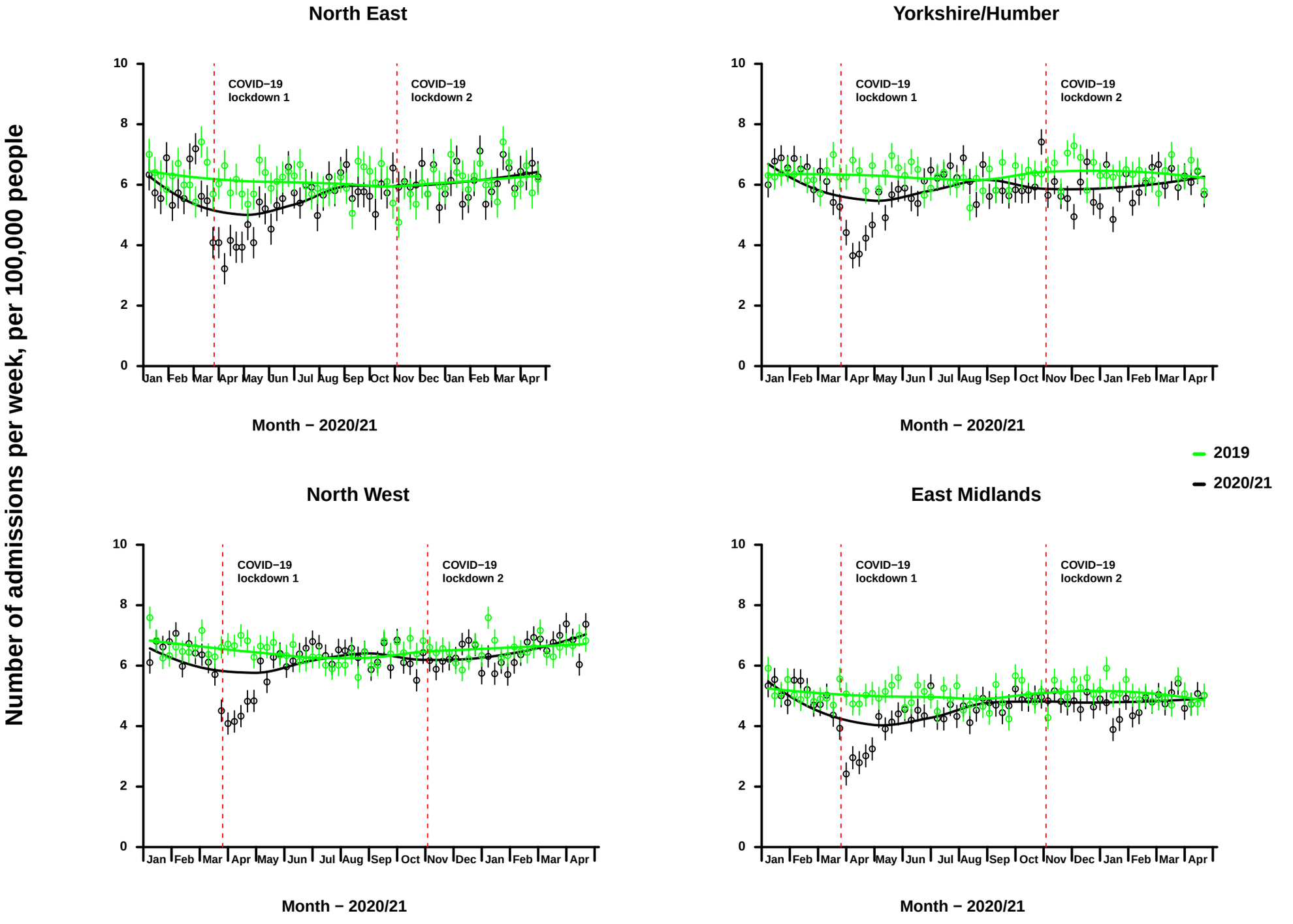
Figure 8(a): Weekly admissions rates to acute NHS hospital trusts with any acute coronary syndrome, by region



For both 2019 and 2020/21, a LOESS smoothing spline is fitted through the weekly reported counts, with datapoints and SEs plotted. The dates of the UK COVID−19 lockdowns (23 March & 05 November, 2020) are shown with a vertical dotted line. LOESS=locally estimated scatterplot smoothing.

