

## APPENDIX A. Survey wording for web-based surveys

Question	Online KPSEM survey	Timing
Survey Q1: Prior COVID-19 status	Have you ever had a positive COVID-19 test or been told by a health care provider that you had COVID-19? [Check boxes - Yes & No - automatically continues to next page]	Day 1 (first ever survey)
Survey Q2: Local reactions	Since getting your COVID-19 vaccine, have you experienced any of the following side effects at or near where you got the shot? Please select all that apply. [Check boxes - Pain, Redness, Itching, Swelling, No symptoms]	Days: 1,2,3,4,5,6,7,8,10,12,14
Survey Q3: Systemic reactions I	Since getting your COVID-19 vaccine, have you experienced any of the following side effects? Please select all that apply. Check boxes - [Fever, Chills, Fatigue or tiredness, Joint pain or body or muscle aches, Headache, Nausea or vomiting, Rash (not including injection site), No symptoms]	Days: 1,2,3,4,5,6,7,8,10,12,14,
Survey Q4: Systemic reactions II	Since getting your COVID-19 vaccine, have you experienced any of the following side effects? Please select all that apply. [Check boxes - Persistent fast heart rate, Lightheadedness Painful, burning, or tingling rash (shingles); Menstrual cycle changes, if applicable; Chest pain; Other symptoms; No symptoms]	Days: 1,2,3,4,5,6,7,8,10,12,14, 21, 35
Survey Q5: Medical care (if yes to previous Qs)	Did any of these symptoms cause you to seek medical care? [Check boxes - Yes & No - automatically continues to next question]	Days: 1,2,3,4,5,6,7,8,10,12,14, 21, 35

KPSEM = Kaiser Permanente Side Effect Monitor

## APPENDIX B. ICD-10 codes used to categorize selected post-vaccine symptoms

Symptom category	Diagnosis description	ICD-10 code
Fatigue or tiredness	Chronic fatigue, unspecified	R53.82
Fatigue or tiredness	Muscle weakness	M62.81
Fatigue or tiredness	Other fatigue	R53.83
Fatigue or tiredness	Other malaise	R53.81
Fatigue or tiredness	Post-viral fatigue syndrome (Myalgic encephalomyelitis)	G93.3
Fatigue or tiredness	Somnolence	R40.0
Fatigue or tiredness	Weakness	R53.1
Fatigue or tiredness	Difficulty in walking, not elsewhere classified	R28.2
Fatigue or tiredness	Immobility (bedfast, chairfast)	R26.3
Fatigue or tiredness	Other and unspecified abnormalities of gait and mobility (unsteadiness on feet NOS)	R26.8
Fatigue or tiredness	Other and unspecified lack of coordination	R27.8
Fatigue or tiredness	Repeated falls	R27.9
Fatigue or tiredness	Unsteadiness on feet	R26.81
Chills	Chills (without fever)	R68.83
Joint pain, muscle or body aches	Arthralgia	M25.5
Joint pain, muscle or body aches	Facial weakness	R29.810
Joint pain, muscle or body aches	Fibromyalgia	M79.7
Joint pain, muscle or body aches	Inflammatory polyarthritis	M06.4
Joint pain, muscle or body aches	Inflammatory polyneuropathy	G61
Joint pain, muscle or body aches	Joint pain	M25.50
Joint pain, muscle or body aches	Musculoskeletal pain	M79.18
Joint pain, muscle or body aches	Myalgia	M79.10
