

## COVID19 vaccination increases mortality of unvaccinated European children, May update

Hervé Seligmann

### Summary

Weekly COVID19 vaccination in total populations ([ourworldindata.org/covid-vaccinations](https://ourworldindata.org/covid-vaccinations)) increases weekly total mortality ([euromomo.eu](https://euromomo.eu)) of children 0-14 years old in January-May 2021 (unvaccinated at that period) from 22 European countries. Above 44, results indicate vaccine protection after week 5. These population-level results match previous individual-level results. In those below 15 years, which are unvaccinated, adverse effects start 3-4 weeks after vaccination and gradually increase until the end of the period examined, 20 weeks after vaccination. At the level of the whole population of children below 15 in these 22 countries, a weekly 1% increase in vaccination of adults results in 29 additional deaths of children, an 8% increase in the average weekly children death rate. Comparing health of unvaccinated children with no, one and both parents vaccinated could test whether vaccine shedding accounts for indirect vaccine effects affecting unvaccinated children, without vaccinating children. Direct adverse vaccination effects are probably stronger than indirect effects, predicting strong or extreme direct postvaccination adverse reactions in the young. Direct vaccine effects probably mask indirect adverse vaccine effects in adult populations.

### Overview

The best decision in relation to COVID19 vaccination might not be the same for individuals as compared to the whole population, or to other individuals. This is because COVID19 affects more males than females, old than young, obese than fit, etc. Adverse vaccine effects seem more frequent in those less affected by COVID19. These and other factors affect the cost-benefit optimization decision process. Former individual-level analyses show that vaccinated COVID19 patients have higher mortalities than unvaccinated COVID19 patients. This ratio is more extreme for those below age 60 than for those above that age, mainly because unvaccinated COVID19 mortalities <60 are very low ([Dr. Seligmann updated expert evaluation on the Covid19 Vax risk assesment including Kids-הודעות של נקים \(nakim.org\)](#)). Here, analyses estimate effects of vaccination on total mortality at population level. Results from population- and individual-based analyses produce similar conclusions for those above 45, with vaccination increasing total mortality during the 5-6 weeks after 1<sup>st</sup> injection, and decreasing it thereafter. Population-level analyses detect increased vaccination-associated total mortality for those below 45, including for the unvaccinated 0-14 years old. Further analyses controlling for COVID19 incidences do not alter results. This confirms observations of increases in total mortalities during the 2021 vaccination period compared to the same period in previous years in the young.

Previous analyses of COVID19- infection and mortality rates after vaccination showed increased infections ([Exposing distortions in the NEJM scientific publication on the efficiency of Pfizer's vax-הודעות של נקים \(nakim.org\)](#)) and mortalities ([Vaccinated COVID-19 are much more likely to die of illness due to a weakened immune system-הודעות של נקים \(nakim.org\)](#)) shortly after 1<sup>st</sup> injection as compared to the unvaccinated. These analyses were done at the level of individuals, not populations, and did not include mortality due to non-COVID19 causes. Vaccine protection should be perfect (which we know it is not) and last about 700 days in order to compensate for excess COVID19 mortality during this 5-week vaccination process. Note that this cost-benefit analysis does not include deaths unrelated to COVID19 ([Dr. Seligmann updated expert evaluation on the Covid19 Vax risk assesment including Kids-הודעות של נקים \(nakim.org\)](#)). Including vaccine-associated deaths unrelated to COVID19 would lengthen the perfect vaccine protection period required to compensate for excess mortality during the initial vaccination period. Here, analyses focus on associations between weekly vaccination rates ([ourworldindata.org](https://ourworldindata.org)) and weekly age-specific total mortalities for

22 European countries (euromomo.eu) in January-May 2021. Total mortality includes but is not restricted to COVID19 mortality.

**Weekly total mortality in European countries.**

Weekly total mortalities do not differentiate between mortality of vaccinated and unvaccinated, hence results from analyses presented here describe vaccination effects at population level, not that of individuals. Previous analyses at individual level did not include information on vaccine adverse effects unrelated to COVID19. Effects detected at the level of total mortality would include effects of vaccination unrelated to COVID19. This is because age-specific total mortality does not differentiate between different death causes. Associations between vaccination rates and total mortality include deaths unrelated to COVID19, and could therefore indicate effects of vaccination beyond COVID19-associated risks. Analyses here exclude data from Israel and the UK up to the 9<sup>th</sup> week included, because weekly vaccination percentages in these two countries are much higher than in other countries during that period. These are extreme points that cause extreme datapoint attraction in statistical correlation analyses assuming a normal distribution.

Figure 1.

**Z-scores by country**

Graphs of the weekly z-score at the national level in the EuroMOMO partner countries and subnational regions.

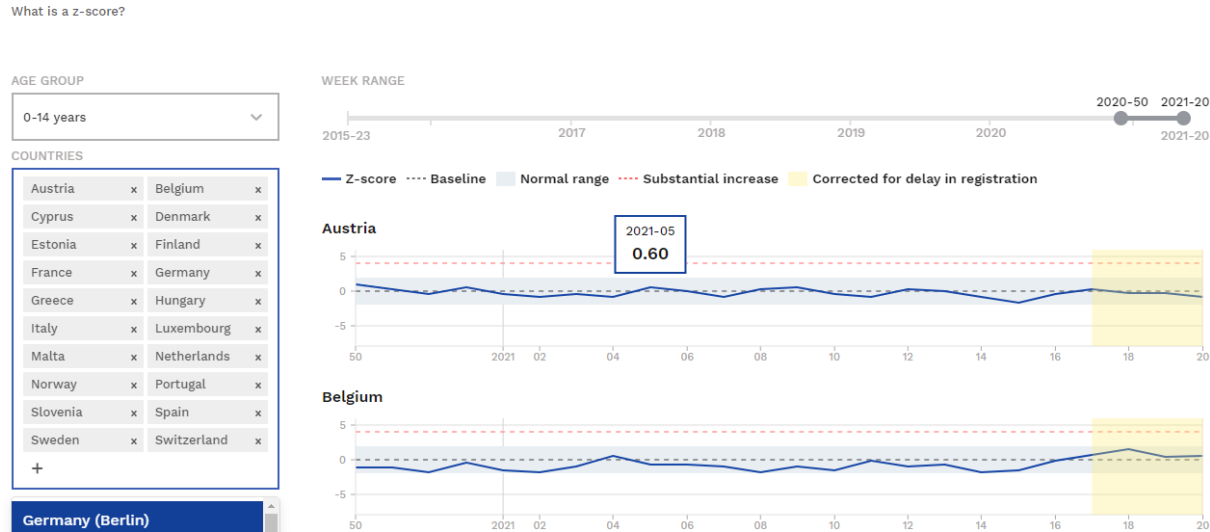


Figure 1. Time series of z-scores of weekly mortalities for age group 0-14 from Austria and Belgium from end 2020 to end of May 2021 (euromomo, accessed May 29 2021). Z scores set for each country average mortality at zero and standard deviation at 1. This standardizes data and enables comparisons between countries with different population sizes. The z-score for Austria for the 5<sup>th</sup> week of 2021 is +0.6.

Supplementary Table 1 shows vaccinated percentages for the whole population of 22 European countries, on a weekly basis, for January-May 2021, ourworldindata.org/covid-vaccinations accessed June 5 2021. Supplementary Table 2 shows weekly z-scores of mortalities for that period, separately for age groups 0-14, 15-44,45-64, 65-74, 75-84 and 85+ (euromomo.eu, also accessed June 5<sup>th</sup> 2021), as for the example in Figure 1.

**Weekly vaccination vs mortality, specific examples**

The principle of analyses done here is to test for correlations between weekly increases in vaccination percentages and mortalities that week or ulterior weeks. This is done by calculating Pearson correlation coefficients  $r$  between columns in Supplementary Table 1 and columns in Supplementary Table 2. When vaccination and mortality data are from the same week, the lag between vaccination and mortality is zero. When mortality data are from the next week, the lag is +1. Negative lags, meaning mortality preceding vaccination, are not examined, because here we test whether vaccination increases mortality. Therefore, mortality must be ulterior to vaccination. Figure 2A,B plots weekly vaccination rates and mortality as a function of the weeks numbered since 2021 started, and shows the principle of time lags for a specific country, Austria. Note that correlation analyses presented beyond Figure 2 consider vaccination for a specific week, and mortality for a week with lag 0 or >0, across countries (Supplementary Tables 1 and 2), not across time for a specific country as in Figure 2.

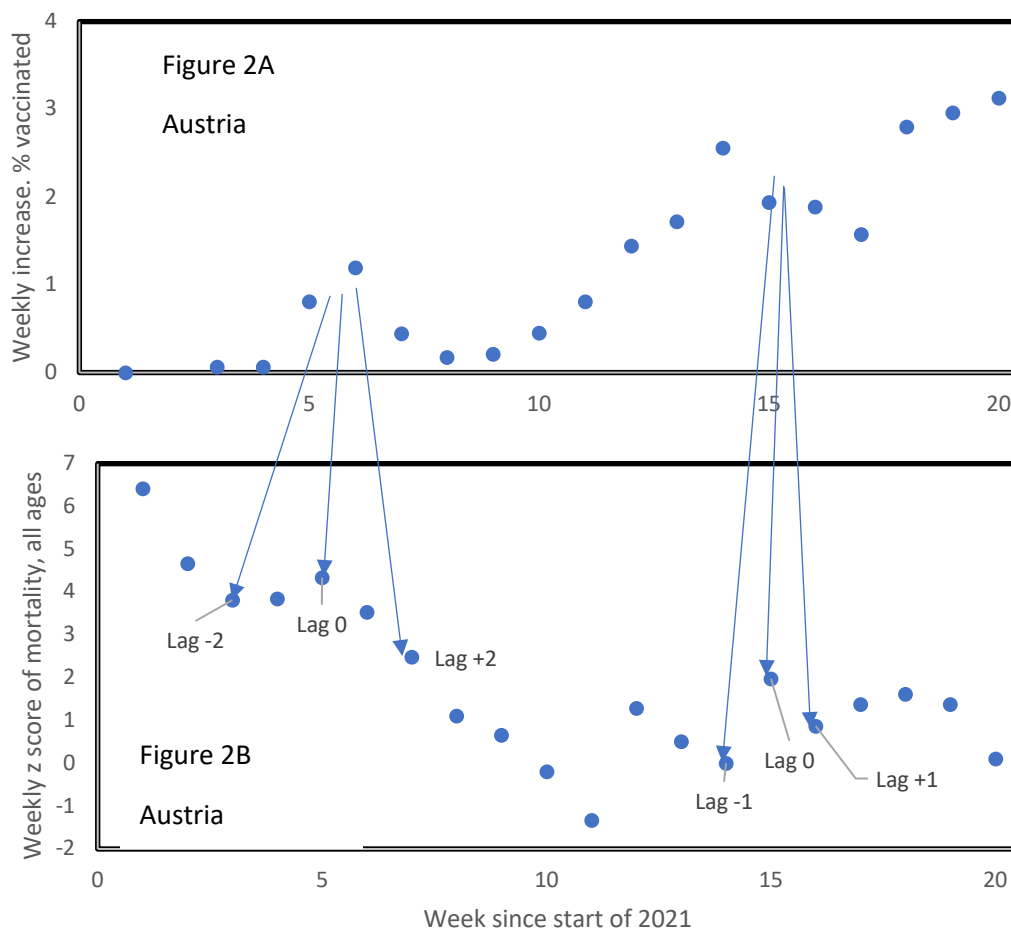


Figure 2. Weekly increase in % vaccinated (A) and z-scores for mortality for all ages pooled (B) for January-May 2021 in Austria.

