Supplemental Table 1

		Time[1]	High dose chemotherapy			
		Months	Mit/Eto	Cyta/dauno	ATRA/ATO	Bu/Cy/Auto
	n	median (range)	n (%)	n (%)	n (%)	n (%)
AML/MDS	22	NA	5	4	1	-
During HD chemotherapy	5	NA	1	3	1	-
< 12 months after HD chemotherapy	5	5 (1-12)	4	1	-	-
Autologous HCT	12	8 (2-11)	-	-	-	12

		Time[1]	Current therapy		Immunosuppressants				
		weeks	Rituximab	Lenalidomide	0	1 - 2	>2	steroids	Other
	n	median (range)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Autologous HCT									
Lymphoma[2] (BEAM)	31	21 (4-44)	3 (9.7)	0 (0.0)	27 (87.1)	4 (12.9)	0 (0.0)	1 (3.2)	3 (9.6)
Multiple myeloma (HDM)	51	18 (1-41)	0	16 (31.4)	40 (78.4)	11 (21.6)	0 (0.0)	11 (21.6)	0
CAR T cell therapy									
CD19 directed	53	30 (1-346)							

		Time[1]	Conditioning										Donor			
		weeks	ATG-Flu-TBI	Flu-TBI	Cy-Flu-TBI-PTCy	Bu4-Flu-PTCy	Bu3-Flu-PTCy	BU-Flu-ATG	TBI-PTCy	Flu-TBI-PTCy	FLAMSA-RIST	other	Sib	MUD	CB	Haplo
	n	median (range)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Allogeneic HCT																
< 6 months	54	12 (1-29)	10 (18.5)	4 (7.4)	5 (9.3)	4 (7.4)	5 (9.3)	4 (7.4)	4 (7.4)	4 (7.4)	4 (7.4)	10 (18.5)	12 (22.2)	34 (63.0)	2 (3.7)	6 (11.1)
Chronic GvHD	57	272 (39-865)	5 (9.3)	19 (35.2)	4 (7.4)	1 (1.9)	0 (0.0)	3 (5.6)	1 (1.9)	0 (0.0)	2 (3.7)	22 (38.6)	23 (40.4)	31 (54.4)	1 (1.8)	2 (3.5)

		GvHD		Immunosuppressants					
		Acute	Chronic	0	1 - 2	>2	steroids	MMF	CI
	n	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Allogeneic HCT									
< 6 months	54	13 (24.1)	6 (11.1)	2 (3.7)	35 (64.8)	17 (31.5)	30 (55.6)	17 (31.5)	45 (83.3)
Chronic GvHD	57		57 (100)	13 (23.2)	39 (69.6)	4 (7.1)	12 (21.4)	8 (14.0)	8 (14.0)

Supplemental Table 1: Baseline characteristics of AML/MDS and cell therapy cohorts. [1]Time: time since HCT, CAR T cell therapy or end of high dose (HD) chemotherapy. Mit/Eto: mitoxantrone, etoposide; Cyta / dauno: cytarabine, daunorubicine; Bu/Cy/Auto: busulphan, cyclophosphamide, autologous HCT; [2]B-NHL n=21, Hodgkin n=2, T-NHL n=8; BEAM: carmustine, etoposide, cytarabine, melphalan; HDM: high dose melphalan; ATG: antithymocyte globulin; Flu: fludarabine; TBI total body irradiation; PTCy: post-transplantation cyclophosphamide; FLAMSA-RIST: fludarabine, amsacrine cytarabine reduced intensity stem cell transplantation; sib: sibling; MUD: matched unrelated donor; CB: cord blood; haplo: haplo-identical donor ; MMF: mycophenolic acid; CI: calcineurin inhibitor.

Supplemental Table 2

	n (%)	Age mean (SD)	Sex women (%)	Seropositive at baseline n (%)
All PIENTER participants selected	44	57 (10)	30 (68)	7 (16)
With comorbidity	21 (48)	62 (7)	10 (48)	2 (10)
Using immunosuppressants	3 (6.8)	60 (8)	2 (67)	0 (0)

Supplemental Table 2: Baseline characteristics of the reference cohort. Participants were extracted from the PIENTER cohort, a Dutch population cohort study including randomly selected inhabitants of The Netherlands 12 years and older, when they fulfilled the following criteria: age 40-75 years, 2 doses mRNA1273 with the second dose 14-61 days previous to the moment of sample collection, not diagnosed with a hematologic condition.