Joint pain, muscle or body aches	Other reactive arthropathies, left ankle and foot	M02.872
Joint pain, muscle or body aches	Other reactive arthropathies, left elbow	M02.822
Joint pain, muscle or body aches	Other reactive arthropathies, left hand	M02.842
Joint pain, muscle or body aches	Other reactive arthropathies, left hip	M02.852
Joint pain, muscle or body aches	Other reactive arthropathies, left knee	M02.862
Joint pain, muscle or body aches	Other reactive arthropathies, left shoulder	M02.812
Joint pain, muscle or body aches	Other reactive arthropathies, left wrist	M02.832
Joint pain, muscle or body aches	Other reactive arthropathies, multiple sites	M02.89
Joint pain, muscle or body aches	Other reactive arthropathies, right ankle and foot	M02.871
Joint pain, muscle or body aches	Other reactive arthropathies, right elbow	M02.821
Joint pain, muscle or body aches	Other reactive arthropathies, right hand	M02.841
Joint pain, muscle or body aches	Other reactive arthropathies, right hip	M02.851
Joint pain, muscle or body aches	Other reactive arthropathies, right knee	M02.861
Joint pain, muscle or body aches	Other reactive arthropathies, right shoulder	M02.811
Joint pain, muscle or body aches	Other reactive arthropathies, right wrist	M02.831
Joint pain, muscle or body aches	Other reactive arthropathies, unspecified ankle and foot	M02.879
Joint pain, muscle or body aches	Other reactive arthropathies, unspecified elbow	M02.829
Joint pain, muscle or body aches	Other reactive arthropathies, unspecified hand	M02.849
Joint pain, muscle or body aches	Other reactive arthropathies, unspecified hip	M02.859
Joint pain, muscle or body aches	Other reactive arthropathies, unspecified knee	M02.869
Joint pain, muscle or body aches	Other reactive arthropathies, unspecified shoulder	M02.819
Joint pain, muscle or body aches	Other reactive arthropathies, unspecified site	M02.80
Joint pain, muscle or body aches	Other reactive arthropathies, unspecified wrist	M02.839
Joint pain, muscle or body aches	Other reactive arthropathies, vertebrae	M02.88
Joint pain, muscle or body aches	Reactive arthropathy, unspecified	M02.9
Joint pain, muscle or body aches	Rhabdomyolysis	M62.82
Joint pain, muscle or body aches	Critical illness myopathy	G72.81
Joint pain, muscle or body aches	Myasthenia gravis and other myoneural disorders	G70*
Joint pain, muscle or body aches	Myopathy, unspecified	G72.9
Joint pain, muscle or body aches	Myositis	M60.9
Joint pain, muscle or body aches	Other specified myopathies	G72.89
Joint pain, muscle or body aches	Primary disorders of muscle, unspecified	G71.9
Fever	Fever of other and unknown origin	R50
Fever	Fever presenting with conditions classified elsewhere	R50.81
Fever	Fever, unspecified	R50.9
Fever	Other specified fever	R50.8
Headache	Cervicogenic headache	R51
Headache	Cluster headache and other trigeminal autonomic cephalgias	G44.0
Headache	Complicated headache syndromes	G44.5