Figure 3A plots mortalities for ages 15-44 on the 14<sup>th</sup> week of 2021 (starting March 31) as a function of the increase in vaccinated percentages two weeks before, on the 12<sup>th</sup> week of 2021, corresponding to lag +2, comparing different countries. The positive association ( $r = 0.592$ , two-tailed  $P = 0.0037$ ) indicates systematic vaccination-associated mortality increases within the 21 days following vaccination. Figure 3B plots mortality in the 15-44 age group on the 21<sup>th</sup> week of 2021 (starting May 18) as a function of the increase in the percentage of vaccinated for the 13<sup>th</sup> week of 2021 (starting March 24). The negative association ( $r = -0.573$ , two-tailed  $P = 0.0053$ ) indicates systematic decrease in mortality 8-9 weeks after vaccination, indicating vaccine protection.

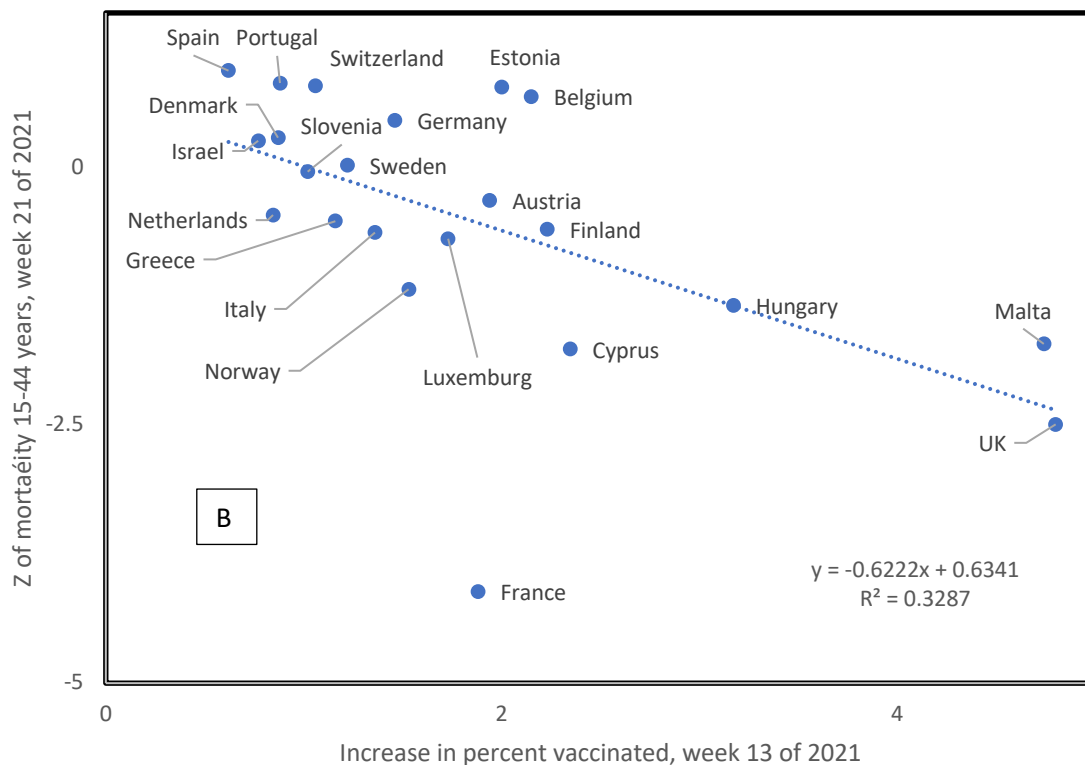
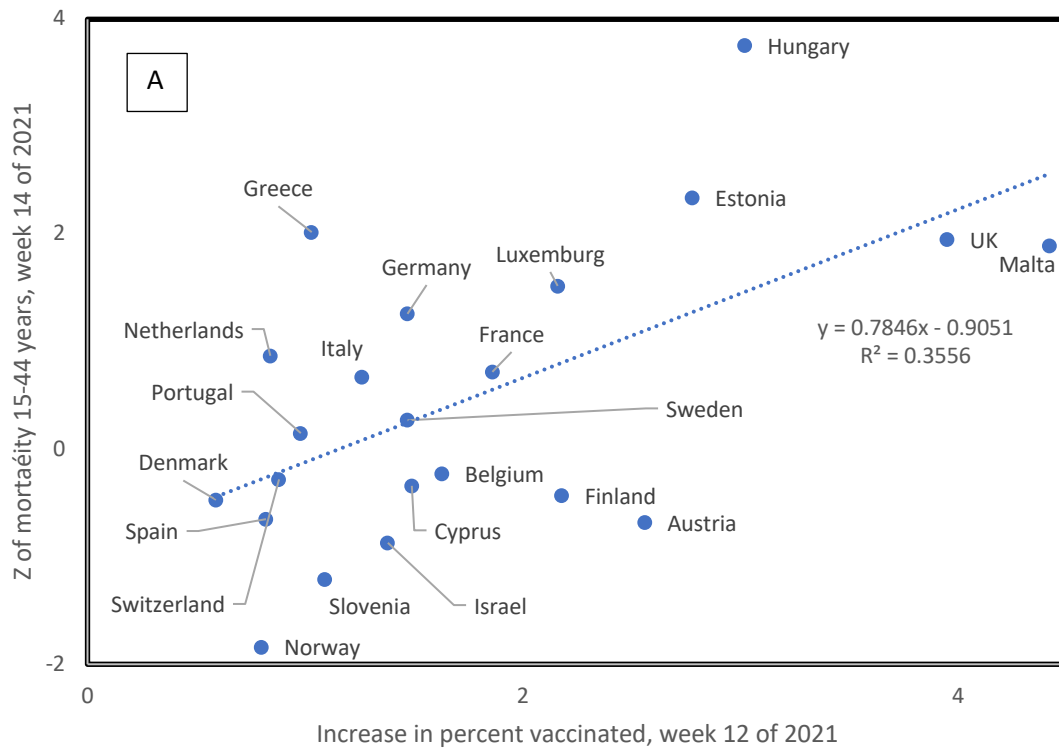


Figure 3. Z-score of weekly total mortality in the 15-44 age class as a function of weekly increase in percent vaccinated. A: Mortality during week 14 of 2021 as function of vaccination during week 12 of 2021. B: Mortality during week 21 of 2021 as function of vaccination during week 13 of 2021.

### Weekly vaccination vs mortality, overall patterns

Supplementary Table 3 presents  $r$ 's for lags 0 and  $>0$ . Adverse and protective vaccine effects correspond to  $r >0$  and  $r <0$ , respectively. There are several levels of analysis of Supplementary Table 3. First, positive  $r$ 's are a statistically significant majority of  $r$ 's for the age class  $<15$  (0-4: 147/231,  $P =$

0.0033). This means that overall vaccination increases mortality <15. Positive r's are a statistically significant minority of r's for age classes >44 (45-64:84/231, P = 0.0034; 65-74:69/231, P = 1.5x10<sup>-5</sup>; 75-84:67/231, P = 6.4x10<sup>-6</sup>; 85+:82/231, P = 0.0018) and nonsignificant minority for age class 15-44. Hence, the overall population level tendency indicates adverse vaccine effects on mortality below 15 and protective effects regarding mortality of those above 44.

The second analysis level of Supplementary Table 3 considers numbers of negative and positive r's with P < 0.05 for the different age classes. Note that P = 0.05 implies 2.5 % negative and 2.5 % positive r's with P < 0.05. From lowest to highest age classes, there are 1, 7, 3, 13, 6, and 4 negative r's with P < 0.05. Only for age classes 15-44 and 65-74, there are more r's with P < 0.05 than 2.5% of all correlations. From lowest to highest age groups, there are 10, 19, 8, 3, 0, and 2 positive r's with P < 0.05. There are significantly more r's with P < 0.05 than 2.5% of all r's for the specific age groups 0-14, 15-44 and 45-64. Hence, the overall number of positive r's with P < 0.05 is statistically significant evidence for adverse vaccine effects on overall mortality for these three age classes below age 65.

### Vaccine effects on mortality as a function of weeks since 1<sup>st</sup> injection

The third analysis level of Supplementary Table 3 accounts for time lags between vaccination and ulterior vaccination, for each age class. This can be done considering for each lag and age class percentages of positive r's, numbers of negative and positive r's with P < 0.05, mean r, and maximal absolute negative and positive r's. Figure 3 hints that most adverse vaccine effects occur shortly after vaccination, and protective effects later. This is in line with previous results obtained for individual-based analyses, where the transition from adverse (positive r's, more vaccination, more mortality) to protective effects (negative r's, more vaccination, less mortality) occurs between days 28 and 35 after 1<sup>st</sup> injection. Table 1 shows percentages of positive r's as a function of time lags between vaccination and mortality, followed by numbers of negative and positive r's with P < 0.05. Yellow and blue indicate overall adverse and protective vaccine effect, respectively. Adverse effects last longer for younger age classes. The first tendencies for protective effects occur on the 5<sup>th</sup> week after 1<sup>st</sup> injection in the elderly but might not occur for those below 15 over the whole 18-week period.

