SUPPLEMENTARY MATERIALS

Clinical Outcomes Following SARS-CoV-2 mRNA Vaccine Myocarditis

Contents

Table S1. Country-specific wash-out and follow-up periods.

Country	Wash-out period	Follow-up period
Denmark	Three years prior to the date of admission (with Jan 1, 2015 as earliest date of potential wash-out)	Jan 1, 2018 – Apr 30, 2022
Finland	Three years prior to the date of admission (with Jan 1, 2015 as earliest date of potential wash-out)	Jan 1, 2018 – March 13, 2022
Norway	One year prior to the date of admission (with January 1, 2017, as the earliest date of potential wash-out)	Jan 1, 2018 -– April 27, 2022
Sweden	Three years prior to the date of admission (with Jan 1, 2015 as earliest date of potential wash-out)	Jan 1, 2018 – Jan 31, 2022

Table S2. ICD-10 codes used for defining heart failure and comorbidity.

Disease category	ICD-10 codes
Heart failure	I11.0, I13.0, I13.2, I42.0, I42.7, I43.0, I50, I50.0, I50.1, I50.2, I50.3, I50.4, I50.8, I50.9
Autoimmune disease	K50.x, K51.x, M32.x, M05.x-M06.x, E05.0, E06.3, G35.x, L40.x, E27.1, E27.2, G12.2, M45.x, M08.1, K90.0, M33.x, L52.x, G61.0, D59.0-D59.1, D69.0, D69.3, M08.x, L93.x, G70.0, D51.0, L12.x, M31.3, M30.0, K74.3, I00.x-01.x, D86.x, M34.x, M31.5-M31.6, L80.x, M35.x
Cardiovascular disease	I00-I99
Malignancy	C00-C97

Table S3. National registries used for obtaining clinical information, information on vaccinations, and information on tests for infectious diseases*.

Country	Clinical information registries	Vaccination information registries	Infectious disease registries
Denmark	The Danish National Patient Register[1]	The Danish Vaccination Register[2]	The Danish Microbiology Database[3]
Finland	National Care Register for Health Care[4]	The National Vaccination Register[5]	National Infectious Diseases Register[6]
Norway	The Norwegian Patient Registry[7]	The Norwegian Immunisation Register[8]	Norwegian Surveillance System for Communicable Diseases
Sweden	The Swedish Patient Register[9]	The National Vaccination Register in Sweden[10]	Register on Surveillance of Notifiable Communicable Diseases[11]

* Information on linkage between individual national registries has been described previously[12]. Furthermore, the cohort study was carried out according to legal and ethical regulations within each participating country, as previously described in detail[13].

Table S4. Country-specific medians and interquartile ranges (IQR) of age by myocarditis type, age group, and country.

	All myocarditis cases (median, IQR)			Cases aged 12-39 years (median, IQR)		
Country	Vaccine	COVID-19	Conventional	Vaccine	COVID-19	Conventional
Denmark	31 (20-48)	51 (41-61)	37 (24-58)	23 (19-30)	-*	24 (19-30)
Finland	30 (18-48)	30 (17-46)	40 (26-57)	22 (17-30)	18 (17-28)	25 (20-32)
Norway	33 (23-57)	52 (36-66)	44 (27-60)	24 (20-29)	23 (19-36)	26 (21-32)
Sweden	28 (20-51)	45 (30-59)	37 (24-58)	21 (18-27)	29 (25-33)	24 (20-30)

*Five or fewer cases.

Table S5. Relative risk of incident heart failure or death, as a combined outcome, within 90 days of follow-up since admission for new-onset myocarditis, by subgroup.