Headache	Daily new persistent headache	G44.52
Headache	Drug-induced headache, not elsewhere classified	G44.4
Headache	Headache with orthostatic component	R51.0
Headache	Headache, unspecified	R51.9
Headache	Migraine	G43*
Headache	Other headache syndromes	G44*
Headache	Tension headache	G44.209
Headache	Vascular headache, not elsewhere specified	G44.1
Nausea	Nausea	R11.0
Nausea	Nausea with vomiting, unspecified	R11.2
Nausea	Vomiting without nausea	R11.11
Nausea	Vomiting, unspecified	R11.10
Nausea	Change in bowel habit	R19.4
Nausea	Other noninfective gastroenteritis and colitis	K52*
Nausea	Constipation	K59*
Nausea	Diarrhea	R19.7
Nausea	Functional disorder of GI tract	K92.9
Nausea	Irritable bowel syndrome	K58*
Nausea	Other specified symptoms and signs involving the digestive system and abdomen	R19.8
Nausea	Unspecified abdominal pain	R109
Nausea	Periumbilical pain	R1033
Nausea	Noninfective gastroenteritis and colitis, unspecified.	K529
Rash, not injection site	Changes in skin texture	R23.4
Rash, not injection site	Dermatitis	L30.9
Rash, not injection site	Dermatosis	L98.9
Rash, not injection site	Other and unspecified skin changes	R23.8
Rash, not injection site	Rash and other nonspecific skin eruption	R21
Rash, not injection site	Raynaud's syndrome	I73.00
Rash, not injection site	Spontaneous ecchymoses	R23.3
Rash, not injection site	Exfoliation due to erythematous conditions according to extent of body surface involved	L49*
Rash, not injection site	Urticaria	L50*
Rash, not injection site	Erythema multiforme	L51*
Rash, not injection site	Erythema nodosum	L52*
Rash, not injection site	Other erythematous conditions	L53*
Rash, not injection site	Erythema in diseases classified elsewhere	L54*
Rash, not injection site	Erythematous condition, unspecified.	L53.9
Rash, not injection site	Urticaria	L50*
Rash, not injection site	Other pruritus	L29.8
Rash, not injection site	Pruritus, unspecified	L29.9
Rash, not injection site	Disturbances of skin sensation	R20*
Rash, not injection site	Disorder of the skin and subcutaneous tissue, unspecified	L98.9
Rash, not injection site	Pyogenic granuloma	L98.0
Rash, not injection site	Factitial dermatitis	L98.1
Rash, not injection site	Febrile neutrophilic dermatosis [Sweet]	L98.2
Rash, not injection site	Eosinophilic cellulitis [Wells]	L98.3
Rash, not injection site	Non-pressure chronic ulcer of skin, not elsewhere classified	L98.4
Rash, not injection site	Mucinosis of the skin.	L98.5
Rash, not injection site	Pityriasis rosea	L42
Rash, not injection site	Other skin changes	R23*
Pre-syncope	Disorientation, unspecified, confusion	R41.0
Pre-syncope	Dizziness and giddiness (including light headedness and Vertigo)	R42
Pre-syncope	Benign paroxysmal positional vertigo	H81.10
Pre-syncope	Disorders of vestibular function	H81*
Pre-syncope	Epidemic Vertigo	A88.1
Pre-syncope	Left benign paroxysmal positional vertigo	H81.12
Pre-syncope	Other peripheral vertigo	H81.3
Pre-syncope	Right benign paroxysmal positional vertigo	H81.11
Pre-syncope	Vertiginous syndrome	H81.90
Pre-syncope	Disorders of the autonomic nervous system	G90
Pre-syncope	Orthostatic hypotension	I95.1
Pre-syncope	Postural orthostatic tachycardia syndrome	I49.8
Pre-syncope	Syncope	R55
Tachycardia	Atrial fibrillation	I48.91
Tachycardia	Atrial fibrillation with rapid ventricular response	I48.91
Tachycardia	Atrial fibrillation, paroxysmal	I48.0