Lag N	0-14	15-44	45-64	65-74	75-84	85+
0 21	57.1 1 0	66.7*1 1	66.7*0 2	71.4* 0 2	61.9 0 0	76.2*0 0
1 20	45 0 0	70.6 0 3	60 0 2	70* 0 1	50 0 0	60.0 0 1
2 19	47.4 0 1	63.2 0 3	63.2 0 2	57.9 0 0	57.9 0 0	63.2 0 0
3 18	55.6 0 2	61.1 0 2	55.6 0 1	55.5 0 0	44.4 0 0	61.1 0 0
4 17	70.6*0 1	52.9 0 1	58.8 0 0	47.1 0 0	47.1 0 0	35.3 0 1
5 16	56.3 0 1	56.3 0 1	50 0 1	37.5 0 0	37.5 0 0	31.3 0 0
6 15	60 0 2	40 0 1	26.7 0 0	13.3* 0 0	20* 0 0	13.3*0 0
7 14	50 0 1	42.9 0 0	21.4 0 0	0* 1 0	0* 2 0	28.6 0 0
8 13	46.2 0 1	30.8 1 2	7.7* 1 0	7.7* 1 0	0* 2 0	23.1 2 0
9 12	66.7 0 0	16.7 1 0	8.3* 0 0	0* 3 0	0* 0 0	25 0 0
10 11	81.8* 0 1	27.3 0 1	9.1* 2 0	0* 2 0	0* 0 0	18.2*1 0
11 10	80* 0 0	30 1 0	10* 0 0	0* 2 0	10* 1 0	10* 1 0
12 9	88.9* 0 0	33.3 1 1	11.1* 0 0	0* 1 0	0* 0 0	0* 0 0
13 8	75 0 0	50 1 0	12.5* 0 0	12.5* 1 0	12.5*0 0	12.5* 0 0
14 7	71.4 0 0	42.9 0 1	14.3 0 0	0* 1 0	14.3 1 0	0* 0 0
15 6	100* 0 0	33.3 1 1	0* 0 0	0* 1 0	16.7 0 0	0* 0 0
16 5	80 0 0	20 0 1	20 0 0	0* 0 0	0* 0 0	0* 0 0
17 4	100 0 0	25 0 0	25 0 0	0 0 0	25 0 0	25 0 0
18 3	100 0 0	66.7 0 0	33.3 0 0	0 0 0	33.3 0 0	33.3 0 0
All 171	63.6*1 10	47.6 7 19	36.4* 3 8	29.9*13 3	29* 6 0	35.5* 4 2

Table 1. Percent positive Pearson correlation coefficients  $r$  between weekly vaccination % and weekly total mortality by age class and lag between vaccination and mortality, followed by numbers of negative and positive  $r$ 's with  $P < 0.05$ . Negative and positive  $r$ 's indicate protective (blue) and adverse (yellow) vaccine effects on total mortality, respectively. For 50%, colour code follows mean  $r$ . For equal numbers of negative and positive  $r$ 's with  $P < 0.05$ , comparisons between absolute values of minimal and maximal  $r$ 's determine the colour code.

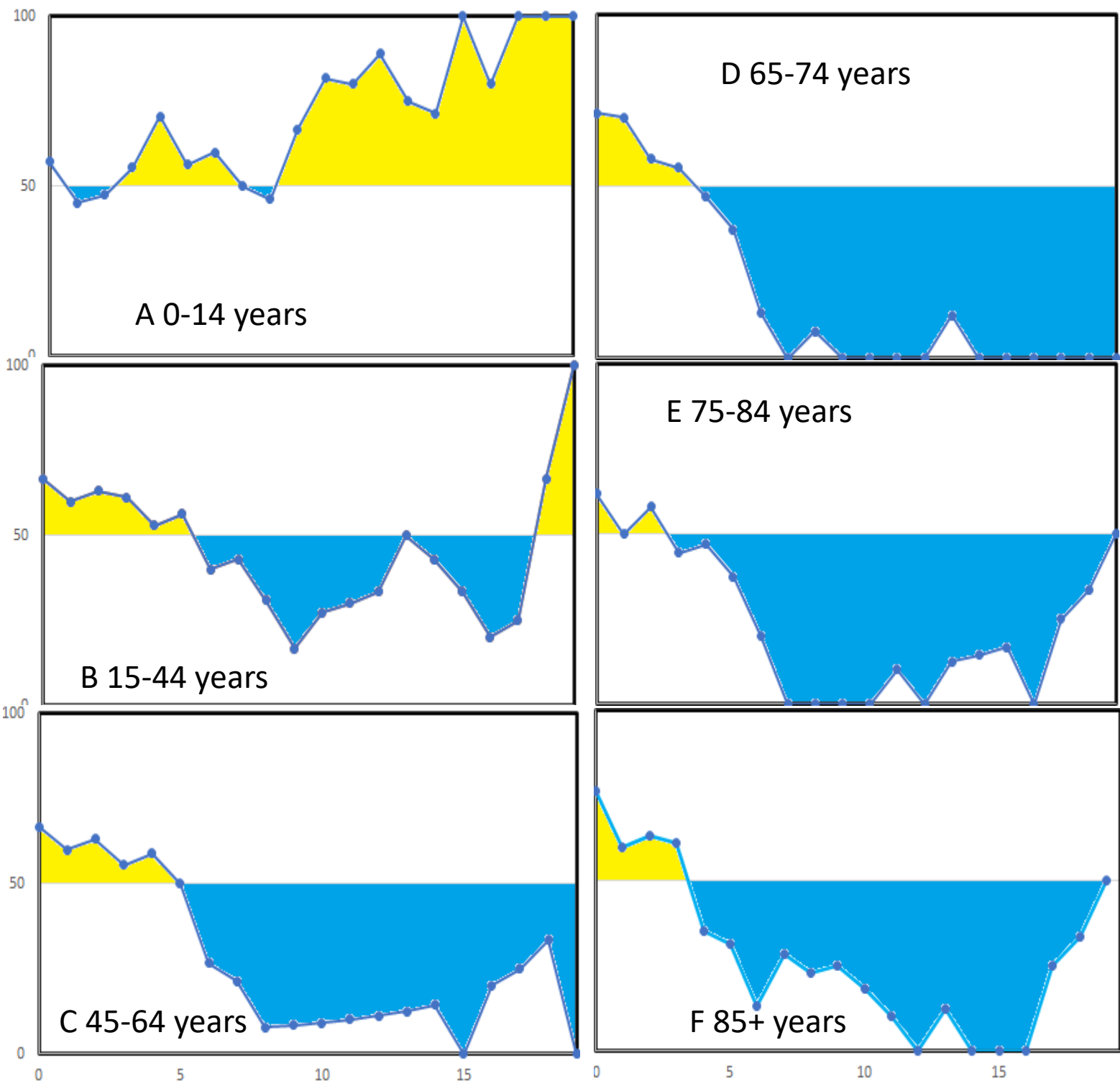


Figure 3. % positive associations between weekly % vaccinated and weekly mortality from Table 1 as a function of week lag between vaccination and deaths for six age groups. Yellow indicates adverse vaccine effects associated with deaths, and blue indicates protective vaccine effects.

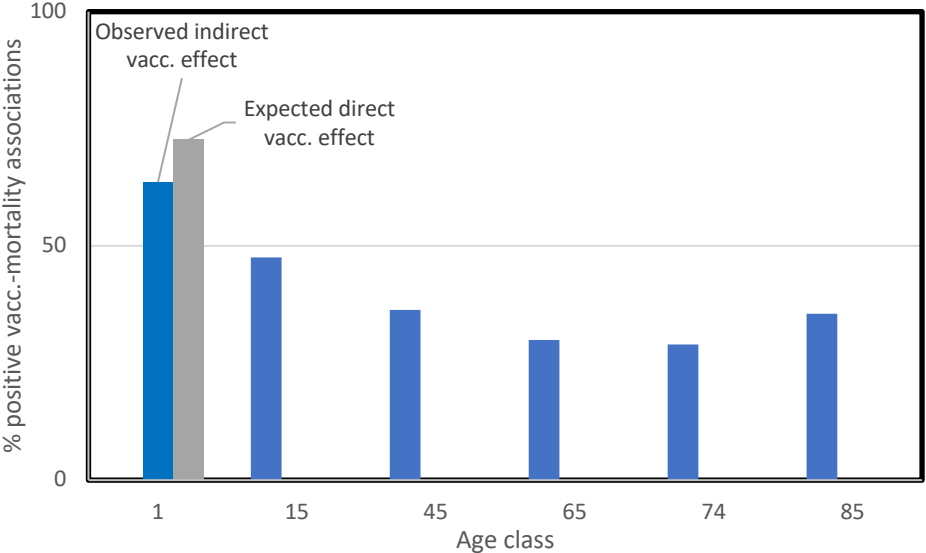


Figure 4. Percent positive r for associations between weekly percentage of vaccinated and weekly mortality, for each age class. Blue, observed values. Gray, expected value for children if vaccinated using extrapolation from ages above 14.

**Discussion**

Results indicate vaccine protection for those above 14 after an initial period of 4 weeks of adverse effects. Previous analyses of adverse effects of vaccination at individual level showed that in order to compensate for this initial adverse effect, perfect vaccine protection needs to last about 700 days. These calculations do not include adverse effects unrelated to COVID19, which would even lengthen the required compensation period. The fact that we know that vaccine protection is far from perfect stresses even more that the cost-benefit bottom line disfavours vaccination also for ages where Table 1 and Figure 3 show long periods with overall vaccine protective effects, in blue. For those below 15, there are no protective effects.

Overall patterns suggest adverse effects of COVID19 vaccination for the younger age classes. The almost total absence of evidence for protective effects in those < 15 years is not surprising, because these are not vaccinated. However, for that same reason, one should also not see any adverse effects, and this is not the case. For ages 0-14 years, most r's are positive in 15 among 18-week lags, 83.3%, a statistically significant majority of weeks, P = 0.0038, sign test. This indicates persistent indirect adverse vaccine effects on total mortality of the unvaccinated, at least those <15 years. The indirect vaccine effects might be due to COVID19 vaccine shedding, which might affect particularly unvaccinated children. This suggests that children are particularly likely to develop adverse vaccination reactions. Most worrying is that adverse effects seem to increase over time. This does not exclude the possibility that vaccine shedding also affects unvaccinated adults of all ages. Such indirect vaccine effects are probably masked by direct vaccine effects on those vaccinated in those older age classes.

**Increasing vaccination by 1% causes an 8% increase in deaths for unvaccinated children below 15**

Results on z scores and correlation coefficients are abstract. The explanation below of results in Figure 5 explains how many deaths result of the suspected causal association between weekly increases in percentages of vaccinated people in the total population and mortality. Figure 5 plots mortality z scores for age class 0-14 for 22 European countries during the 13<sup>th</sup> week of 2021 as a function of the increase in the percentage of vaccinated during the 10<sup>th</sup> week in the same countries. The main difficulty for this is to translate z scores into actual numbers of deaths, and this requires the information and calculations described below.