Myocarditis type by subgroup	Heart failure diagnosis or death within 90 days of admission	Total number of individuals	Relative risk of heart failure diagnosis or death within 90 days since admission
12–39 year olds			
Vaccine myocarditis	8	340	0.61 (0.30–1.24)
COVID-19 myocarditis	5	48	2.71 (1.16–6.31)
Conventional myocarditis	128	3,327	1 (ref.)
≥ 40 year olds			
Vaccine myocarditis	19	190	0.68 (0.44–1.05)
COVID-19 myocarditis	13	61	1.45 (0.89–2.37)
Conventional myocarditis	488	3,326	1 (ref.)
Men			
Vaccine myocarditis	16	413	0.49 (0.30–0.81)
COVID-19 myocarditis	12	76	2.01 (1.19–3.41)
Conventional myocarditis	378	4,815	1 (ref.)
Women			
Vaccine myocarditis	11	117	0.73 (0.41–1.29)
COVID-19 myocarditis	6	33	1.40 (0.67–2.92)
Conventional myocarditis	238	1,838	1 (ref.)
Admitted on January 1, 2020 or later			
Vaccine myocarditis	27	530	0.54 (0.37–0.80)
COVID-19 myocarditis	18	109	1.77 (1.14–2.73)
Conventional myocarditis	265	2,833	1 (ref.)

Table S6. Relative risk of readmission within 90 days of follow-up since discharge for new-onset myocarditis, by subgroup.

Myocarditis type by subgroup	Readmission within 90 days of discharge	Total number of individuals	Relative risk of Readmission within 90 days since discharge
12–39 year olds			
Vaccine myocarditis	26	340	0.77 (0.52–1.12)
COVID-19 myocarditis	5	48	1.04 (0.45–2.41)
Conventional myocarditis	332	3,326	1 (ref.)
≥ 40 year olds			
Vaccine myocarditis	36	190	0.96 (0.71–1.29)
COVID-19 myocarditis	4	61	0.33 (0.13–0.86)
Conventional myocarditis	656	3,312	1 (ref.)
Men			
Vaccine myocarditis	39	413	0.72 (0.53–0.98)
COVID-19 myocarditis	5	76	0.50 (0.21–1.17)
Conventional myocarditis	633	4,807	1 (ref.)
Women			
Vaccine myocarditis	23	117	1.01 (0.69–1.48)
COVID-19 myocarditis	4	33	0.63 (0.25–1.57)
Conventional myocarditis	355	1,831	1 (ref.)
Admitted on January 1, 2020 or later			
Vaccine myocarditis	62	530	0.76 (0.59–0.98)
COVID-19 myocarditis	9	109	0.49 (0.29–1.01)
Conventional myocarditis	434	2,823	1 (ref.)
12–39 year olds without predisposing comorbidity			
Vaccine myocarditis	24	326	0.82 (0.55–1.22)
COVID-19 myocarditis	5	47	1.18 (0.51–2.73)
Conventional myocarditis	277	3,076	1 (ref.)

Table S7. Relative risk of readmission within 90 days of follow-up since discharge for new-onset myocarditis and relative risk of heart failure or death within 90 days of follow-up since admission for new-onset myocarditis, by myocarditis subgroup using only pre-pandemic cases as reference.

Myocarditis type	Readmission within 90 days of discharge	Total number of individuals	Relative risk of readmission within 90 days since discharge
Vaccine myocarditis	62	530	0.81 (0.63–1.03)
COVID-19 myocarditis	9	109	1.04 (0.30–1.07)
Conventional myocarditis (pre-2020 only)	554	3,815	1 (ref.)
Myocarditis type	Heart failure diagnosis or death within 90 days of admission	Total number of individuals	Relative risk of heart failure diagnosis or death within 90 days since admission
Vaccine myocarditis	27	530	0.55 (0.38–0.81)
COVID-19 myocarditis	18	109	1.80 (1.16–2.77)
Conventional myocarditis (pre-2020 only)	351	3,820	1 (ref.)

Figure S1. Country-specific cumulative incidences of heart failure during follow-up.