Tachycardia	Atrial fibrillation, permanent	I48.21
Tachycardia	Atrial flutter	I48.92
Tachycardia	Atrial premature beats	I49.1
Tachycardia	Bradycardia	R00.1
Tachycardia	Cardiac arrhythmia	I49.9
Tachycardia	Palpitations	R00.2
Tachycardia	Premature ventricular beats	I49.3
<hr/>		
Chest pain	Chest pain, unspecified	R07.9
Chest pain	Unstable angina	I20.0
Chest pain	Angina pectoris with documented spasm	I20.1
Chest pain	Other forms of angina pectoris	I20.8
Chest pain	Angina pectoris, unspecified	I20.9
Chest pain	Atypical chest pain	R07.89
Chest pain	Chest pain in breathing	R07.1
Chest pain	Chest pain, unspecified	R07.9
Chest pain	Costochondritis	M94.0
Chest pain	Intercostal pain	R07.82
Chest pain	Other chest pain	R07.8
Chest pain	Pleurisy	R09.1
Chest pain	Pleurodynia	R07.81
Chest pain	Precordial pain	R07.2

\*Includes all ICD-10 codes contained within diagnosis category  
ICD= International Classification of Diseases

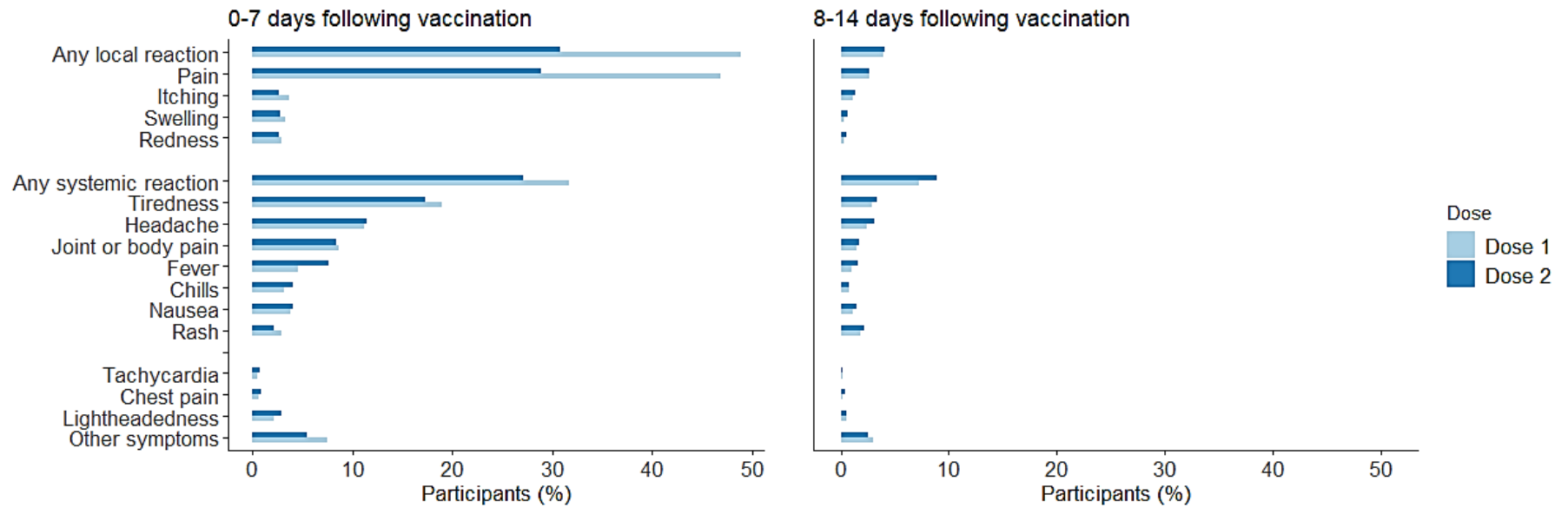
**APPENDIX C. Kaiser Permanente Side Effect Monitor Survey Participation**

	All vaccinated patients		Participation rate*			
	Dose 1	Dose 2	Dose 1		Dose 2	
				P value <sup>†</sup>		P value <sup>†</sup>
<b>Total</b>	79,780	80,692	7.8%		6.4%	
<b>Age at vaccination, years</b>				0.238		0.717
5	10,068	9,530	8.8%		5.1%	
6	10,076	10,135	8.9%		4.8%	
7	10,549	10,802	8.3%		4.3%	
8	11,065	11,278	8.2%		4.5%	
9	12,006	12,219	7.4%		3.9%	
10	12,527	12,957	7.0%		3.6%	
11	13,489	13,771	6.6%		3.4%	
<b>Sex</b>				0.500		0.856
Female	39,222	39,815	7.8%		4.2%	
Male	40,545	40,866	7.7%		4.2%	
<b>Race/Ethnicity</b>				0.021		0.728
Hispanic	34,747	35,567	7.0%		3.9%	
Asian	13,482	13,686	5.9%		3.0%	
Black	4,584	4,885	5.8%		3.1%	
Other	5,027	5,061	7.4%		4.0%	
White	16,158	15,853	11.8%		6.4%	
Unknown	5,782	5,640	7.3%		4.0%	
<b>Insurance status</b>				0.021		0.499
State-subsidized	15,345	15,753	6.2%		3.2%	
Not subsidized	64,435	64,939	8.1%		4.4%	

\*Participants with at least one documented report via KPSEM within 14 days following receipt of vaccination/ total vaccinated population.