The population of the 22 countries in analyses presented here is about 395 million people, approximately 80% of the total population of all countries at euromomo, about 493 million people. Not all countries in the analyses presented here are part of the European Union. Nevertheless, the statistic that in 2019, 15.2% of people in the EU were below 15 years old is a reasonable estimate for these 22 countries. This means that the countries in Figure 5 have about 60 million children under 15. The average baseline weekly number of children under 15 dying from any causes for all countries at euromomo.eu for January-April is 352.5 deaths, with a standard deviation estimated from the figure at euromomo.eu for that age group for all countries at euromomo.eu of about 27.75 deaths.

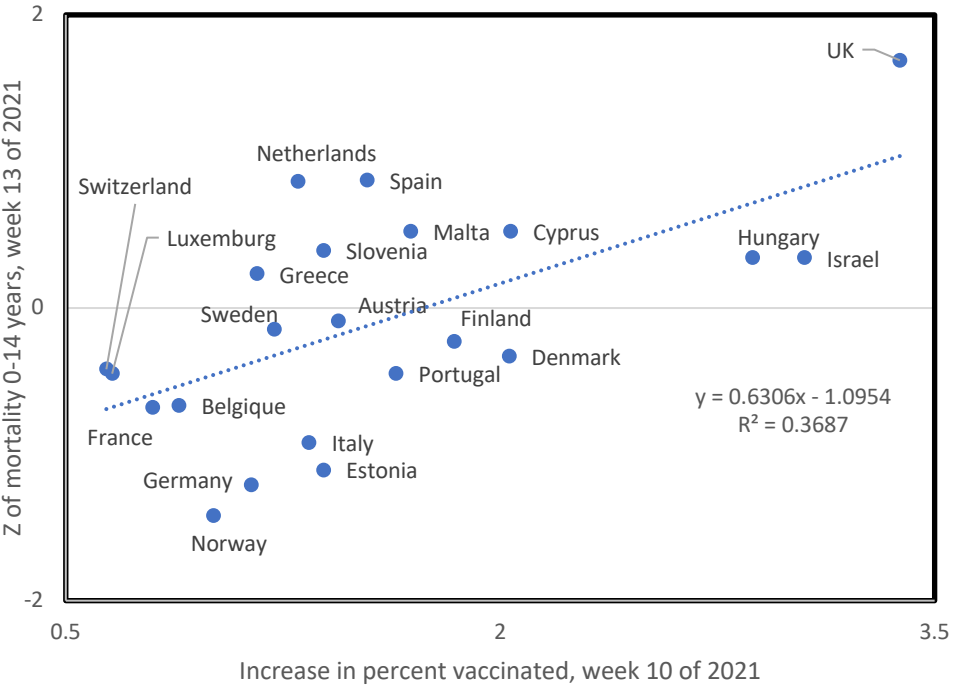


Figure 5. Z score of mortality in children 0-14 years old on week 13 of 2021 as a function of weekly increase in COVID19 1<sup>st</sup> dose-vaccinated on week 10 of 2021 for 22 European countries. Put at the level of the total population of these countries, the slope implies 29 unvaccinated children <15 died as a result of indirect vaccine effects per 1% increase in vaccination percentage of the total population, see text for explanations. The continuous line indicates Z score 0, meaning baseline deaths per week for that age group in all countries in euromomo.eu. The dotted line is the average Z score for the countries in this specific analysis, for that specific week.

Reported to the 22 countries used in analyses which represent 80% of that total population, this means an estimated 282 weekly children die per week, with a standard deviation of approximately 20.81 deaths. Z scores are defined so that Z = zero for the average and Z = 1 is that standard error. The meaning of Z = 3 in Figure 5 is that the actual value is three standard deviations more than the average. This is  $282 + 3 \times 20.81 = 344.43$  deaths of children under 15. In short, the slope in Figure 5 means that on average, an increase of 1% of recipients of the 1<sup>st</sup> COVID19 vaccine dose for the total



population increases the mean weekly death rate by 29 deaths, which is a  $100 \times 29 / 264 = 8.4\%$  increase in weekly deaths of children under 15 for that population pool. A weekly increase in vaccination of 2% doubles numbers of deaths presumed due to vaccination.

### **General overview**

Vaccine-induced increases in deaths remain unnoticed in the absence of adequate analyses and explanations. For the children, death rates are very low. A 2% weekly increase in vaccination means 58 additional deaths among 60 million children under 15, about 1 child per million. Extrapolating this effect to 100% vaccination would mean 5 dead among 100000 children due to indirect vaccine effects. These effects are likely to remain unnoticed on a large population spread across a whole continent. It seems likely that these indirect effects of vaccination, presumably due to vaccine shedding by surrounding vaccinated adults, predict greater direct effects of vaccination on children. Direct effects of vaccination will probably be more noticeable, even without adequate explanations and data analysis. Results here relate only to short term effects of vaccines. Long term effects due to vaccine-induced increases in rates of autoimmune diseases, cancers etc are not included but are likely, for all age groups.

Vaccination increases COVID19 infections. Hence, results reported above might not reflect direct effects of vaccination on total mortality, but might be indirect, due to vaccine-associated increased COVID19 cases that increase total mortality. This is tested by partial correlation analyses. Results of these partial correlation analyses are qualitatively similar to those above using regular correlation analyses in Table 1 and Figure 3. Hence, indirect effects of COVID19 vaccination on COVID19 infections is not the cause of associations between vaccination and increases in total mortality.

Indirect effects of the COVID19 vaccines, putatively vaccine shedding (of spike proteins and/or other molecules), increase total mortality in the unvaccinated, especially during the early period when vaccination has adverse effects on the vaccinated. The evidence for adverse vaccine effects on the unvaccinated after week lag 5 is particularly worrying and warrants to examine as soon as possible patterns for a longer period. Results suggest that vaccination and vaccine shedding increase non-COVID19 mortality, and this for the cocktail of COVID19 vaccines used across these 22 countries included in analyses presented here. Suspicions of indirect vaccine effects due to vaccine shedding could be tested without vaccinating the young. This could be done by comparing health indices in children living with two parents with no, one and two vaccinated parents. The fact that for those above 44 years, results from population-level analyses match those from individual-level analyses of vaccination effects is a strong indication that the results from those < 45 years are valid for evidence-based decision-making in relation to vaccinating the young.

### **Acknowledgements**

I thank Haim Yativ from nakim.org for advice and discussions.

**Supplementary Table 1.** Weekly vaccinated percentages, 1<sup>st</sup> dose at least, for 23 countries (ourworldindata.org) with matching mortality data at euromomo.eu. Ukraine is not included because less than 3% were vaccinated mid-May 2021. The outlier data for Israel and the UK are also excluded to avoid effects of extreme datapoints on correlation analyses. Note that association analyses use weekly increases in percentages, not cumulated percentages as presented below.

1st day Week	31-Dec 1	7-Jan 2	14-Jan 3	21-Jan 4	28-Jan 5	3-Feb 6	10-Feb 7	17-Feb 8	24-Feb 9	3-Mar 10	10-Mar 11	17-Mar 12	24-Mar 13	31-Mar 14	7-Apr 15	14-Apr 16	21-Apr 17	28-Apr 18	4-May 19	11-May 20	18-May 21
Austria	0.06	0.06	0.81	1.19	0.44	0.17	0.21	0.45	0.81	1.44	1.72	2.56	1.94	1.89	1.57	2.8	2.96	3.13	3.67	3.43	3.91
Belgium	0.01	0.12	0.68	0.97	0.78	0.33	0.32	0.25	0.61	0.89	1.3	1.63	2.15	2.11	2.14	4.09	3.54	3.26	4.23	2.8	3.88
Cyprus		0.45	0.48	0.53	0.54	0.43	0.57	0.85	1.22	2.04	1.25	1.49	2.35	1	1.01	1.82	2.9	4.9	5.74	5.35	4.95
Denmark	0.59	1.19	0.74	0.54	0.05	0.13	0.26	1.18	1.52	2.03	1.61	0.59	0.87	1.51	1.35	3.21	2.33	2.81	2.4	2.65	3.55
Estonia	0.19	0.41	0.65	0.4	0.33	0.41	0.75	0.79	1.24	1.39	2.02	2.78	2	1.96	2.5	2.4	2.06	2.08	2.57	2.13	2.56
Finland					2.31	0.4	0.5	0.93	1.32	1.84	2	2.18	2.23	2.4	1.82	3.55	4.34	3.02	4.53	2.91	3.26
France	0	0.07	0.44	0.88	0.84	0.47	0.53	0.48	0.44	0.8	1.66	1.86	1.88	2.48	1.92	2.7	2.35	2.38	2.88	5.03	2.61
Germany	0.24	0.38	0.6	0.57	0.4	0.36	0.47	0.6	0.77	1.14	1.5	1.47	1.46	1.91	2.07	3.84	3.74	4.35	4.56	4.15	3.26
Greece	0.02	0.23	0.43	0.51	0.83	0.63	0.74	0.57	1.05	1.16	1.58	1.03	1.16	0.54	2.12	2.46	2.94	2.14	2.68	3.09	4.11
Hungary				1.44	0.37	0.77	0.47	0.73	1.48	2.87	3.77	3.02	3.17	3.3	5.61	5	3.4	4.66	2.32	3.23	4.2
Israel	8.98	9.1	3.48	4.81	5.35	4.11	4.35	5.18	5.12	3.05	2.03	1.38	0.77	0.47	0.56	0.47	0.34	0.32	0.21	0.15	0.09
Italy	0.06	0.64	0.99	0.49	0.07	0.06	0.26	0.63	1	1.34	1.57	1.26	1.36	2.04	2.01	2.6	2.82	3	3.67	3.68	3.43
Luxemburg	0.19	0.09	0.24	0.58	0.48	0.43	0.39	0.89	0.75	0.66	1.16	2.16	1.73	1.94	2.48	2.95	2.55	2.13	4.13	4.06	3.66
Malta				3.74	1.28	0.92	1.23	1.7	2.24	1.69	3.67	4.42	4.74	6.71	4.91	3.77	4.7	4.67	5.95	5.77	4.08
Netherlands			0.325	0.385	0.8	1.11	1.01	0.97	1.22	1.30	1.2	0.84	0.85	1.585	2.495	3.55	3.56	3.16	3.16	3.84	2.81
Norway	0.04	0.35	0.46	0.55	0.54	0.66	1.23	1.08	0.92	1.01	1.24	0.8	1.53	2.42	1.72	3.37	3.36	2.76	1.93	1.62	0.53
Portugal	0.31	0.39	0.39	0.74	0.38	0.45	0.27	0.67	1.24	1.64	1.25	0.98	0.88	2.66	1.5	2.58	3.93	2.34	3.29	3.58	3.17
Slovenia	0.53	0.74	0.83	0.39	0.11	0.04	0.2	0.98	1.24	1.39	1.08	1.09	1.02	2.67	1.91	2.71	1.78	1.26	2.79	4.1	3.01
Spain		0.44	1.01	0.8	0.36	0.13	0.21	0.55	1.21	1.54	1.6	0.82	0.62	2.08	2.35	3.93	3.49	3.5	3.33	3.38	3.02
Sweden	0.09	0.24	0.555	0.895	0.83	0.53	0.44	0.57	0.84	1.22	1.61	1.47	1.22	1.605	2.685	3.24	3.46	3.715	3.33	2.65	2.75
Switzerland								5.5	0.6	0.64	0.94	0.88	1.06	1.48	0.95	2.09	2.6	1.79	3.61	3.26	3.59
UK		2.7	2.07	3.16	3.69	3.83	4.45	4.29	3.34	3.38	3.05	3.95	4.8	3.17	0.97	0.94	1.2	1.41	1.27	1.77	2.02

