

Supplementary material to the article:

Cause-specific mortality in Spain during the pandemic: educational differences and its impact on life expectancy

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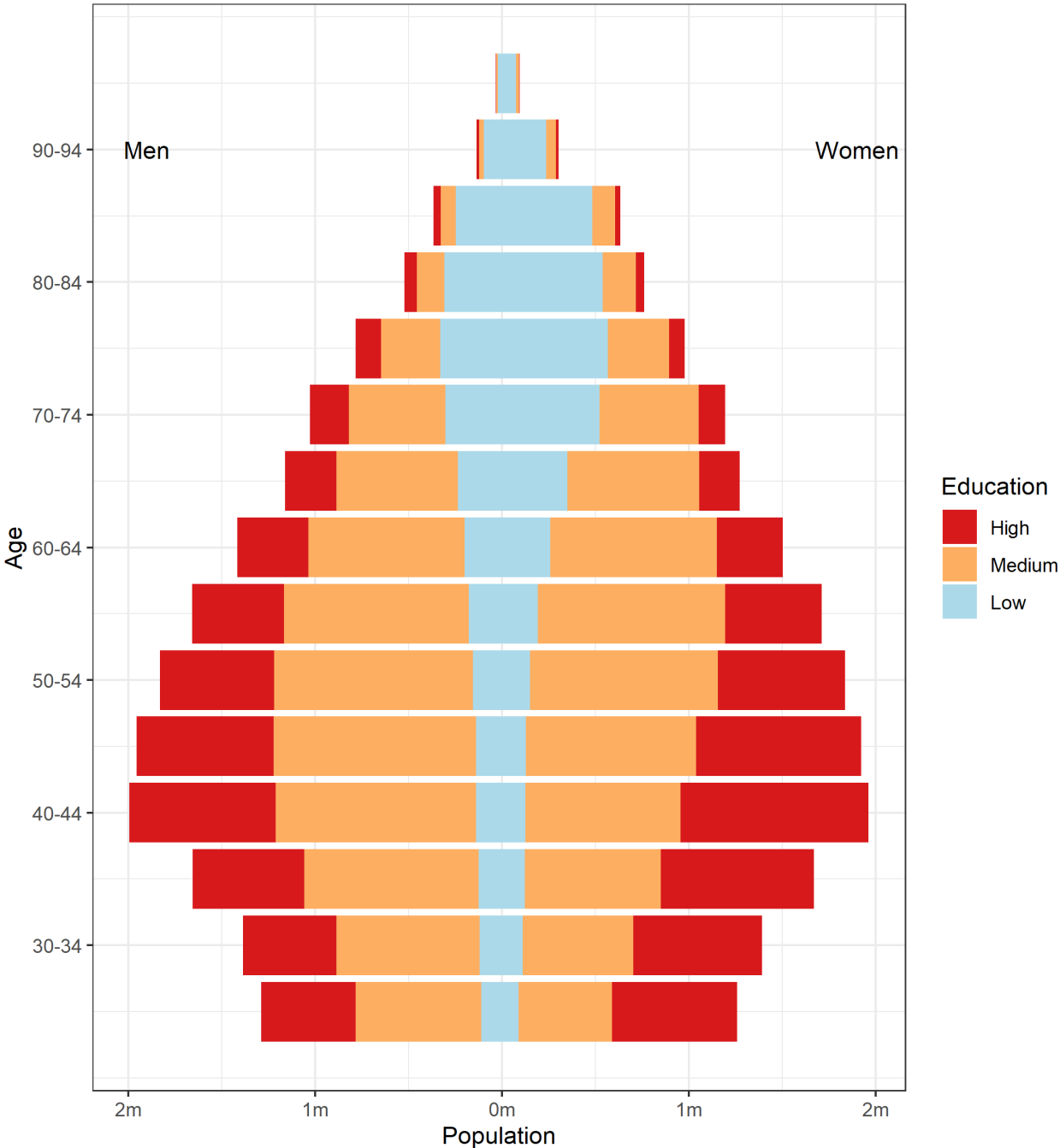
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Supplementary Figure S1. Distribution of the Spanish population aged 30+ according to five-year age group, sex and educational attainment (January 2020)