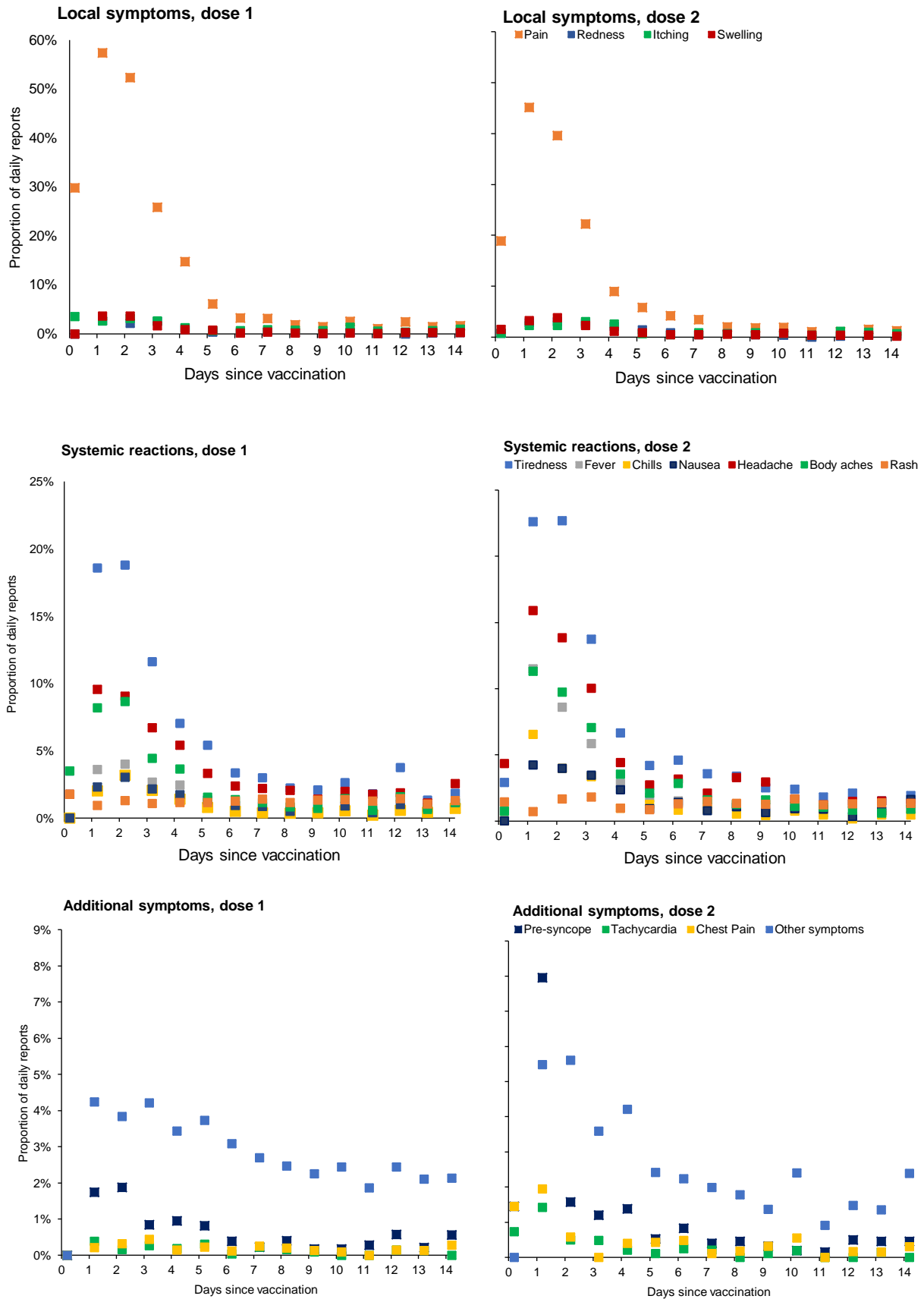
†Differences in participation rate were compared across demographic characteristics using chi-square tests or Fisher's exact test.

**APPENDIX D. Self-reported symptoms, by dose and week following vaccination\***



\*Denominator: All participants who have one documented report via KPSEM within 14 days following receipt of vaccination, regardless of analysis time period.