**Supplementary Table 2.** Weekly z-scores of age-specific mortalities from euromomo.eu.

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
0-14																					
Austria	-0.46	-0.86	-0.46	-0.86	0.6	-0.09	-0.86	0.26	0.6	-0.46	-0.86	0.26	-0.09	-0.86	-1.73	-0.47	0.25	0.25	-0.53	-1.52	-0.4
Belgium	-1.49	-1.8	-0.93	0.54	-0.66	-0.66	-0.93	-1.8	-0.93	-1.5	-0.16	-0.93	-0.67	-1.8	-1.5	-0.16	0.75	1.18	0.08	1.18	0.49
Cyprus	-1.63	0.58	-1.64	-1.64	-1.64	0.56	-1.65	-1.65	-0.28	-1.62	-1.66	-1.62	0.52	0.69	-0.15	-1.57	-1.57	0.67	-1.57	-1.58	-0.17
Denmark	0.78	-0.34	-0.97	0.24	1.05	-0.65	-0.96	-0.64	1.8	0.79	-0.59	0.25	-0.33	1.09	0.28	0.56	1.11	-0.26	0.63	0.64	-0.03
Estonia	-1.19	-1.18	-1.18	0.01	0.72	0.04	0.05	0.07	2.47	0.85	0.14	-1.12	-1.11	0.89	0.17	-1.12	-1.1	0.26	0.35	0.22	0.19
Finland	0.22	-0.76	0.22	-0.24	-0.75	0.22	-0.75	0.22	-0.75	-2.4	-0.74	-0.23	-0.23	0.25	0.25	-2.34	-0.74	-0.75	-0.39	-2.33	-2.33
France	-1.59	-1.13	-1.94	-1.13	-3.04	-1.13	-1.71	-1.59	-0.24	-0.35	-1.94	0.92	-0.68	-1.59	-0.47	-0.69	0.6	-0.8	-2.18	-3.41	-4.2
Germany	0.07	-0.91	-0.69	1	-1.24	-2.29	-0.91	-0.58	1.4	-1.35	-0.46	-1.35	-1.21	-2.02	-0.77	-0.41	-0.62	-0.09	0.04	-0.62	-0.97
Greece	-0.12	-0.78	-0.12	0.77	0.2	0.91	-0.42	-0.59	0.65	0.22	0.66	-1.31	0.23	0.81	-0.37	-0.58	-1.26	-1.5	0.64	-1.02	-1.02
Hungary	-1.21	0.55	-1.2	0.24	0.87	1.46	0.88	0.04	-0.95	-0.57	0.89	-0.38	0.34	-0.14	1.26	-0.32	-0.04	0.56	-0.05	-0.22	3.94
Israel	-1.83	-1	-1	0.65	0.43	0.43	0.44	-0.48	-0.01	-0.72	2.63	0.22	0.34	-0.1	0.65	0.55	0.32	0.48	0.98	0.49	-0.18
Italy	0.83	-0.63	-1.06	-0.21	-0.19	0.21	-1	-0.98	-0.5	-0.93	-1.43	0.8	-0.92	-2.04	1.62	-1.22	-0.29	0.62	0.23	0.26	-0.33
Luxemburg	-0.44	1.94	0.29	-0.44	0.29	-1.67	-0.43	-0.43	0.9	0.2	-0.43	0.18	-0.45	0.22	0.34	0.95	0.24	0.25	-0.42	-0.5	0.8
Malta	-1.2	-1.2	0.35	-1.2	-1.2	-1.2	-1.2	0.65	0.55	0.54	-1.03	-1.03	0.52	0.55	-1.01	0.54	-1	-1	-1.02	-1.08	-1.16
Netherlands	-0.57	-0.57	-0.57	-0.57	-1.09	1.3	1.3	1.3	-0.31	-1.36	0.63	0.4	0.86	-1.14	0.34	0.1	-0.14	-0.3	0.25	-1.02	-0.45
Norway	-1.37	-1.38	-0.68	-0.69	-1.03	-1.4	-2.61	-1.4	-2.64	0.81	0.87	-0.94	-1.42	-1.84	-0.49	-0.42	-0.35	-0.98	-0.58	-0.82	-0.77
Portugal	-1.22	1.47	-0.82	-0.82	0.24	-0.45	-0.82	-2.14	0.24	-0.09	-1.65	-0.09	-0.45	-0.39	-1.62	1.27	-2.12	-0.39	0.32	0.32	-1.29
Slovenia	-0.29	0.97	-1.47	-0.3	0.39	-0.3	0.39	0.39	-1.46	0.39	0.39	0.39	0.39	-0.3	0.39	-0.1	-0.1	-0.08	0.38	-1.46	-1.46
Spain	0.67	0.16	1.01	-0.01	1.65	1.34	0.35	0.18	0.69	0.53	1.03	1.36	0.87	0.72	-1.05	0.05	0.4	1.07	2.2	1.65	1.87
Sweden	-1.63	0.09	1.43	-1.13	1.44	0.46	0.11	1.13	0.11	-0.26	-0.26	-0.13	-0.15	0.83	0.13	0.14	1.17	0.5	0.24	0.63	0.23
Switzerland	0.97	1.26	-1.07	-0.32	0.67	-0.32	-1.96	0.03	1.55	-0.47	1.38	1.04	-0.42	0.31	0.32	-0.69	-1.07	0.52	0.11	0.86	0.32
UK	0.29	-0.27	1.3	1.21	-0.58	0.27	1.71	0.53	0.47	-0.63	0.76	-0.48	1.69	-1.01	0.6	-1.61	1.77	-0.99	-0.17	-0.06	-0.42
15-44																					
Austria	0.32	-0.12	0.9	0.46	0.59	1.56	1.67	0.07	1.05	-0.16	-0.52	-1.39	-0.16	-0.68	0.78	-1.14	1.32	-2.74	0.58	0.07	-0.32
Belgium	-1.55	0.15	0.05	0.95	0.41	0.31	0.88	-0.73	-0.37	0.58	1.05	-0.23	1.53	-0.23	-0.64	1.41	1.98	0.96	0.41	0.28	0.69
Cyprus	-0.15	0.77	-1.32	0.77	0.33	0.33	-0.69	-2.45	0.32	0.32	1.2	-0.18	0.31	-0.34	0.6	-0.22	-0.99	-1.02	0.49	0	-1.76

Denmark	-0.56	-0.57	0.01	-0.01	0.34	0.87	-1.77	0.26	-0.36	-0.4	0.82	1.02	-0.86	-0.47	0.07	1.32	-1.02	0.28	0.79	-1.5	0.29
Estonia	1.91	0.46	0.77	0.14	1.92	1.36	-1.33	0.45	0.11	0.1	0.41	0.06	0.69	2.34	-0.75	0.58	-0.43	1.45	2.11	0.92	0.78
Finland	-0.64	0.03	0.41	-0.48	-0.21	-0.61	-0.21	-1.48	0.04	-0.64	-1.7	-0.53	1.07	-0.43	-0.6	-1.04	-0.92	-0.18	-0.48	-0.69	-0.6
France	1.34	0.1	1.09	-0.56	-1.58	-2.07	0.64	-1.85	-0.48	-1.02	-0.21	0.97	0.45	0.72	0.46	0.98	-1.01	0.46	-1.69	-2.31	-4.11
Germany	-0.42	0.82	0.6	0.75	1.8	-0.66	-0.97	0.24	1.71	0.52	0.54	-0.67	0.4	1.26	0.95	2.31	0.49	2.85	0.93	-0.29	0.46
Greece	-0.06	0.34	0.48	1.94	0.26	-0.37	0.67	1.43	-0.21	-0.34	0.61	0.22	2.29	2.02	1.37	-0.56	1.99	1.46	0.37	0.89	-0.52
Hungary	1.96	-0.75	0.37	-0.6	1.89	0.33	1.45	1.1	0.21	5.07	3.33	8.32	7.38	3.76	4.67	2.8	2.68	2.58	-1.12	-1.62	-1.34
Israel	-0.19	-0.61	-2.75	-0.24	0.51	0.16	-0.2	0.09	-0.93	-0.47	2.99	-1.54	-1.49	-0.87	0.66	0.45	5.73	0.23	-1.01	0.15	0.26
Italy	1.59	1.81	0.78	2.21	2.4	0.32	-0.4	3.28	1.92	1.27	2.23	2.18	0.36	0.67	1.64	1.36	1.7	0.79	0.36	1.56	-0.63
Luxemburg	0.3	2	0.96	2.04	-0.38	-0.38	0.99	0.36	-0.4	0.96	0.38	0.34	0.29	1.52	0.34	0.35	0.37	0.73	0.17	0.12	-0.69
Malta	-1.74	-0.56	-1.73	-0.56	-0.56	-1.74	-0.57	1.24	1.25	0.2	0.2	0.21	-0.53	1.89	0.29	1.41	0.4	0.4	0.39	0.22	-1.71
Netherlands	-0.3	-0.89	0.2	-0.77	0.2	0.08	0.2	-0.9	-0.65	-0.05	-0.65	-0.9	0.19	0.87	-0.18	0.06	-0.42	0.45	0.93	0.15	-0.46
Norway	-1.21	-0.58	-0.61	-0.8	-0.52	-0.86	-2.64	-1.92	-2.13	-1.97	-1.28	-1.15	-1.38	-1.84	-0.43	-1.35	-0.69	-0.81	0.04	-0.66	-1.18
Portugal	0.75	3.27	2.53	2.54	1.79	0.3	-0.95	-0.55	1.19	-0.66	-1.06	-0.64	-0.36	0.15	-0.35	-1.46	-3.19	0.89	0.66	0.15	0.82
Slovenia	0.56	0.27	-0.35	2.16	0.56	0.27	0.26	-0.06	-0.39	-0.75	-0.1	-0.12	-0.36	-1.21	1.04	0.73	0.71	0.69	0.4	1.84	-0.04
Spain	0.91	1.67	2.47	0.37	0.3	1.07	0.93	0.64	1.68	1.47	1.54	-0.81	1.74	-0.65	0.53	-0.02	-0.59	1.29	0.95	1.64	0.94
Sweden	-0.93	-0.28	0.79	0.47	0.3	1.03	-1.02	0.09	-0.57	0.04	-0.63	-0.49	1.54	0.27	-0.57	-0.1	0.05	-0.24	-0.14	-0.7	0.02
Switzerland	-1.34	0.97	1.15	-0.3	2	0.98	-0.51	1.49	-0.55	-1.24	0.71	0.72	1.52	-0.28	0.21	0.59	-0.25	1.25	-0.22	-1.13	0.79
UK	7.25	5.6	7.2	6.7	4.79	1.52	3.69	-0.99	0.36	0.56	-1.91	1.01	1.04	1.95	0.21	-1.26	-0.45	-2.36	-1.94	0.39	-2.49
45-64																					
Austria	-0.49	0.93	-0.28	0.17	0.56	1.01	0.04	0.38	-0.62	0.44	1.21	0.28	1.06	0.56	1.23	1.84	1.44	0.16	0.46	-1.25	-0.45
Belgium	0.04	0.18	0.26	0.68	-0.66	-1.81	-0.17	-0.11	-2.36	-0.94	0.05	-0.85	3.53	2.93	1.88	0.61	1.43	3.56	1.53	1.69	1.24
Cyprus	0.24	-0.75	-1.39	-0.76	0.37	-0.57	-0.17	0.23	-0.53	-0.51	-0.27	0.17	-0.2	1.12	2.16	1.06	0.28	0.12	0.41	-1.25	-2.05
Denmark	1.65	-0.23	-0.67	0.12	-0.66	0.69	0.91	-1.46	-1.69	-0.25	0.71	-0.77	-0.17	-1.14	-0.62	-0.84	0.41	-0.17	0.01	0.01	0.45
Estonia	0.9	-0.4	0.81	-0.86	-0.45	0.68	1.08	0.18	1.08	3.54	-0.29	0.94	2	1.6	3.28	0.69	2.2	0.33	2.03	1.55	1.9
Finland	-0.62	0.73	1.65	-2.05	-0.3	-0.35	1.18	-0.03	-0.47	0.24	0.46	-0.35	0.46	-1.37	-0.74	1.4	-0.1	0.1	2.11	0.29	-0.52
France	2.99	0.63	1.75	2.37	2.01	3.11	2.13	1.67	1.44	1.76	2.14	2.34	2.95	2.88	3.94	5.23	4.04	4.08	1.62	1.62	-6.32
Germany	5.87	6.08	4.76	2.92	3.76	3.23	2.87	-0.18	0.01	1.24	-1.6	0.88	1.29	1.79	3.37	3.69	5.14	4.01	0.13	0.13	0.98
Greece	3.38	2.68	1.93	-0.13	1.55	0.53	-0.63	0.73	3.04	4.4	0.86	3.98	3.1	2.86	3.95	4.13	2.69	2.37	2.93	1.17	0.96
Hungary	4.06	1.09	2.19	1.15	2.37	0.4	-0.33	3.15	5.09	10.83	12.68	14.87	16.08	14.99	9.62	7.3	3.38	2.95	-2.11	-2.91	-0.99