Figure 8(b): Weekly admissions rates to acute NHS hospital trusts with any acute coronary syndrome, by region

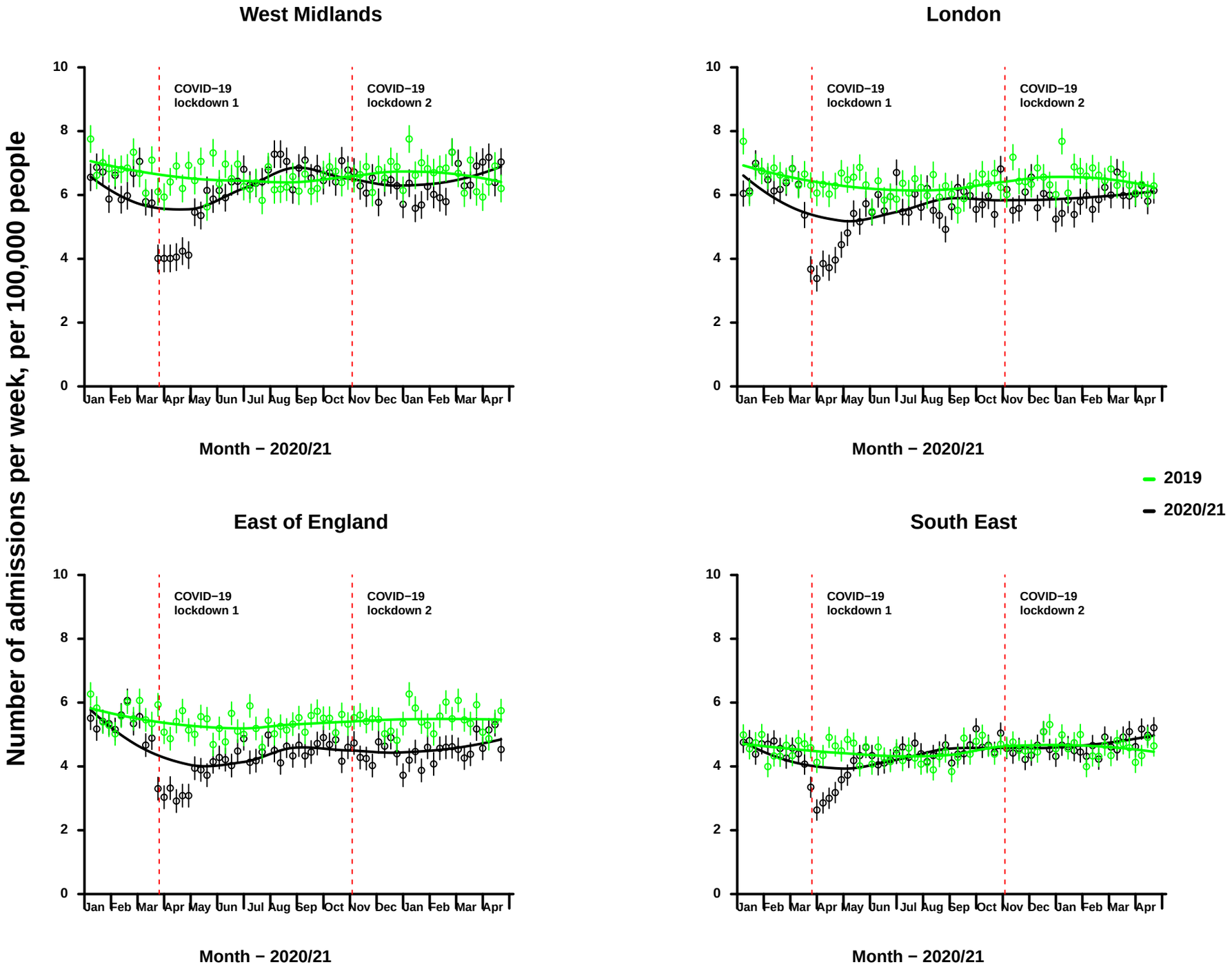


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Figure 8(c): Weekly admissions rates to acute NHS hospital trusts with any acute coronary syndrome, by region