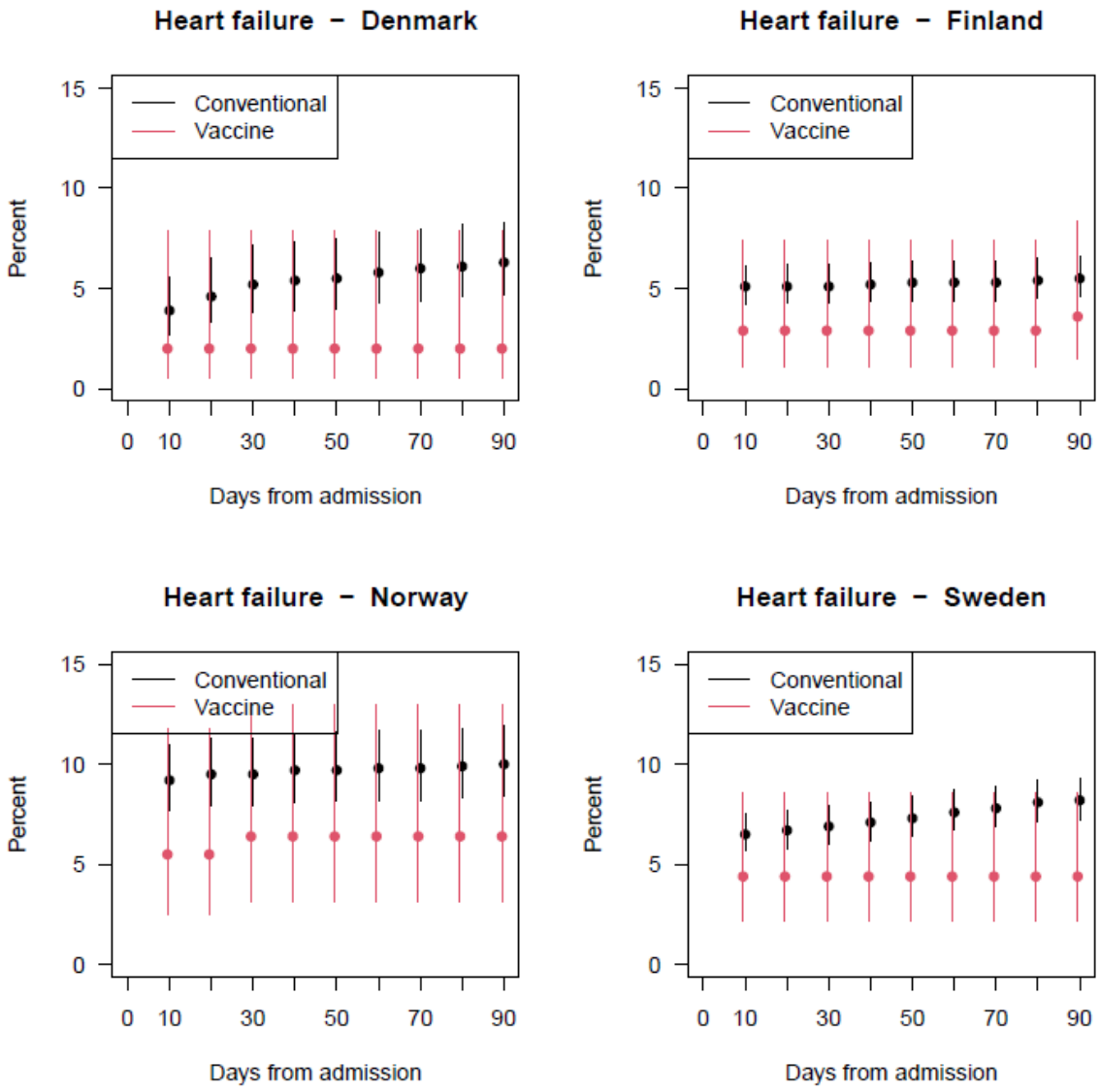


Figure S2. Country-specific cumulative incidences of death during follow-up.