See main text for the data source and the definition of the educational attainment categories

Supplementary Table S1. List of causes of death used in the analysis and the corresponding ICD-10 codes

	Cause of death	ICD-10 codes
	All deaths	A00-Y98
1	COVID-19	U07.1, U07.2
2	Flu, Pneumonia	J10-J18
3	Chronic lower respiratory diseases	J40-J46
4	Remaining respiratory system diseases	J00-J09; J20-J39; J60-J70; J80-J84; J90-J95; J97-J99
5	Sepsis	A40-A41
6	Remaining infectious and parasitic diseases	A00-A39; A42-B99
7	Malignant neoplasm of lymphoid, haematopoietic & related tissue	C81-C96
8	Lung cancer	C32-C34
9	Neoplasms of reproductive organs	Women: C50, C53-C56; Men C61
10	Remaining Neoplasms	C00-D48
11	Diseases of the blood (-forming organs), immunol disorders	D50-D89
12	Diabetes mellitus	E10-E14
13	Obesity	E65-E68
14	Other endocrine, nutritional and metabolic diseases	E00-E07; E15-E64; E70-E90
15	Dementia, Alzheimer	F01-F03; G30-G31
16	Other mental/behavioural disorders & Diseases of nervous system	F04-G26; G32-G99
17	Hypertensive diseases	I10-I15
18	Ischaemic heart diseases	I20-I25
19	Other heart diseases	I00-I09; I30-I33; I39-I45, I47-I48, I49.1-I52
20	Cerebrovascular diseases	I60-I69
21	Other diseases of the circulatory system	I70-I95.8; I96-I98
22	Chronic liver diseases	K70; K73-K74
23	Other diseases of the digestive system	K00-K67; K75-K93
24	Diseases of the skin and subcutaneous tissue	L00-L99
25	Diseases of the musculoskeletal system/connective tissue	M00-M99
26	Diseases of the genitourinary system	N00-N99
27	Other diseases	H00-H95; O00-P28.4; P28.8-Q99; R95
28	Ill-defined causes	I46; I49.0; I95.9; I99; J96; P28.5; R00-R94; R96-R99
29	Transport accidents	V01-V99
30	Accidental falls	W00-W19
31	Other accidental threats to breathing	W75-W84
32	Suicide and self-inflicted injury	X60-X84
33	Other external causes	S00-T98, W20-W74; W85-X59; X85-Y98

Supplementary Table S2. COVID-19 deaths as underlying cause of death (UCOD) with flu and pneumonia as contributing deaths (total deaths and as a percentage) in 2020 in Spain.

	Jan- Feb	March- May	June- August	Sept- Dec	Total 2020
COVID-19 as UCOD	0	45988	2726	26125	74839
Flu/Pneumonia contributing	0	13640	843	8250	22733
% Flu/Pneumonia mentioned	N/A	29.7%	30.9%	31.6%	30.4%

For the data source, see main text.

Supplementary Table S3. Distribution of causes of death registered in 2020 in Spain compared to 2018/19: underlying cause of death (UCOD) and multiple causes of death (MCOD) according to different periods of the year.