Supplemental Table 3

	n	Age mean (SD)	Sex women (%)	B cell ($x10^9$/l) median (range)
All patients	204	59 (11)	83 (40.9)	0.11 (0.0-88.94)
Sickle cell disease				
Hydrea	11	39 (11)	6 (54.5)	0.54 (0.16-0.73)
Lymphoma				
During rituximab +/- chemotherapy	2	70 (6)	0 (0)	0.0 (0.0-0.0)
< 12 months after rituximab +/- chemotherapy	6	60 (15)	2 (33.3)	0.013 (0.0-0.04)
< 12 months after autologous HCT (BEAM)	8	52 (15)	4 (50.0)	0.11 (0.0-0.19)
Multiple myeloma				
1st line therapy	9	60 (9)	4 (44.4)	0.02 (0.0-0.04)
Daratumumab-containing therapy	33	63 (7)	12 (36.4)	0.04 (0.0-0.62)
IMiDs	17	61 (8)	5 (29.4)	0.08 (0.01-0.27)
< 9 months after autologous HCT (HDM)	16	62 (6)	5 (33.3)	0.14 (0.0-86)
Chronic lymphocytic leukemia				
Wait & see	17	64 (9)	9 (52.9)	8.06 (1.10-88.93)
Ibrutinib	6	61 (7)	3 (50.0)	1.62 (0.02-56.10)
Chronic myeloid leukemia				
Tyrosine kinase inhibitors	14	53 (11)	7 (50.0)	0.21 (0.13-0.50)
Acute myeloid leukemia and high-risk MDS				
Hypomethylating therapy	6	60 (20)	1 (16.7)	0.04 (0.0-0.10)
High-dose chemotherapy	7	60 (11)	4 (57.1)	0.06 (0.0-0.59)
Myeloproliferative disease				
Ruxolitinib	20	58 (10)	10 (50.0)	0.18 (0.05-0.59)
Allogeneic HCT				
< 6 months after HCT	15	61 (11)	6 (40.0)	0.02 (0.0-0.28)
Chronic GvHD	15	60 (10)	4 (26.7)	0.22 (0.0-1.09)
CAR T cell therapy				
CD19-directed	2	71 (2)	1 (50.0)	0.09 (0.0-0.17)

Supplemental Table 3: Baseline characteristics of patients included in pseudovirus neutralisation analysis. These were all patients with S1 IgG 50-300 BAU/ML (n=67) and a random selection of patients with S1 IgG ≥300 BAU/ml (n=137).

Supplemental Table 4

	n	No seroconversion (%) <10 BAU/ml	Insufficient concentration (%) 10-300 BAU/ml	Sufficient concentration (%) ≥300 BAU/mL
All patients	34	2.9	5.8	91.2
Sickle cell disease				
Hydrea	3	0	0	100
Lymphoma				
During rituximab +/- chemotherapy	1	100	0	0
< 12 months after rituximab +/- chemotherapy	0	NA	NA	NA
< 12 months after autologous HCT (BEAM)	0	NA	NA	NA
Multiple myeloma				
1st line therapy	1	0	0	100
Daratumumab-containing therapy	1	0	0	100
IMiDs	6	0	16.7	83.3
< 9 months after autologous HCT (HDM)	5	0	0	100
Chronic lymphocytic leukemia				
Wait & see	3	0	0	100
Ibrutinib	2	0	50	50
Chronic myeloid leukemia				
Tyrosine kinase inhibitors	2	0	0	100
Acute myeloid leukemia and high-risk MDS				
Hypomethylating therapy	0	NA	NA	NA
High-dose chemotherapy	1	0	0	100
Myeloproliferative disease				
Ruxolitinib	3	0	0	100
Allogeneic HCT				
< 6 months after HCT	1	0	0	100
Chronic GvHD	3	0	0	100
CAR T cell therapy				
CD19-directed	2	0	0	100

Supplemental Table 4: S1-specific antibody concentration of previously infected participants after full vaccination with mRNA-1273. Previous SARS-CoV-2 infection was identified as N IgG >14.3 BAU/ml before vaccination ('pre').