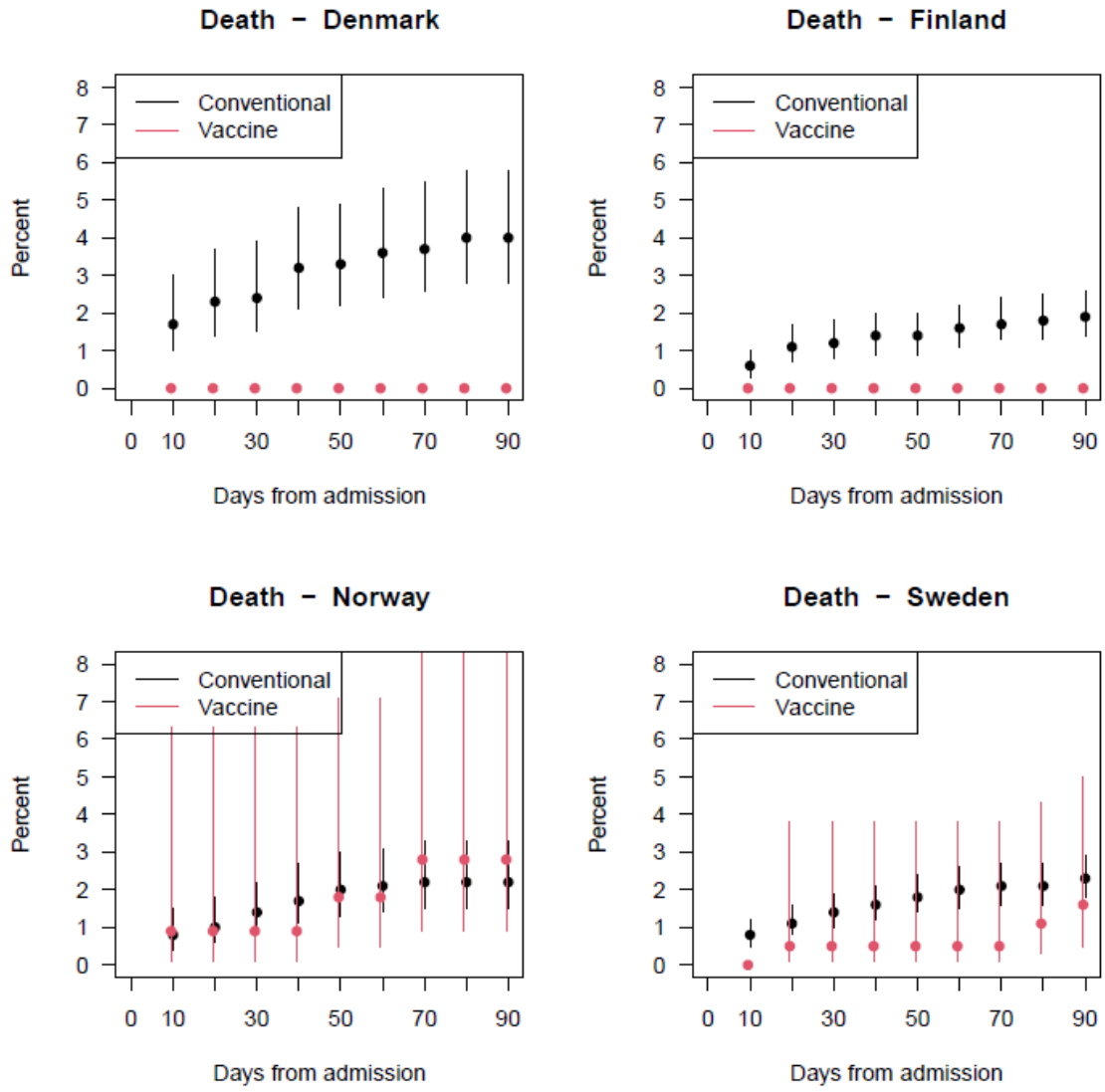


Figure S3. Country-specific cumulative incidences of readmission during follow-up.

