

### Supplementary Material

Table 1: Regression analysis (GML with log link), with time as a factor, for COVID-19 symptom data provided by two sources: KCL ZOE symptom tracker app for NI and HSC NI Symptom checker feature (COVIDCare NI) and covariates of individual MDM domains. The dates shown correspond to the end date of a 14 day symptom reporting sliding window (resulting in a one week overlap of data).

KCL ZOE	Estimate	Std. Error	t value	Pr(> t )	Signif. Codes
Intercept	3.304	0.05102	64.754	< 2e-16	<0.001
06.04.20	-0.00063	0.04037	-0.016	0.987565	
13.04.20	0.2608	0.03791	6.877	6.76E-12	<0.001
20.04.20	0.2263	0.04067	5.564	2.75E-08	<0.001
27.04.20	0.159	0.04416	3.599	0.000322	<0.001
04.05.20	0.1641	0.04431	3.703	0.000215	<0.001
11.05.20	0.176	0.04426	3.976	7.09E-05	<0.001
18.05.20	0.3512	0.04151	8.46	< 2e-16	<0.001
23.05.20	0.3542	0.04275	8.284	< 2e-16	<0.001
30.05.20	0.3733	0.04476	8.34	< 2e-16	<0.001
Employment	-0.00211	0.000175	-12.091	< 2e-16	<0.001
Income	1.11E-05	5.59E-05	0.198	0.843133	
Education	2.44E-05	9.86E-05	0.248	0.804406	
Health	-9.7E-05	0.000191	-0.506	0.612973	
Services	-1.2E-05	5.25E-05	-0.223	0.82352	
Living Environment	-0.00044	4.33E-05	-10.259	< 2e-16	<0.001

  

COVIDCare NI	Estimate	Std. Error	t value	Pr(> t )	Signif. Codes
Intercept	3.037	0.04908	61.875	< 2e-16	<0.001
27.04.20	-0.01081	0.04009	-0.27	0.78741	
04.05.20	0.009657	0.04053	0.238	0.811676	
11.05.20	0.03329	0.04085	0.815	0.415178	
18.05.20	0.05482	0.0417	1.315	0.1887	
23.05.20	0.1401	0.04077	3.437	0.000594	<0.001
30.05.20	0.4639	0.03689	12.576	< 2e-16	<0.001
Employment	-0.00094	0.000163	-5.771	8.43E-09	<0.001
Income	0.000143	6.11E-05	2.345	0.019058	0.01
Education	0.000423	8.96E-05	4.724	2.39E-06	<0.001
Health	0.000174	0.000172	1.01	0.312399	
Services	0.000368	5E-05	7.358	2.2E-13	<0.001
Living Environment	-0.00032	4.22E-05	-7.579	4.18E-14	<0.001

Table 2: Regression analysis (GML with log link), with time as a factor, and covariate Housing density, for COVID-19 symptom data provided by two sources: KCL ZOE symptom tracker app for NI and HSC NI Symptom checker feature (COVIDCare NI). The dates shown correspond to the end date of a 14 day symptom reporting sliding window (resulting in a one week overlap of data).

Date	Estimate	Std. Error	<i>t</i> value	Pr(>  <i>t</i>  )	Signif. Codes
<b>KCL ZOE</b>					
Intercept	3.22281	0.10636	30.3	< 2e-16	<0.001
06.04.20	0.02337	0.0517	0.452	0.65126	
13.04.20	0.19553	0.04965	3.938	8.32E-05	<0.001
20.04.20	0.11162	0.0539	2.071	0.03842	0.01
27.04.20	0.02876	0.0588	0.489	0.62479	
04.05.20	0.0155	0.06017	0.258	0.79667	
11.05.20	0.03295	0.05983	0.551	0.58186	
18.05.20	0.15512	0.05711	2.716	0.00662	0.001
23.05.20	0.16197	0.05805	2.79	0.00528	0.001
30.05.20	0.19424	0.06091	3.189	0.00144	0.001
Housing Density	-0.33639	0.03925	-8.57	< 2e-16	<0.001
<b>COVIDCare NI</b>					
Intercept	3.645691	0.082435	44.225	< 2e-16	<0.001
27.04.20	-0.011	0.041831	-0.263	0.79266	
04.05.20	-0.00264	0.042457	-0.062	0.95036	
11.05.20	0.029034	0.042761	0.679	0.49718	
18.05.20	0.049578	0.043832	1.131	0.25808	
23.05.20	0.140744	0.042672	3.298	0.00098	<0.001
30.05.20	0.448168	0.038678	11.587	< 2e-16	<0.001
Housing Density	-0.25199	0.030256	-8.329	< 2e-16	<0.001

Table 3: Regression analysis (GLM with log link) results, using time as a factor, for Belfast Urban area for the covariates of overall MDM and housing density using COVID-19 symptom data provided by two sources: KCL ZOE symptom tracker app for NI and HSC NI Symptom checker feature (COVIDCare NI). The dates correspond to the end date of a 14 day symptom reporting sliding window.

