Supplemental material

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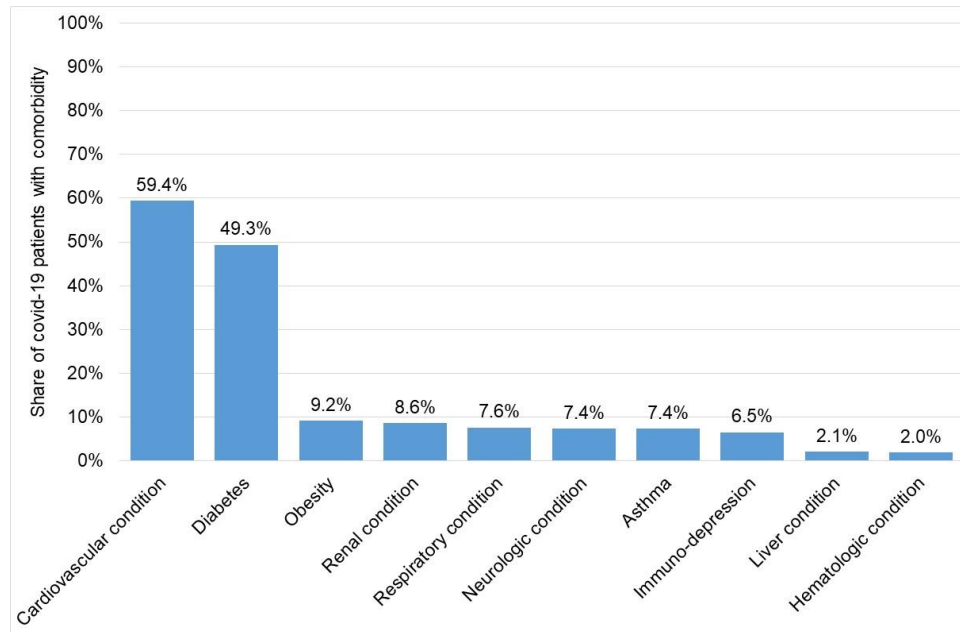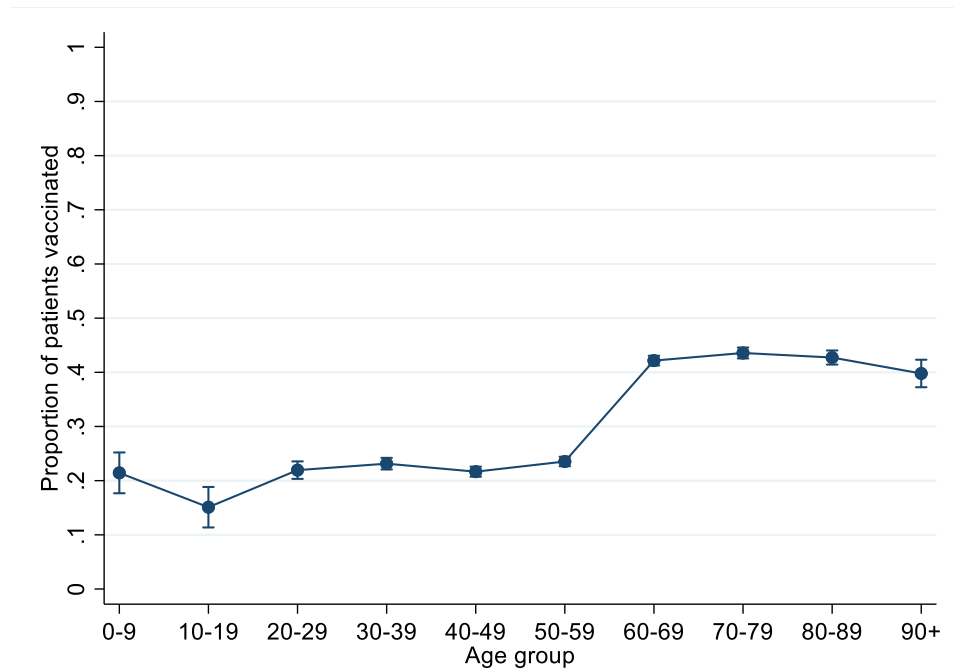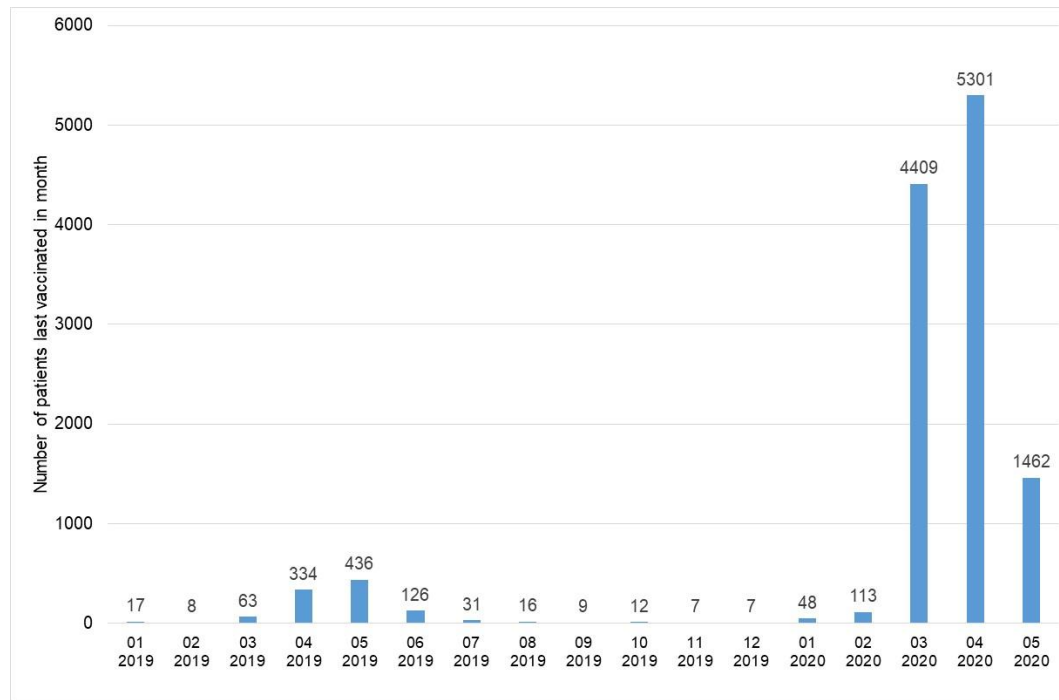
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Supplementary Material