Supplemental Table 5

		No seroconversion	Insufficient concentration	Sufficient concentration	
	n	<10 BAU/ml (%)	10-300 BAU/ml (%)	≥300 BAU/ml (%)	95% CP (CI)
All patients	634	30.0	15.0	55.0	51.5-59.0
Sickle cell disease					
Hydrea	25	0.0	4.0	96.0	79.6-99.9
Lymphoma					
During rituximab +/- chemotherapy	42	88.1	11.9	0.0	0.0-8.4
< 12 months after rituximab +/- chemotherapy	38	55.3	18.4	26.3	13.4-43.1
< 12 months after autologous HCT (BEAM)	27	44.4	22.2	33.3	16.5-54.0
Multiple myeloma					
1st line therapy	23	26.1	21.7	52.2	30.6-73.2
Daratumumab-containing therapy	48	6.2	25.0	68.8	53.7-81.3
IMiDs	48	10.4	12.5	77.1	62.7-88.0
< 9 months after autologous HCT (HDM)	45	4.4	6.7	88.9	75.9-96.3
Chronic lymphocytic leukemia					
Wait & see	46	17.4	13.0	69.6	54.2-82.3
Ibrutinib	34	61.8	11.8	26.5	12.9-44.4
Chronic myeloid leukemia					
Tyrosine kinase inhibitors	50	0.0	0.0	100	92.9-100
Acute myeloid leukemia and high-risk MDS					
Hypomethylating therapy	17	23.5	35.3	41.2	18.4-67.1
High-dose chemotherapy	16	6.2	0.0	93.8	69.8-99.8
Myeloproliferative disease					
Ruxolitinib	33	9.1	42.4	48.5	30.8-66.5
Allogeneic HCT					
< 6 months after HCT	49	46.9	20.4	32.7	19.9-47.5
Chronic GvHD	49	18.4	12.2	69.4	54.6-81.7
CAR T cell therapy					
CD19-directed	44	79.5	9.1	11.4	3.8-24.6

Supplemental Table 5: S1 IgG concentration of previously uninfected participants after 2 dose mRNA-1273. 95% Clopper-Pearson (CP) confidence interval (CI) is only indicated for patients who obtained S1 IgG ≥300 BAU/ml.

Supplemental Table 6

	Model 1 (per subcategory of variables)			Model 2 (overall)			Model 3 (sensitivity analyses for CLL)		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
Clinical									
Age	0.97	0.96-0.99	<0.001	0.97	0.95-0.99	0.005	ns.		
Immunological									
IgG4 (g/L)	1.96	1.27-3.04	0.002	1.84	1.10-3.07	0.019	ns.		
B cells (x10^9/L)			<0.001			<0.001			<0.001
0,1-5,0	ref.	ref.		ref.	ref.		ref.	ref.	
<0,1	0.15	0.10-0.24		0.25	0.15-0.42		0.21	0.12-0.37	
>5,0	0.26	0.14-0.49		0.35	0.18-0.67		1.15	0.40-3.28	
CD3 T cells (x10^9/L)	1.74	1.21-2.51	0.003	ns.			ns.		
CD8 T cells (x10^9/L)			<0.001	ns.			ns.		
0,7-2,1	ref.	ref.							
<0.7	1.43	0.79-2.59							
>2.1	0.04	0.01-0.24							
NK cells (x10^9/L)			<0.001			<0.001			0.001
0,09-0,6	ref.	ref.		ref.	ref.		ref.	ref.	
<0,09	0.82	0.53-1.26		0.66	0.41-1.09		0.64	0.38-1.07	
> 0,6	4.99	1.85-13.44		8.37	2.87-24.42		14.84	2.96-74.44	
Therapy									
Immunosuppressants			<0.001			0.001			<0.001
0	ref.	ref.		ref.	ref.		ref.	ref.	
1 to 2	0.45	0.30-0.68		0.45	0.28-0.73		0.35	0.21-0.59	
> 2	0.23	0.10-0.53		0.25	0.10-0.64		0.24	0.09-0.63	
CD20 antibody	0.20	0.09-0.44	<0.001	0.24	0.10-0.57	0.001	0.27	0.11-0.65	0.004
Lenalidomide/pomalidomide	2.49	1.37-4.51	0.003	3.46	1.78-6.71	<0.001	3.35	1.72-6.53	<0.001
Hydrea	6.36	1.46-27.67	0.014	ns.			ns.		
CAR T cell	0.14	0.05-0.37	<0.001	0.16	0.06-0.48	0.001	0.16	0.05-0.48	0.001
Tyrosine kinase inhibitor	5.23	2.16-12.65	<0.001	2.74	1.06-7.09	0.038	8.16	1.81-36.81	0.006
Venetoclax	0.11	0.02-0.54	0.006	0.11	0.02-0.63	0.013	ns.		