Israel	1.11	1.06	1.39	2.9	2.56	1.8	0.15	1.44	1.13	-0.67	0.71	0.14	-0.77	-0.24	0.43	0.23	-0.51	0.08	2.09	-0.04	-0.02
Italy	2.84	3.35	3.14	3.37	1.14	2.2	3.31	3.03	2.99	0.64	2.93	4.22	3.14	3.04	3.08	2.14	3.63	1.06	0.53	0.81	-0.39
Luxemburg	1	0.78	0.13	0.98	0.35	-0.33	0.58	-0.33	0.15	2.03	1.42	1.15	-0.92	0.45	-0.73	0.72	0.26	-0.23	-0.85	1.28	1.13
Malta	-0.34	-0.67	-0.66	0.86	-0.32	0.02	0.63	0.66	2.63	1.36	0.14	0.49	0.84	0.09	1.08	0.18	0.22	-0.79	0.23	0.36	-0.86
Netherlands	1.26	0.79	1.05	0.5	-0.71	0.33	3.18	0.53	1.33	1.2	1.08	0.25	0.99	2.65	2.62	3.22	2.48	1.43	5.26	1.94	1.91
Norway	-1.66	-0.26	1.29	0.45	-0.66	-0.54	0.5	-0.28	-2.22	-0.18	-0.75	0.36	-0.28	-0.89	1.22	-0.72	-0.06	0.19	0.58	-0.1	-0.31
Portugal	7.13	9.37	9	6.1	5.32	3.11	3.6	1.12	1	-1.35	1.07	-0.12	-0.26	0.72	-1.04	-0.55	-0.3	-0.1	0.14	-1.66	1.34
Slovenia	2.26	2.12	2.11	1.66	2.11	0.03	0.04	1.25	1.51	0.71	1.47	-0.23	0.54	-2.28	1.04	1.42	0.27	-0.1	0.83	0.12	-0.15
Spain	6.06	7.2	8.8	9.72	7.56	4.17	4.75	3.48	1.4	0.46	-0.31	2.03	0.48	0.4	0.2	1.03	2.16	1.42	0.25	1.73	3.65
Sweden	1.04	-0.55	1.02	-0.11	-0.27	0.65	-1.15	0.18	-0.83	1.48	1.32	1.3	0.98	0.33	1.63	1.84	1.71	3	1.56	2.12	0.95
Switzerland	1.16	2.08	0.95	1.25	-0.58	0.91	-1.02	-1.49	-0.62	0.28	-0.95	-0.58	-1.94	0.66	0.1	0.71	0.37	-1.69	0.35	-1.53	0.04
UK	13.63	16.85	16.07	13.82	11.13	10.64	7.99	4.66	3.14	2.47	1.48	-0.15	-0.41	0.21	0.22	-0.31	-0.26	-0.02	1.2	-0.23	-4.53
65-74																					
Austria	2.24	3.29	3.44	1.31	1.1	0.24	1	-0.27	0.72	1.77	1.61	2.22	1.56	1.42	1.6	2.78	2.55	1.78	1.95	1.3	-0.29
Belgium	0.74	-0.47	1.05	0.9	-0.03	-0.53	0.34	0.19	-0.32	-0.36	-0.12	0.51	1.68	2.99	1.94	3.23	0.85	1.4	1.99	1.53	1.55
Cyprus	0.19	-2.73	-1.54	1.54	-0.48	-0.98	-1.9	0.42	-0.56	0.52	0.06	-1.8	0.18	-0.22	-0.38	0.04	-0.31	2.15	0.93	-2.45	-3.2
Denmark	0.9	2.32	1.73	2.62	1.41	0.52	-0.76	-3.73	-1.44	0.74	-0.3	-0.71	-0.71	-0.62	-0.85	0.32	-0.42	1.89	-1.12	0.74	-0.44
Estonia	1.69	2.57	2.46	0.93	1.15	1.7	0.12	3.1	2.86	2.84	3.33	3.32	4.04	2.94	3.25	3.78	1.52	1.83	1.19	1.62	0.55
Finland	-2.21	1.5	-0.37	1.61	0.6	-2.28	1.17	-0.05	-0.2	-0.6	0.36	0.38	0	0.89	-1.86	-0.29	-1.97	0.92	0.55	-1.7	-1.87
France	2.4	3.83	3.65	3.9	3.88	3	5.46	1.97	2.43	4.03	5.33	3.93	5.65	5.88	5.27	8.57	6.84	6.84	2.5	0.77	-6.79
Germany	7.53	8.1	7.79	6.86	5.36	4.57	4.13	2.46	1.82	2.71	2.65	2.85	3.8	5.24	6.31	7.06	6.18	5.95	4.55	3.36	3.95
Greece	0.55	0.8	2.35	1.64	1.31	0.75	1.59	1.9	2.84	2.27	4.17	3.42	4.51	3.65	3.68	2.67	2.9	4.67	1.33	2.8	-0.3
Hungary	2.87	4.61	3.26	1.66	1.54	2.59	3	4.33	6.85	10.65	15.19	20.18	19.03	16.92	10.02	5.72	3.36	1.36	-0.24	-5.58	-4.49
Israel	4.02	2.65	4.75	2.11	3.62	3.34	2	1.26	1.19	0.99	0.43	1.7	1.92	2.84	0.38	0.21	-0.18	-0.41	-0.36	0.97	0.17
Italy	3.92	4.92	3.61	4.75	4.21	2.57	5.05	2.32	3.82	4.85	6.1	5.45	6.1	7.78	5.54	6.36	4.5	3.32	2.39	2.68	1.7
Luxemburg	1.24	-1.42	-0.44	-0.9	0.66	0.48	0.92	-1.34	0.15	0.85	3.84	-0.44	0.81	0.2	0.5	-0.86	0.85	0.65	-0.88	1.55	-0.17
Malta	1.45	0.42	1.22	0.6	-0.05	0.37	1.94	0.58	1.64	0.79	3.38	2.31	-0.79	-0.94	0.27	-0.93	-0.68	-1.15	0.32	0.06	0.13
Netherlands	3.26	1.94	1.43	2.79	2.26	2.29	2.3	-0.61	0.17	1	0.76	0.38	1.83	1.74	3.41	1.83	1.74	1.58	0.8	2.02	-0.73
Norway	-1.44	0.09	0.8	0.71	-0.74	-1.68	-1.9	-1.53	-2.04	-0.25	-0.94	2.13	-1.49	-1.4	-0.83	-1.55	0.37	-1.34	-0.84	-0.8	-0.75
Portugal	8.45	9.71	11.75	12.89	9.43	6.34	2.85	2.54	2.08	1.27	-0.05	-1.57	-1.08	0.49	-0.05	-0.84	0.21	0.04	-0.17	-1.01	0.59