Cause of death	January-February				March-May				June-August				September-December			
	UCOD		MCOD		UCOD		MCOD		UCOD		MCOD		UCOD		MCOD	
	N 2020	$\Delta 2020$ vs 2018/19 %	N 2020	$\Delta 2020$ vs 2018/19 %	N 2020	$\Delta 2020$ vs 2018/19 %	N 2020	$\Delta 2020$ vs 2018/19 %	N 2020	$\Delta 2020$ vs 2018/19 %	N 2020	$\Delta 2020$ vs 2018/19 %	N 2020	$\Delta 2020$ vs 2018/19 %	N 2020	$\Delta 2020$ vs 2018/19 %
All deaths	79716	-6.2	-	-	154302	44.7	-	-	101561	4.5	-	-	158197	17.8	-	-
1 COVID-19	0	NA	4	NA	45988	NA	50258	-	2726	NA	3795	-	26125	NA	29057	-
2 Flu, Pneumonia	3050	-25.3	6825	-23.0	2790	-6.8	20997	172.9	1612	-6.6	5827	7.6	2210	-19.7	15240	89.9
3 Chronic lower respiratory diseases	2915	-16.9	5049	-15.9	3614	-1.8	8850	33.0	2417	-12.0	5070	-3.5	3405	-11.8	8119	10.9
4 Remaining respiratory system diseases	4872	-20.9	16274	-14.1	5239	-14.9	27507	36.2	3799	-17.7	15113	-6.7	4927	-27.5	23341	0.0
5 Sepsis	533	-8.5	2458	-5.6	617	-13.6	4037	22.1	718	-2.4	3582	5.1	877	-5.7	4510	2.3
6 Remaining infectious and parasitic diseases	671	-1.4	2095	-3.3	885	5.0	4944	79.2	709	-4.3	2754	11.2	946	-8.3	5124	51.0
7 Malignant neoplasm of lymphoid, haematopoietic tissue	1483	-3.5	1729	-3.6	2075	3.9	2860	22.2	2074	-0.1	2386	0.3	2742	-2.7	3478	8.4
8 Lung cancer	4096	2.2	4418	1.2	5635	-3.7	6441	2.0	5687	1.1	6167	1.7	7681	-2.2	8564	1.6
9 Neoplasms of reproductive organs	3022	7.2	3689	4.3	4103	0.1	5636	12.3	4134	2.5	5032	2.6	5544	-0.3	7040	4.7
10 Remaining Neoplasms	11028	1.7	21415	2.8	16056	-0.4	32092	3.8	16127	0.4	31323	2.3	21254	-1.5	41846	0.8
11 Diseases of the blood (-forming organs), immunological	380	-3.7	2713	-1.6	563	15.1	4447	22.2	448	-0.8	3525	4.2	671	4.2	5343	12.8
12 Diabetes mellitus	1861	-6.8	6474	-10.7	3292	35.6	14846	65.9	2471	9.8	8876	11.5	3673	18.1	13960	27.8
13 Obesity	83	-19.0	522	-5.6	139	-1.8	1283	86.8	121	26.7	737	37.5	160	3.2	1410	70.8
14 Other endocrine, nutritional and metabolic diseases	628	-0.9	5375	-4.0	916	16.5	9584	36.8	788	8.6	7647	18.4	1158	17.6	11166	28.5
15 Dementia, Alzheimer	6980	-8.1	11657	-7.2	10280	10.5	24293	56.7	9627	6.2	16479	11.0	10906	-8.6	21920	11.8
16 Other mental/behavioural disorders/nervous system	2111	-4.3	7347	-12.3	2910	7.8	12870	21.9	2874	14.4	10037	0.1	3491	-0.4	14062	3.1
17 Hypertensive diseases	2390	-9.2	10457	-8.8	4144	34.3	25140	79.7	3142	15.1	14502	15.8	4595	23.2	23095	34.1
18 Ischaemic heart diseases	5606	-12.3	7785	-12.4	7750	0.8	12493	16.2	6589	-1.1	9395	1.4	9709	2.7	14537	10.0
19 Other heart diseases	2928	1.1	6419	-4.4	3471	-7.1	10153	14.3	3230	2.2	8009	5.5	4728	5.5	12304	15.1
20 Cerebrovascular diseases	4739	-6.3	7384	-9.6	6693	0.5	12376	17.1	5943	0.4	9635	1.1	8442	0.2	14264	7.4
21 Other diseases of the circulatory system	6909	-8.4	20643	-7.2	9354	0.5	33216	21.0	8018	1.1	23955	3.9	11359	3.2	36863	14.1
22 Chronic liver diseases	775	0.0	1227	-1.6	872	-12.6	1614	-1.0	916	-0.5	1495	-0.7	1413	7.2	2413	11.6
23 Other diseases of the digestive system	3316	1.8	8520	1.5	4094	-8.3	11682	0.7	4206	1.6	11030	0.4	5973	-0.3	15741	1.7
24 Diseases of the skin and subcutaneous tissue	315	0.3	1563	4.5	489	8.7	2467	15.6	521	9.8	2461	19.0	577	2.7	2924	8.9
25 Diseases of the musculoskeletal system/connective tissue	997	-1.5	2467	-2.3	1254	-4.7	4113	25.3	1292	7.1	3331	9.0	1682	2.1	4857	16.6
26 Diseases of the genitourinary system	2740	1.3	13938	-2.5	4035	14.8	23947	29.5	4059	21.5	19049	12.2	4976	11.3	27807	20.6
27 Other diseases	283	2.0	594	6.1	368	-0.1	1049	42.3	337	-6.9	815	16.8	445	-10.4	1222	23.1
28 Ill-defined causes	2084	-8.4	78773	-6.8	3197	11.8	157625	50.5	2493	-8.9	101485	6.8	3333	-18.0	159109	20.8
29 Transport accidents	319	-4.8	322	-4.2	252	-46.4	259	-45.3	507	-10.6	513	-10.0	608	-13.8	625	-11.9
30 Accidental falls	640	14.7	723	12.7	779	2.0	924	9.0	905	9.2	1057	16.3	1281	19.8	1507	25.9
31 Other accidental threats to breathing	533	3.2	3064	-3.7	574	-12.5	4030	-4.3	664	-2.3	4470	8.7	740	-12.8	5551	4.1
32 Suicide and self-inflicted injury	664	19.0	665	19.0	902	-6.1	906	-5.8	1155	21.4	1159	21.6	1220	7.5	1225	8.0
33 Other external causes	765	2.7	5434	12.6	972	-6.0	7250	9.0	1252	8.5	7945	20.8	1346	-5.0	9939	12.5