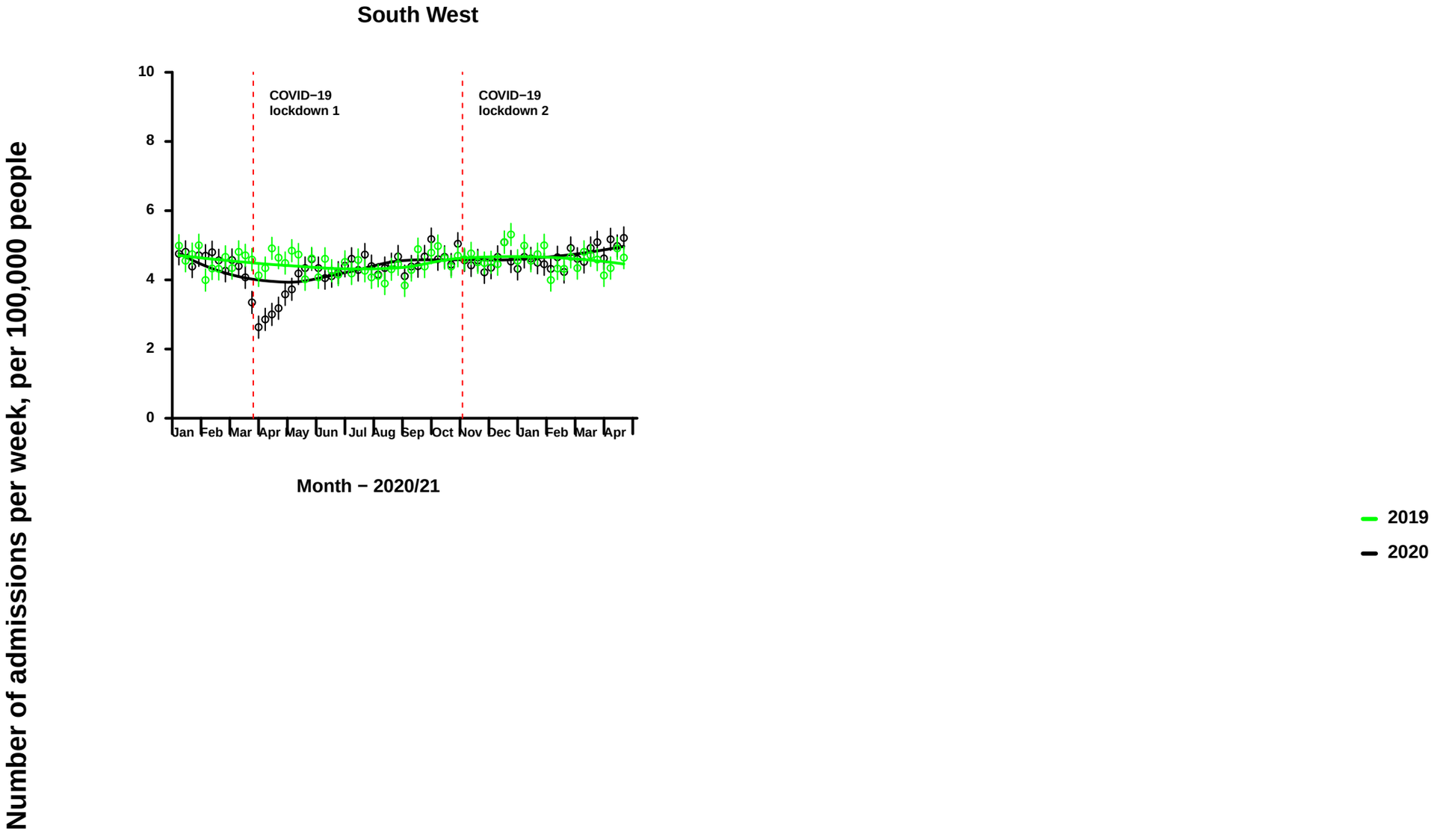

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Table 2: Weekly number of admissions from acute coronary syndrome, any acute myocardial infarction, ST-elevation myocardial infarction and non-ST-elevation myocardial infarction in 2019, 2020 and 2021. Weekly admissions in 2021 are adjusted for incomplete coding