Slovenia	2	1.48	2.66	1.68	1.88	-0.7	-0.09	0.88	0.2	0.25	-0.47	0.68	2.37	0.73	0.19	2.78	0.64	2.45	0.46	0.77	-0.27
Spain	4.22	7.65	9.9	9.46	7.56	4.95	4.75	7.75	2.67	2.36	0.52	1.66	0.02	1.03	1.86	1.06	0.67	3.1	2.71	1.34	4.29
Sweden	1.23	2.17	3.05	0.08	-0.42	-0.65	0.55	-0.82	1.33	-0.72	-0.47	0.19	-0.88	0.38	-0.39	0.75	0.51	0.55	1	0.06	0.18
Switzerland	2.8	1.88	0.1	1.25	0.83	-1.08	-1.26	0.18	-1.32	0.71	-0.07	-1.6	-0.27	-0.5	-0.53	0.18	-0.9	-1.46	-1.19	-0.05	0.18
UK	14.26	16.81	16.25	13.81	9.45	7.47	6.54	1.59	0.43	0.51	-1.64	-2.29	-2.43	-2.45	-1.13	-0.86	-1.86	-0.58	-2.43	-1.41	-10.35
75-84																					
Austria	5.01	3.58	3.05	3.74	3.3	2.37	1.17	0.53	0.42	1.2	0.9	0.88	3.05	2.79	2.33	1.7	0.83	1.28	0.97	-0.32	-0.6
Belgium	3.52	2.87	2.94	2.87	2.05	-0.13	1.71	-0.46	0.49	1.63	-0.23	1.55	1.3	2.46	2.24	3.22	2.87	2.37	2.89	3.12	4.76
Cyprus	1.82	1.29	1.72	1.22	0.22	-0.31	0.57	-0.73	-1.73	-1.15	-1.29	-0.14	-0.25	0.19	1.22	-0.46	0.19	0.25	-2.63	-1.21	-2.53
Denmark	2.33	1.87	3.39	1.15	1.71	0.28	-0.78	-1.3	-2.2	-0.53	-1.62	0.18	-1.15	-1.75	-0.37	0.4	-1.7	0.65	-0.7	0.57	1.22
Estonia	1.54	3.01	2.51	0.19	-0.06	1.3	0.99	1.49	2.69	2.62	3.51	3.73	3.7	2.68	2.35	1.92	-0.49	1.87	2.28	0.39	1.31
Finland	-0.34	-0.97	1.21	0.15	-0.18	-0.49	0.87	-1	-0.42	-1.23	-0.41	-1.79	-1.99	-0.68	-0.07	-0.17	0.73	1.11	0.67	-1.68	-1.58
France	5.78	6.33	8.21	7.87	9.07	7.63	6.93	6.67	6.5	5.72	8.03	7.4	9.96	8.78	8.95	9.69	8.87	6.9	4.21	3.35	-1.95
Germany	8.35	7.64	6.57	3.73	1.5	0.72	-0.04	-2.25	-3.29	-3.9	-3.55	-4.13	-2.86	-2.3	-1.32	2.64	0.76	-1.34	-3.12	-3.36	-3.34
Greece	1.17	0.92	1.24	1.26	0.81	0.8	1.73	2.22	2.5	1.52	2.91	2.65	3.65	2.72	2.87	1.57	2.42	2.44	0.34	1.35	1
Hungary	3.84	4.28	2.86	1.72	1.38	2.31	2.67	3.81	4.45	6.97	10.88	11.41	10.29	8.6	4.7	4.35	2.08	-0.3	-1.38	-4.43	-3.51
Israel	3.13	3.44	4.28	4.22	3.05	2.7	1.64	0.62	0.05	0.97	0.84	0.7	0.08	1	-0.55	-1.35	-0.37	-0.51	0.7	0.9	0.91
Italy	6.19	6.97	6.37	5.49	4.45	2.96	4.13	2.44	4.88	3.75	5.75	5.46	6.82	6.19	5.2	6.2	4.22	1.98	2.35	2.94	0.6
Luxemburg	-0.54	0.79	0.98	0.8	0.45	1.89	1.22	0.14	-0.03	1.72	0.04	-0.54	0.11	1.02	-0.71	1.11	2.21	1.2	0.6	0.56	0.51
Malta	1.44	1.24	4.12	1.53	1.2	2.03	2.53	1.44	3.81	4.66	1.44	1.15	0.66	-0.51	-0.04	-0.17	-0.67	2.2	0.91	0.4	1.28
Netherlands	7.99	5.75	5.24	4.11	5.15	3.88	2.82	2.84	1.82	1.88	0.84	2.37	4.5	3.07	3.24	2.73	2.94	3.19	1.55	3.52	-0.63
Norway	0.92	0.51	0.22	0.71	-1.71	0.23	-1.4	-3.35	-2.02	-1.73	-0.59	-2.78	-1.02	-0.56	-0.99	-1.92	-2.04	-1.34	-0.57	-1.21	-1.31
Portugal	10.77	16.16	19.14	17.75	12.68	9.44	4.94	2.79	1.87	-0.07	-0.61	-0.26	1.34	-0.79	-0.37	-2.22	-1.1	0.3	-0.7	-0.43	-0.03
Slovenia	4.67	4.84	3.57	2.06	3.67	2.42	0.65	1.18	1.1	1.97	0.71	2.27	1.74	2.44	1.82	1.26	-0.1	-0.42	1.16	0.11	-1.49
Spain	8.41	13	18.4	16.84	13.53	9.15	5.24	4.62	1.79	2.08	0.52	1	1.96	1.5	0.13	2.18	-0.14	4.48	3.42	3.21	4.47
Sweden	5.36	3.42	3.61	1.89	-0.75	-0.56	-0.09	0.75	-0.68	0.06	0.67	-0.15	0.77	0.4	1.1	2.12	0.93	1.2	1.39	0.48	0.55
Switzerland	7.32	5.37	4.08	4.02	0.37	1.14	0.13	-0.58	-0.87	-0.39	-1.4	-0.31	-1.43	-0.1	-0.63	0.01	0.3	-0.09	-0.27	-1.52	-1.71
UK	13	15.92	16.88	12.49	8.79	5.51	4.21	-0.18	-1.52	-1.19	-3.08	-2.95	-2.71	-2.57	-2.28	-1.66	-2.85	-1.44	-1.03	1.39	-8.71
85+																					
Austria	1.66	1.8	3.28	2.32	0.68	-0.89	-0.67	-0.97	-3.16	0.18	-1.11	-1.82	-0.16	0.67	0.87	1.01	1.07	1.55	0.26	0.03	-0.99

Belgium	2.15	1.36	1.2	0.51	-0.46	0.46	0.09	-1.26	-3.19	-1.56	-2.07	-2.16	-1.86	0.38	0.33	1.36	1.16	1.64	1.77	2.2	4.27
Cyprus	0.79	-0.92	-0.07	0.46	0.62	-1.66	0.44	-0.41	-0.49	-1.41	0.01	-0.78	-1.16	0.61	1.21	0.38	0.71	1.49	-2.31	-2.91	-4
Denmark	1.88	2.44	3.78	1.93	2.39	-0.02	-0.87	-0.95	-1.84	-1.99	-3.97	-1.75	-2.79	-2.22	-1.2	-0.19	-1.65	1.54	-0.78	0.18	-0.19
Estonia	0.73	0.99	1.95	1.85	0.93	1.42	0.35	2.89	2.91	1.93	3.38	1.1	1.06	4.71	3.89	3.83	0.74	2.98	2.7	1.66	1.36
Finland	-0.17	-1.73	-0.13	-0.86	-2.21	-1.67	-1.48	-0.45	-1.54	-1.96	-1.37	-2	-1.3	-1.05	-0.85	-0.6	-1.2	0.6	1.11	-2.35	-2.07
France	7.2	6.69	8.47	6.39	5.57	4.78	4.47	2.65	1.32	0.74	1.37	1.02	2.97	6.53	6.82	8.07	6.74	5.63	2.02	0.3	-6.57
Germany	11.91	10.33	9.79	6.8	5.01	3.19	2.21	-0.94	-2.2	-1.04	-1.51	-0.86	-0.04	0.22	0.94	4.99	2.08	1.23	-0.59	-0.89	-1.41
Greece	1.44	0.19	1.24	1.36	0.19	0.16	0.28	0.99	0.75	0.55	1.16	1.09	2.13	2.42	2.8	1.72	2.09	3.11	-0.1	1.28	0.39
Hungary	3.31	3.11	1.79	1.59	0.8	0.44	0.86	1.6	0.5	2.71	4.54	4.23	3.77	1.087	5.95	4.02	2.27	-0.6	-1.77	-5.5	-5.2
Israel	3.21	5.23	4.17	4.92	3.17	1.47	0.64	-1.56	-1.55	1.57	1.71	0.69	-0.98	2.25	-0.16	-0.88	-0.39	-0.43	0.08	0.94	0.72
Italy	3.37	3.88	3.8	4.06	2.47	0.63	1.98	0.83	0.91	0.94	1.74	3.52	3.29	5.88	4.84	5.27	2.87	1.67	1.1	1.55	-0.34
Luxemburg	-0.01	0.09	-0.95	1.16	-0.29	-1.61	-0.9	0.31	0.36	1.49	1.05	-0.53	-1.05	0.12	-0.72	-0.2	1.15	0.21	-1.4	0.48	-0.06
Malta	1.89	1.36	2.83	1.42	2.15	1.51	1.96	3.85	0.16	0.5	0.33	-0.02	0.7	-0.88	-0.38	-0.99	-0.83	0.59	1.16	-0.06	0.15
Netherlands	8.61	6.47	6.82	5.05	3.93	2.82	2.29	-0.19	-1.52	0.69	-1.59	-1.73	-1.82	1.51	1.6	1.84	2.05	1.22	0.58	1.13	-1.36
Norway	0.01	0.72	0.12	1.93	-1.07	-0.46	-1.4	-0.32	-2.31	-0.88	-1.27	-1.75	-2.06	-1.03	-2.32	-1.25	-0.6	-2.12	-1.09	-2.02	-2.09
Portugal	12.17	17.44	20.26	18.24	12.33	8.15	4.49	1.6	-0.57	-1.77	-1.55	-1.9	-1.52	-2.05	-1.83	-2.32	-2.28	-0.23	-1.19	-1.33	-0.49
Slovenia	3.02	3.8	2.51	0.8	-0.74	-2.04	-1.54	-0.48	-1.3	-1.45	-0.39	-2.67	-1.72	0.56	0.11	2.13	-0.83	-0.19	0.18	-0.05	-3.22
Spain	5.33	9.45	11.38	10.26	6.44	3.04	0.47	-1.59	-2.38	-3.25	-2.88	-2.7	-2.4	-0.8	-1.22	-0.54	-1.21	1.45	1.2	0.97	2.81
Sweden	4.57	4.9	2.73	2.28	-0.76	-0.43	-0.63	-1.69	-4.37	-0.99	-3.82	-1.93	-2.53	-0.65	-0.92	-0.08	-0.74	0.33	0.7	-0.52	0.23
Switzerland	6.83	5	6.08	2.21	0.46	-0.09	-1	-1.1	-1.31	-1.73	-2.12	-1.12	-1.49	-1.24	-1.07	-1.22	-0.86	-2.19	-1.6	-2.16	-1.77
UK	10.72	14.75	14.74	12.87	7.33	4.29	2.85	-0.95	-2.64	-2.47	-3.19	-3.83	-4.08	-3.67	-2.95	-2.5	-3	-2.03	-2.03	-2.5	-10.72

**Supplementary Table 3.** Pearson correlation coefficient  $r \times 100$  of weekly mortality with weekly increase in percent vaccinated for six age classes. Lag: weeks between vaccination and ulterior mortality.