Date	Estimate	Std. Error	<i>t</i> value	Pr(>  <i>t</i>  )	Signif. Codes
<b>KCL ZOE</b>					
Intercept	2.063784	0.100041	20.629	< 2e-16	<0.001
06.04.20	0.083114	0.092504	0.898	0.369102	
13.04.20	0.419136	0.08467	4.95	8.47E-07	<0.001
20.04.20	0.478806	0.085951	5.571	3.13E-08	<0.001
27.04.20	0.331547	0.09639	3.44	0.000602	<0.001
04.05.20	0.375345	0.092933	4.039	5.71E-05	<0.001
11.05.20	0.449695	0.091904	4.893	1.13E-06	<0.001
18.05.20	0.590634	0.089661	6.587	6.68E-11	<0.001
23.05.20	0.488385	0.094613	5.162	2.86E-07	<0.001
30.05.20	0.4906	0.097609	5.026	5.76E-07	<0.001
Overall MDM	-0.00284	0.000131	-21.635	< 2e-16	<0.001
Housing Density	0.428296	0.030446	14.067	< 2e-16	<0.001

COVIDCare NI	Estimate	Std. Error	t value	Pr(> t )	Signif. Codes
Intercept	2.368	0.1575	15.031	< 2e-16	<0.001
27.04.20	0.03624	0.07763	0.467	0.64074	
04.05.20	0.1139	0.07743	1.471	0.14165	
11.05.20	0.05171	0.08077	0.64	0.52221	
18.05.20	0.0973	0.08042	1.21	0.22664	
23.05.20	0.2274	0.07688	2.958	0.00318	
30.05.20	0.5373	0.07125	7.54	1.16E-13	0.001
Overall MDM	-0.00044	6.81E-05	-6.511	1.25E-10	<0.001
Housing Density	0.3568	0.06135	5.816	8.42E-09	<0.001

Table 4: Results of regression analysis (GLM with log link) with covariates MDM and population housing density for age standardised rates of self-reported COVID-19 symptom data (using COVIDCare NI) for two time periods ending 20.04.20 and 11.05.20. The table shows the number of SOAs with reported symptoms for each of the time periods. The dates correspond to the end date of a 14 day symptom reporting sliding window.

20.04.20		Estimate	Std. Error	Pr(> t )	Signif. Codes
Age group <18	Intercept	9.48E-02	1.08E-02	2.76E-15	<0.001
159 SOAs	MDM	-1.65E-05	2.11E-05	0.437	
	Intercept	-0.05261	0.04439	0.23769	
	Housing Density	0.05352	0.01684	0.00178	0.001
Age group 18-24	Intercept	4.76E-02	4.01E-03	<2e-16	<0.001
178 SOAs	MDM	-2.12E-05	8.25E-06	0.0111	0.1
	Intercept	0.028072	0.016148	0.0839	0.05
	Housing Density	0.004178	0.006175	0.4995	
Age group 25-34	Intercept	4.52E-02	2.43E-03	<2e-16	<0.001
349 SOAs	MDM	-2.31E-05	4.95E-06	4.60E-06	<0.001
	Intercept	0.061368	0.00958	4.86E-10	<0.001
	Housing Density	0.010085	0.003696	0.00669	0.001
Age group 35-49	Intercept	1.26E-01	5.81E-03	<2e-16	<0.001
477 SOAs	MDM	-9.27E-06	1.13E-05	0.411	
	Intercept	0.082366	0.021898	0.00019	<0.001
	Housing Density	0.015207	0.008348	0.06916	0.05
Age group 50-64	(Intercept	9.39E-02	9.81E-03	<2e-16	<0.001
296 SOAs	MDM	5.45E-05	1.81E-05	0.00281	0.001
	Intercept	0.06483	0.03445	0.0608	0.05
	Housing Density	0.02115	0.01305	0.106	
Age group >65	Intercept	3.88E-02	1.15E-02	0.00112	0.001
77 SOAs	MDM	4.46E-05	2.13E-05	0.03954	0.1
	Intercept	0.11575	0.05233	0.03	0.1
	Housing Density	-0.02159	0.02	0.284	

11.05.20					
Age group <18	Intercept	1.34E-01	1.85E-02	2.56E-10	<0.001
79 SOAs	MDM	-4.11E-05	3.46E-05	0.239	
	Intercept	-0.04444	0.07677	0.5644	
	Housing Density	0.06134	0.02932	0.0397	0.1
Age group 18-24	(Intercept	7.59E-02	1.21E-02	6.69E-09	<0.001
111 SOAs	MDM	-4.02E-05	2.59E-05	0.124	
	Intercept	0.064809	0.056327	0.252	
	Housing Density	-	-	-	-
	Density	0.001829	0.021937	0.934	
Age group 25-34	(Intercept	5.48E-02	2.87E-03	<2e-16	<0.001
279 SOAs	MDM	-2.09E-05	5.76E-06	0.000353	<0.001
	Intercept	0.076144	0.01068	8.76E-12	<0.001
	Housing Density	-	-	-	-
	Density	0.011859	0.004139	0.00448	0.001
Age group 35-49	(Intercept	1.30E-01	7.62E-03	<2e-16	<0.001
326 SOAs	MDM	1.38E-05	1.51E-05	0.359	
	Intercept	0.06974	0.02784	0.0127	0.1
	Housing Density	0.02536	0.01063	0.0176	0.1
Age group 50-64	(Intercept	1.30E-01	1.43E-02	3.91E-16	<0.001
158 SOAs	MDM	4.46E-05	2.68E-05	0.0979	0.05
	Intercept	0.06643	0.04796	0.168	
	Housing Density	0.03209	0.01809	0.0781	0.05
Age group >65	(Intercept	6.32E-02	1.64E-02	0.000369	<0.001
46 SOAs	MDM	2.26E-05	3.28E-05	0.495668	
	Intercept	0.13116	0.06819	0.0609	0.05
	Housing Density	-0.02254	0.02618	0.3939	