	Any ACS			Any acute MI			STEMI			NSTEMI		
WEEK	**2019**	**2020**	**2021**	**2019**	**2020**	**2021**	**2019**	**2020**	**2021**	**2019**	**2020**	**2021**
1	3459	3014	2877	2405	2131	2021	676	656	640	1521	1282	1144
2	3048	3111	2668	2111	2188	1901	607	644	614	1318	1335	1049
3	3098	3070	2660	2166	2096	1892	670	631	620	1301	1289	1051
4	3156	3052	2829	2241	2110	1965	694	637	620	1335	1283	1103
5	2980	3104	2719	2105	2135	1915	648	595	591	1282	1330	1097
6	3135	3002	2832	2175	2051	1981	653	591	640	1345	1268	1095
7	3047	2999	2827	2109	2028	1989	635	582	652	1301	1280	1125
8	3047	2954	3069	2105	2050	2127	658	626	669	1277	1223	1250
9	3081	3103	3030	2102	2119	2012	622	637	628	1298	1287	1199
10	3055	2842	2952	2144	1988	1991	617	643	644	1357	1192	1130
11	3093	2643	3006	2117	1814	2031	664	570	597	1277	1069	1215
12	3088	2073	3032	2070	1480	2023	631	494	656	1279	852	1180
13	2913	1793	3003	1990	1323	2007	593	473	611	1227	725	1184
14	3019	1824	3122	2029	1304	2118	644	495	665	1246	667	1244
15	3099	1824	3053	2123	1289	2073	599	466	624	1351	682	1243
16	3005	1996	3144	2061	1409	2184	642	522	647	1254	746	1303
17	3006	2087		2037	1453		588	498		1275	823	
18	3017	2525		2049	1711		619	575		1281	970	
19	3073	2456		2152	1647		681	521		1305	964	
20	3045	2610		2074	1721		589	571		1290	1002	
21	3055	2715		2077	1808		635	567		1267	1053	
22	2840	2701		1967	1806		568	597		1230	1030	
23	3054	2677		2071	1790		626	575		1261	1040	
24	2981	2710		2026	1733		626	514		1231	1070	
25	2916	2843		1931	1895		565	584		1210	1131	
26	2908	3021		1959	2012		622	614		1196	1212	
27	2959	2793		2018	1833		620	560		1228	1085	
28	2955	2763		2007	1868		616	607		1224	1081	
29	2832	2894		1934	1937		627	576		1150	1155	
30	2932	2887		2014	1915		632	572		1225	1164	
31	2819	2944		1904	1970		583	594		1175	1160	
32	2884	2843		1917	1867		572	573		1194	1096	
33	2865	2795		1883	1827		599	573		1131	1084	
34	2956	2884		1962	1908		605	647		1211	1096	
35	2897	2791		1936	1791		506	582		1268	1029	
36	2849	2853		1909	1899		555	588		1198	1120	
37	3063	2890		2051	1952		627	545		1251	1210	
38	2968	2880		1996	1955		576	608		1260	1169	
39	3159	2984		2113	2003		612	586		1325	1216	
40	3103	2842		2033	1905		570	600		1300	1119	
41	3088	2886		2047	1976		597	584		1269	1192	
42	3043	2797		2008	1904		626	582		1212	1150	
43	3033	3104		2075	2072		609	618		1283	1249	
44	2938	2900		1999	1990		598	618		1248	1132	
45	3155	2793		2121	1915		632	634		1292	1097	
46	2984	2777		2070	1874		619	593		1271	1067	
47	2975	2782		2011	1870		639	621		1222	1052	
48	3084	2815		2098	1902		645	589		1262	1142	
49	2997	2863		2126	1919		671	553		1234	1139	
50	3057	3041		2166	2133		625	672		1363	1238	
51	3093	2832		2215	1969		651	597		1344	1166	
52	2951	2615		2122	1842		676	634		1224	1002	