Lag	0-14	15-44	45-64	65-74	75-84	85+	Lag	0-14	15-44	45-64	65-74	75-84	85+
0	44	5	27	21	10	13	6	-4	-6	-8	-11	-18	-8
0	14	-8	5	11	5	4	6	46	-19	-21	-20	-30	-28
0	3	14	22	28	23	3	6	11	-9	-19	-27	-32	-27
0	-28	-35	-3	-16	-6	-11	6	28	7	-17	-15	-35	-25
0	-36	-48	-29	-31	-23	-28	6	-14	-3	-4	-20	-34	-28
0	14	-43	-27	-3	-7	19	6	16	26	3	-7	-15	-8
0	-21	-40	-14	-23	-19	7	6	-21	-24	-9	-23	-6	-6
0	18	24	-43	-18	-23	-9	6	-49	-39	-23	-27	-18	-12
0	5	27	40	18	16	21	6	-16	-2	-13	-30	-10	-22
0	-14	39	27	23	2	2	6	40	-16	11	3	11	7
0	9	18	56	52	39	35	7	19	4	-31	-29	-22	-17
0	-32	31	21	25	13	14	7	13	8	1	-20	-23	2
0	35	24	25	8	-3	10	7	-12	6	-16	-5	-6	6
0	-6	32	9	0	-2	-22	7	40	18	6	-4	-5	10
0	7	50	60	51	29	39	7	-1	-19	-19	-18	-25	-11
0	16	43	40	27	35	26	7	50	-12	-14	-13	-24	-26
0	-39	-40	20	6	9	3	7	-7	6	-14	-21	-28	-18
0	17	16	34	17	11	17	7	32	-5	-30	-29	-43	-36
0	-39	37	-17	40	-8	9	7	9	-8	-28	-33	-44	-38
0	-47	-3	-1	2	0	-5	7	24	29	-29	-34	-44	-38
0	19	0	7	8	10	8	7	-21	-1	3	-20	-9	-12
1	50	6	18	18	17	22	7	-39	-30	-22	-18	-4	6
1	-23	-22	3	3	6	5	7	-23	-11	-22	-45	-18	-39
1	25	10	38	19	20	-4	7	-6	-34	-24	-17	-12	-19
1	-13	-24	-10	-19	-7	0	8	26	6	-6	-32	-37	-4
1	3	-46	-30	-40	-22	-12	8	-14	-10	-21	-12	-7	22
1	16	-5	-13	-3	3	28	8	63	39	9	-24	-12	8
1	17	-20	-23	-20	-16	44	8	-3	-2	-5	1	-9	3
1	26	-20	-12	-35	-19	1	8	41	-18	-23	-21	-31	-25
1	-1	4	-3	-7	-3	12	8	-5	10	-5	-14	-23	-17
1	30	20	41	11	3	11	8	27	-6	-16	-14	-37	-29
1	-23	57	53	56	34	35	8	-4	-9	-33	-37	-43	-44
1	30	23	27	15	6	20	8	21	49	-43	-40	-42	-39
1	-4	52	22	2	-6	-21	8	-5	-26	-18	-28	-41	-33
1	-16	8	5	6	-4	-6	8	-12	-39	-27	-21	-11	-1
1	20	52	50	23	31	26	8	-22	-4	-15	-33	-17	-25
1	-1	-14	42	27	21	21	8	3	-57	-54	-59	-47	-49
1	-9	22	20	2	20	7	9	-17	-11	-30	-11	-3	33
1	-28	24	-30	41	-24	-3	9	65	43	4	-22	-11	17
1	-23	5	4	5	-12	-2	9	16	-14	-16	-4	-12	2
1	-24	-35	-18	3	-1	-10	9	45	-13	-7	-11	-20	-8
2	-20	-11	11	17	17	20	9	1	-5	-19	-18	-26	-14
2	19	5	6	16	-5	-2	9	28	0	-12	-7	-33	-25



2	43	40	29	21	22	-4	9	-9	-22	-27	-32	-41	-37
2	-14	-39	-12	-7	1	6	9	12	29	-46	-46	-36	-39
2	-11	6	-15	-2	0	-8	9	-10	-23	-31	-39	-34	-34
2	27	-17	-8	-11	11	41	9	15	-43	-12	-41	-36	-33
2	-18	-39	6	-16	5	21	9	-5	-15	-28	-49	-25	-38
2	-3	-21	-13	-19	-21	-8	9	6	-45	-42	-47	-36	-36
2	51	21	5	-13	-12	11	10	70	63	-3	-20	-7	25
2	-12	32	26	23	6	6	10	12	-26	-21	-8	-11	10
2	40	44	55	40	22	31	10	39	-29	-30	-10	-24	-19
2	6	60	23	9	3	-7	10	8	9	-6	-10	-19	-18
2	3	16	19	17	-8	1	10	21	-12	-25	-24	-33	-28
2	11	20	-5	-9	-2	-8	10	-2	-18	-19	-29	-37	-36
2	-6	13	35	22	18	22	10	32	38	-38	-36	-35	-31
2	12	45	44	18	23	13	10	-2	-18	-50	-54	-40	-57
2	-14	32	-9	34	-5	14	10	24	-38	12	-42	-15	-14
2	-10	-20	-12	-27	-30	-31	10	11	0	-43	-54	-21	-43
2	-12	-2	10	29	19	22	10	27	-39	-33	-42	-30	-33
3	15	20	14	21	3	11	11	17	-40	-19	-4	-7	17
3	30	32	0	11	0	7	11	33	-44	-38	-8	-23	-16
3	25	52	29	8	8	-16	11	0	-15	-27	-3	-16	-5
3	-12	12	-16	12	15	18	11	8	7	-14	-13	-30	-23
3	22	-33	-20	-15	-8	10	11	-13	-23	-22	-32	-37	-38
3	-15	-32	26	10	19	15	11	33	42	-35	-33	-30	-28
3	-7	-10	-3	-16	-17	5	11	-23	-36	-26	-42	-36	-44
3	60	9	-14	-27	-29	-10	11	13	-45	5	-58	-21	-35
3	-4	-6	-6	-4	-12	0	11	18	14	-15	-16	3	-4
3	61	18	25	16	-7	-11	11	28	-18	-28	-48	-44	-43
3	14	63	48	36	14	-9	12	42	-48	-40	-4	-20	-12
3	2	16	19	21	-2	10	12	6	-17	-27	-3	-17	-1
3	-32	7	2	-10	-9	-10	12	33	18	-25	-12	-29	-21
3	-4	-20	-10	-12	-13	-15	12	13	2	-21	-30	-33	-37
3	-1	43	28	0	18	7	12	27	45	-42	-40	-23	-29
3	3	27	-25	36	9	21	12	-17	-31	-20	-41	-33	-43
3	-11	-11	2	-11	-19	-15	12	7	-54	23	-50	-17	-23
3	26	-13	8	16	6	8	12	26	-10	-29	-13	-8	-19
4	41	21	19	22	11	17	12	7	-6	-16	-25	-19	-17
4	11	28	6	1	-10	-11	13	13	-28	-25	2	-11	6
4	11	12	22	22	8	-23	13	36	11	-25	-18	-28	-19
4	25	22	10	4	12	49	13	-4	-2	-29	-18	-30	-28
4	-18	-14	-10	-17	1	-9	13	22	51	-40	-38	-28	-30
4	-12	-3	2	-10	-12	10	13	-16	-32	-21	-38	-25	-33
4	57	-2	-6	-23	-22	0	13	9	-58	23	-50	-17	-26
4	21	-6	-22	-25	-26	-11	13	12	4	-8	-12	9	-10
4	50	-20	-12	-10	-23	-20	13	5	3	-22	-26	-34	-27
4	17	21	21	14	-12	-27	14	29	12	-24	-21	-25	-15
4	19	46	41	39	3	19	14	15	0	-27	-24	-34	-28
4	-21	10	7	-2	-3	-2	14	35	65	-34	-32	-30	-31

4	13	0	-13	-20	-16	-10	14	-12	-25	-28	-48	-21	-35
4	-29	-1	-15	-27	4	-16	14	7	-59	29	-38	-6	-8
4	-8	4	-30	11	8	17	14	14	-1	-11	-15	8	-12
4	1	-19	7	-12	-19	-11	14	-3	-24	-35	-46	-42	-38
4	0	8	29	34	24	29	15	30	4	-22	-23	-33	-27
5	-13	28	6	9	3	-4	15	21	66	-38	-31	-26	-25
5	11	-51	17	-19	-26	-19	15	13	-23	-26	-33	-31	-35
5	16	51	49	40	8	-32	15	0	-52	-1	-36	-5	-6
5	2	28	27	19	31	4	15	3	-3	-4	-13	7	-7
5	-28	-14	-12	-23	-16	3	15	2	-21	-32	-46	-41	-37
5	58	3	3	-17	-17	2	16	13	70	-37	-29	-20	-20
5	-8	-11	-15	-16	-25	-12	16	7	-12	-27	-35	-31	-33
5	31	-15	-33	-24	-38	-30	16	32	-48	8	-29	-2	-6
5	14	2	-11	-10	-24	-15	16	10	-3	-19	-20	0	-9
5	35	35	11	11	-23	-10	16	-13	-16	-30	-36	-27	-23
5	-10	28	24	4	0	0	17	21	-5	-24	-31	-27	-27
5	13	11	-7	-12	-11	-5	17	28	-42	30	-34	-9	-11
5	-29	-30	-9	-27	-14	-16	17	29	16	-18	-9	9	2
5	-31	-12	-32	-12	5	12	17	1	-20	-29	-27	-16	-15
5	-4	-10	-3	-30	-22	-20	18	39	-40	28	-27	-6	-7
5	31	11	34	33	30	28	18	22	3	-17	-8	4	5
6	37	-30	12	-29	-30	-20	18	13	3	-18	-18	-16	-13
6	7	24	-8	-17	-21	-15	19	23	4	-18	-6	2	14
6	5	52	11	27	11	-19	19	7	6	-10	-12	-9	-5
6	-5	4	-1	-6	11	15	20	11	16	0	4	10	15
6	51	0	-8	-24	-20	0							

---