Supplementary Materials Figure S1: Prevalence of comorbidity among Covid-19 patients

Fig. S1 shows the prevalence and type of comorbidities among Covid-19 patients.

Supplementary Materials Figure S2: Vaccination coverage by age group

Fig. S2 shows age vaccination rates by 10-year age group. Vaccination coverage on the y-axis is expressed as proportion of Covid-19 patients in each age group having received an influenza vaccine as part of the most recent national campaign. The 2020 campaign for children started on May 9th, reaching only some children by June 23, when the data was extracted.

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Supplementary Materials Figure S3: Timing of influenza vaccination

Fig. S4 shows the number of Covid-19 patients who received an influenza vaccine as part of the most recent campaign by month of administration.

Tables S1: Estimated associations between influenza vaccine and care received (full model)

Outcome:	Intensive Care		Respiratory Support	
	(1)	(2)	(3)	(4)
Influenza vaccine	0.919***	0.927***	0.818***	0.825***
	(0.867 - 0.973)	(0.874 - 0.982)	(0.764 - 0.875)	(0.770 - 0.884)
Cardiovascular problems		1.014		1.007
		(0.951 - 1.081)		(0.938 - 1.081)
Hematology		0.845		0.867
		(0.677 - 1.055)		(0.669 - 1.124)
Hepatic disorder		1.047		1.008
		(0.846 - 1.295)		(0.797 - 1.275)
Asthma		0.956		0.908
		(0.851 - 1.074)		(0.791 - 1.041)
Diabetes		1.048		1.059*
		(0.989 - 1.111)		(0.990 - 1.134)
Neurological disorder		0.958		1.001
		(0.856 - 1.073)		(0.881 - 1.137)
Respiratory condition		1.092		1.106
		(0.971 - 1.228)		(0.975 - 1.255)
Immuno-suppressed		0.991		1.008
		(0.878 - 1.120)		(0.876 - 1.161)
Renal problems		1.101*		1.183***
		(0.988 - 1.226)		(1.054 - 1.328)
Obese		1.289***		1.369***
		(1.157 - 1.437)		(1.211 - 1.547)
Age controls	YES	YES	YES	YES
Facility controls/intercepts	YES	YES	YES	YES
SES controls	NO	YES	NO	YES
Observations	39,156	39,156	39,745	39,745

Table S1 shows estimated associations between influenza vaccination and intensive care (columns 1 and 2) as well as invasive respiratory support (columns 3 and 4). All estimates are based on multivariable logistic regression models. Estimated coefficients are expressed as odds ratios with 95% confidence intervals in parentheses. Information on intensive care treatment and respiratory support was missing for 17,718 and 17,330 patients, respectively. Age controls correspond to separate binary indicator variables for each 10-year age group. SES controls include gender, race and educational attainment group. Missing data on comorbidities and SES were imputed using multiple imputations using chained equations. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

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Tables S2: Estimated associations between influenza vaccine and Covid-19 mortality (by time of vaccination)

Outcome:	Patient Death		
Sample	All	Age < 60	Age >=60
	(1)	(2)	(3)
Vaccinated post-onset	0.643***	0.572***	0.656***
	(0.528 - 0.783)	(0.394 - 0.828)	(0.514 - 0.837)
Vaccinated 2020 pre-onset	0.830***	0.691***	0.883***
	(0.770 - 0.894)	(0.595 - 0.802)	(0.805 - 0.969)
Vaccinated earlier	1.051	1.105	1.025
	(0.887 - 1.246)	(0.832 - 1.469)	(0.820 - 1.280)
Date of vaccination unknown	0.866***	0.791**	0.932
	(0.780 - 0.963)	(0.646 - 0.969)	(0.818 - 1.062)
Female	0.752***	0.804***	0.720***
	(0.712 - 0.795)	(0.737 - 0.877)	(0.669 - 0.775)
Basic education	0.928	0.626**	0.969
	(0.796 - 1.081)	(0.438 - 0.894)	(0.816 - 1.152)
Lower secondary education	0.894	0.611***	0.977
	(0.758 - 1.054)	(0.427 - 0.873)	(0.803 - 1.189)
Upper secondary education	0.790***	0.513***	0.924
	(0.674 - 0.926)	(0.363 - 0.727)	(0.759 - 1.125)
Higher education	0.583***	0.352***	0.740**
	(0.485 - 0.702)	(0.242 - 0.513)	(0.580 - 0.945)
Age controls	YES	YES	YES
Facility controls/intercepts	NO	YES	YES
SES controls	YES	YES	YES
Observations	36,543	17,531	15,588

Table S2 shows estimated associations between influenza vaccination and Covid-19 mortality by time of vaccination. All estimates are based on multivariable logistic regression models. Estimated coefficients are expressed as odds ratios with 95% confidence intervals in parentheses. Age controls correspond to separate binary indicator variables for each 10-year age group.