For the data source, see main text.

Supplementary Table S4 Contribution of COVID-19 only as underlying cause of death to all-cause life expectancy and lifespan inequality at age 30 by sex. Spain. 2020.

		Educational groups				Inequality gap	Changes in inequality by eliminating COVID-19 (%)
		All	Low	Medium	High		
Men	e30	49.99	48.46	49.91	52.20	3.74	
	e30 eliminating COVID-19	51.48	50.12	51.46	53.90	3.78	
	PGLE COVID-19	1.49	1.66	1.54	1.70	0.03	0.9%
	SD30	12.06	13.18	12.27	10.94	-2.24	
	SD30 eliminating COVID-19	12.41	13.38	12.68	11.30	-2.07	
Women	e30	55.31	54.00	55.76	56.70	2.71	
	e30 eliminating COVID-19	56.52	55.46	57.07	58.07	2.61	
	PGLE COVID-19	1.21	1.46	1.31	1.36	-0.09	-3.5%
	SD30	10.83	12.30	10.99	10.31	-1.99	
	SD30 eliminating COVID-19	11.00	12.22	11.21	10.65	-1.57	
	Difference	0.17	-0.08	0.22	0.34	0.42	-21.1%

For the data source and methodology, see main text.

Supplementary references ¹, ² and ³

1. INE. Certificado médico de defunción (Medical death certificate). Madrid: INE (Instituto Nacional de Estadística); 2009. https://www.ine.es/metodologia/t20/cues_def_09.pdf. Accessed 17/1/2023.
2. INE. Death statistics according to cause of death. Methodology. Madrid: INE (Instituto Nacional de Estadística); 2020. https://www.ine.es/en/daco/daco42/sanitarias/metodologia_00_en.pdf. Accessed 26/7/2022.
3. INE. Asignación de nivel educativo, relación con la actividad laboral y ocupación a ficheros de Movimiento Natural de la Población (MNP). Método de obtención y advertencias a usuarios (Assignment of educational level, relation to employment activity and occupation to the Vital Statistics (MNP) files. Method of capturing and warnings to users.). Madrid, Spain: INE (Spanish National Statistics Institute); 2020. https://www.ine.es/metodologia/t20/Nota_meto_MNP.pdf. Accessed 16/7/2022.