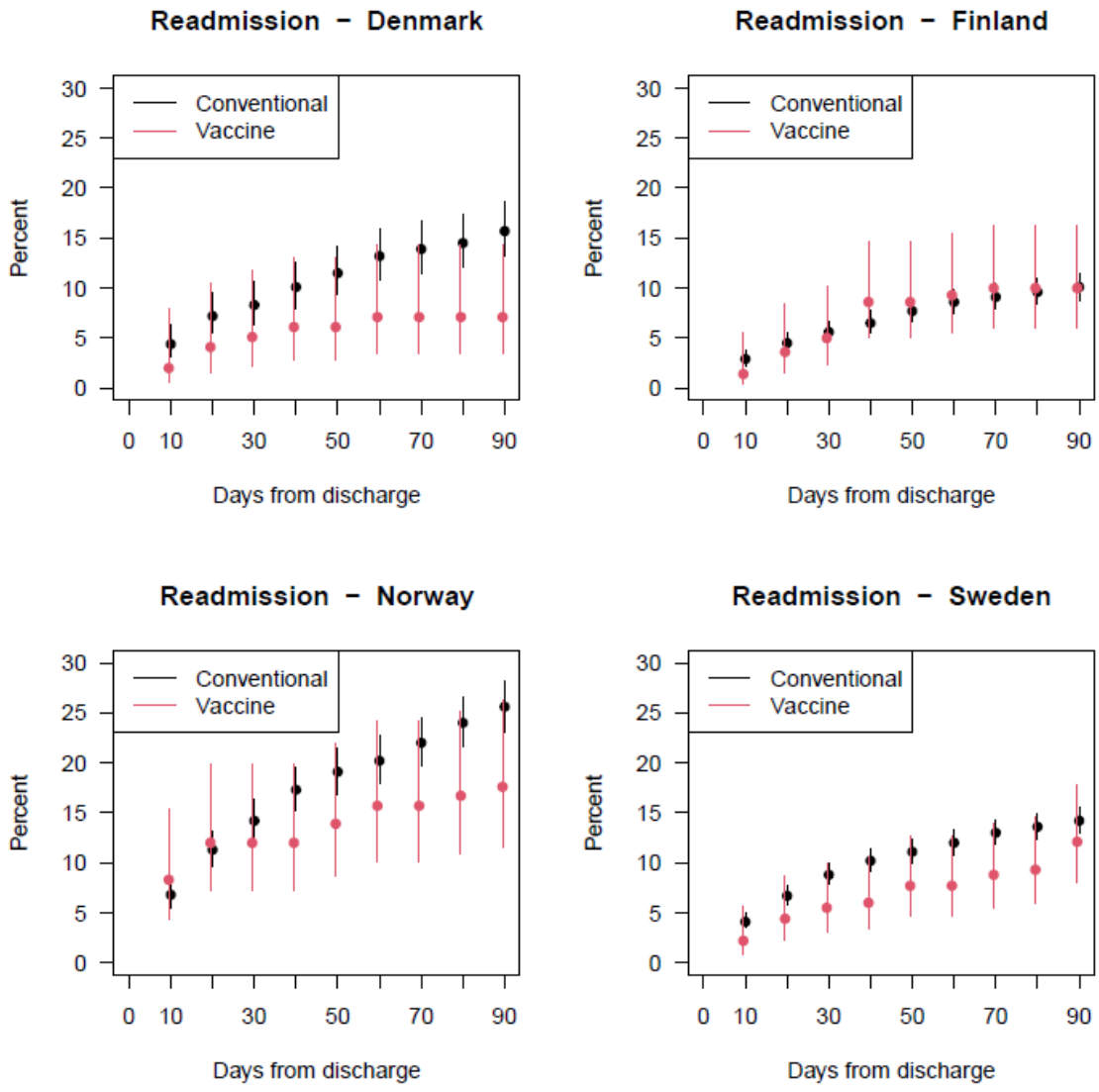
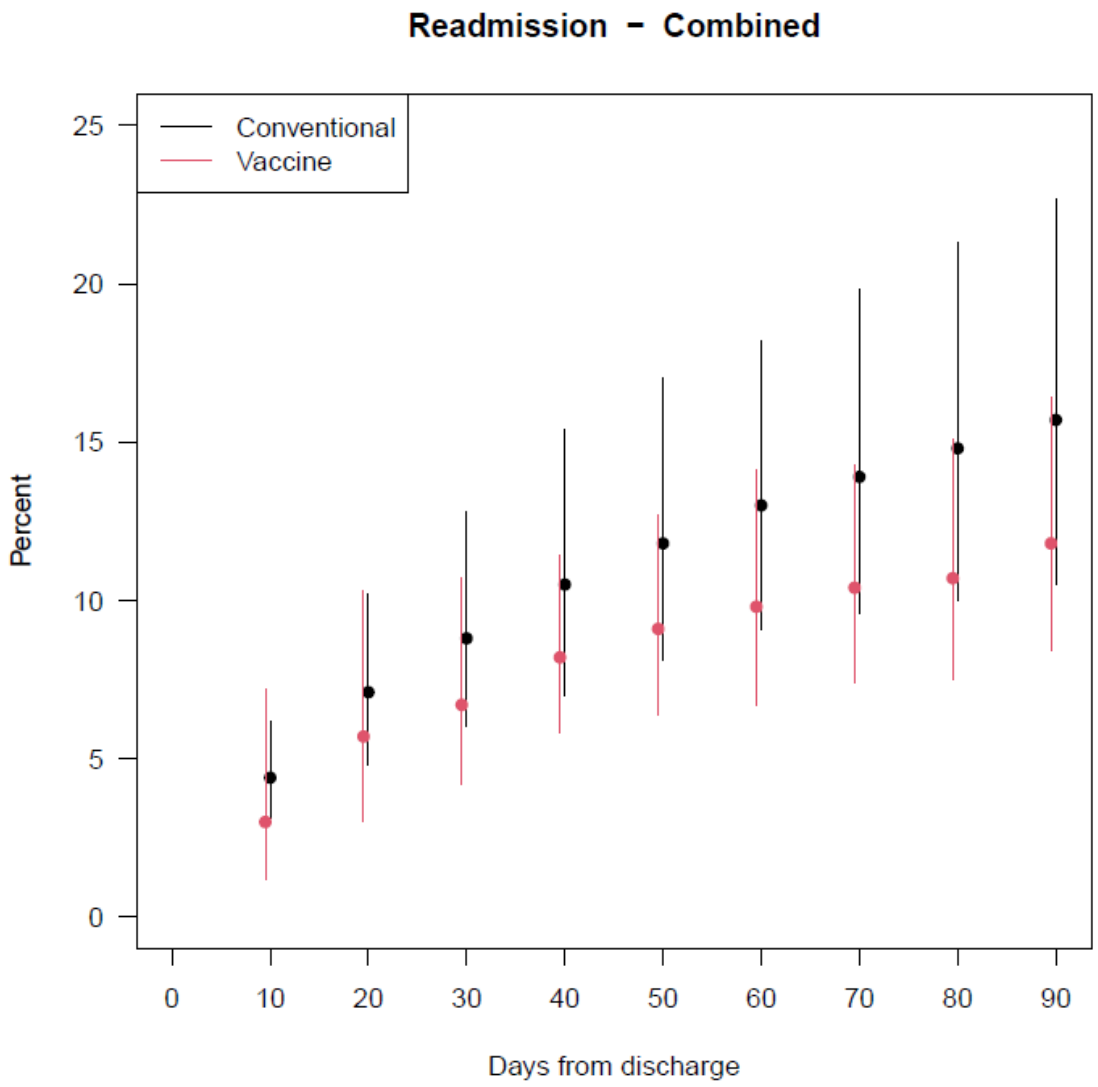


Figure S4. Cumulative incidence of readmission, combined from all countries, during follow-up.



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