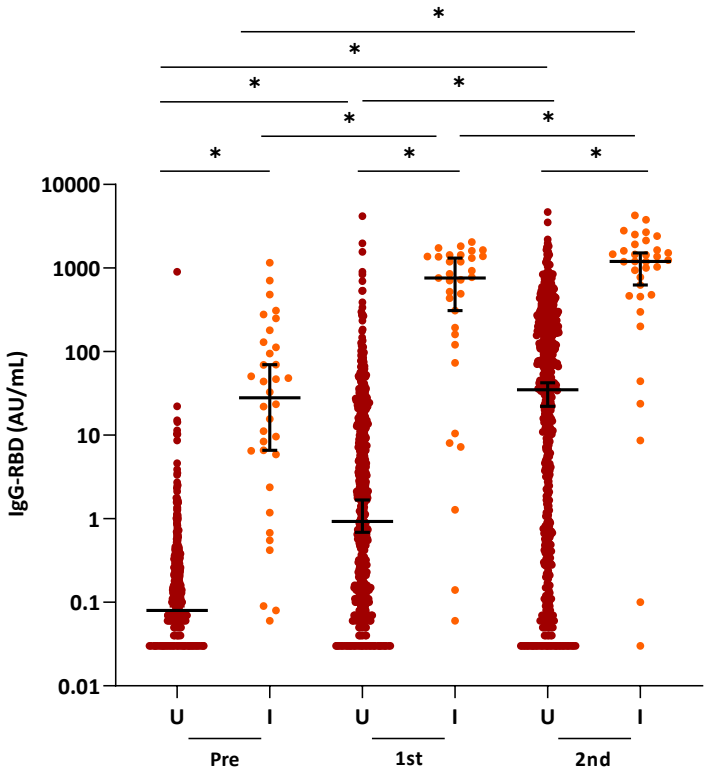
Supplemental Table 6: Multivariable analyses. Variables significantly associated with positive response (S1 binding antibody concentration ≥300 BAU/ml) as a dichotomous outcome were tested in a multivariate model per subcategory of variables (Model 1) and significant variables of Model 1 were subsequently tested in a overall model (Model 2). Model 3 represents sensitivity analyses with CLL patients excluded from analyses. Analyses included previously uninfected patients only.

Supplemental Table 7

		Model 1 (univariable)		
	n	OR	95% CI	p-value
Lymphoma	65			
Time (months)[1,2]				0.069
≤2	15	ref.	ref.	
2-4	15	1.45	0.26-8.01	
4-6	13	0.33	0.03-3.68	
6-8	16	2.40	0.47-12.13	
8-10	6	20.0	1.65-241.72	
Multiple myeloma	45			
Time (months)[1]				0.98
≤2	15	ref.	ref.	
2-4	13	1.85	0.15-23.07	
4-6	13	0.85	0.10-7.04	
6-8	3	NE	NE	
8-10	1	NE	NE	
Allogeneic HCT[3]	49			
Time (months)[1]				0.272
≤2	24	ref.	ref.	
2-4	11	1.12	0.22-5.66	
4-6	14	3.0	0.74-12.13	
Mycophenolic acid	15	0.40	0.10-1.71	0.218
Calcineurin inhibitor	41	0.41	0.09-1.93	0.262
Corticosteroids	27	0.51	0.15-1.69	0.269
Chronic GvHD	50			
Ruxolitinib	12	0.33	0.09-1.30	0.113
Mycophenolic acid	7	0.27	0.05-1.38	0.115
CLL on ibrutinib	36			
Venetoclax	8	0.00	0.0	1.00

Supplemental Table 7: Univariable analyses for specific patient cohorts. Analyses included previously uninfected patients only. [1]Time after last rituximab; [2]time after HCT; [3]not including chronic GvHD cohort. NE: not estimable.

Supplemental Figure 1



Supplemental Figure 1. Scatterplot of RBD IgG concentration for each timepoint. Dark red indicates previously uninfected participants (U), in orange previously infected individuals (I). Previous SARS-CoV-2 infection was identified as N IgG >14.3 BAU/ml before vaccination ('pre'). Timepoints: pre: before first vaccination; 1st: 4 weeks after the first vaccination; 2nd: 4 weeks after the 2nd vaccination.