## APPENDIX E. Self-reported symptoms, by dose and day following vaccination



## Appendix F. Kaiser Permanente Side Effect Monitor Survey responses by dose and prior SARS-CoV-2 infection status

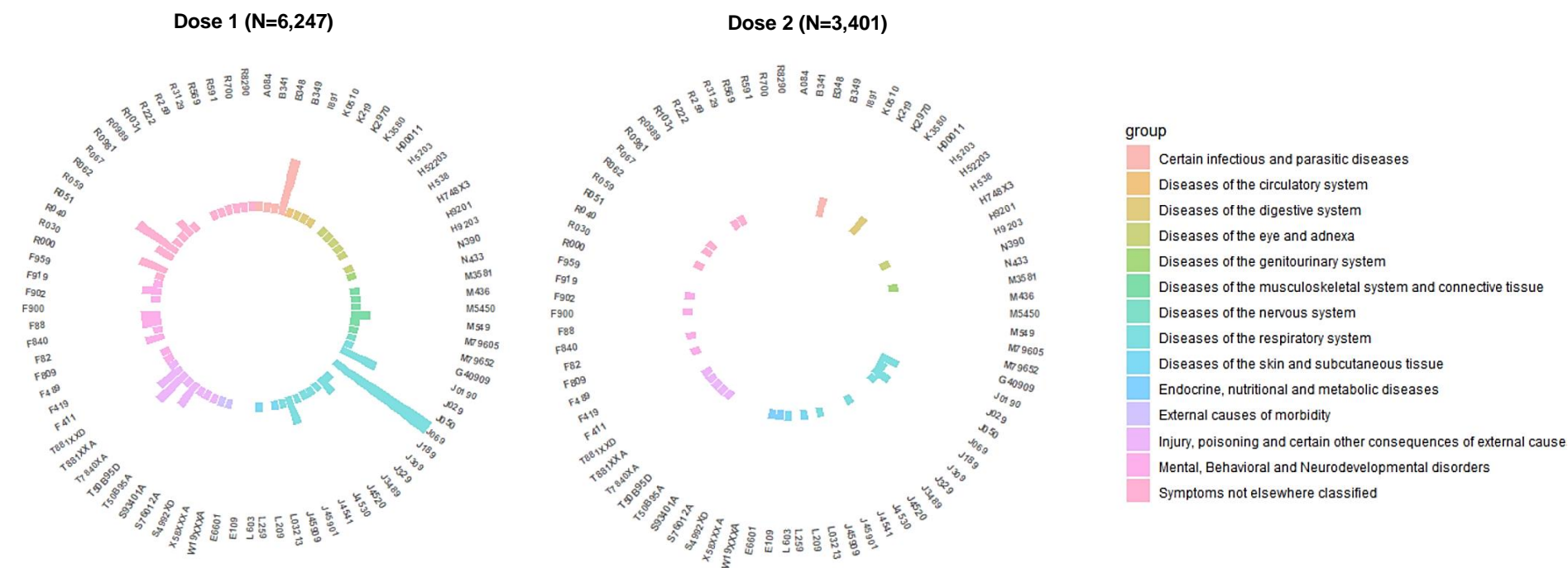
Symptom	Dose 1		Dose 2	
	No prior SARS-CoV-2 infection	Prior SARS-CoV-2 infection*	No prior SARS-CoV-2 infection	Prior SARS-CoV-2 infection*
	N (%)	N (%)	N	N
<b>All</b>	5,597 (100%)	650 (100%)	3,056 (100%)	345 (100%)
<b>Any symptom*</b>	<b>3472(62.0%)</b>	<b>462(71.1%)</b>	<b>1402(45.9%)</b>	<b>199(57.7%)</b>
<b>Local reaction</b>				
Any systemic	2755(49.2%)	385(59.2%)	963(31.5%)	150(43.5%)
Pain	2621(46.8%)	367(56.5%)	885(29.0%)	143(41.4%)
Itching	246(4.4%)	35(5.4%)	105(3.4%)	14(4.1%)
Swelling	181(3.2%)	32(4.9%)	94(3.1%)	16(4.6%)
Redness	161(2.9%)	34(5.2%)	86(2.8%)	
<b>Systemic reaction</b>				
Any systemic	1903(34.0%)	273(42.0%)	933(30.5%)	143(41.4%)
Fever	269(4.8%)	61(9.4%)	244(8.0%)	48(13.9%)
Chills	187(3.3%)	33(5.1%)	127(4.2%)	28(8.1%)
Fatigue	1097(19.6%)	165(25.4%)	559(18.3%)	90(26.1%)
Myalgia	510(9.1%)	74(11.4%)	278(9.1%)	47(13.6%)
Headache	660(11.8%)	115(17.7%)	371(12.1%)	76(22.0%)
Nausea	247(4.4%)	41(6.3%)	136(4.5%)	32(9.3%)
Rash	237(4.2%)	31(4.8%)	113(3.7%)	12(3.5%)
<b>Additional symptom</b>				
Pre-syncope	123(2.2%)	22(3.4%)	89(2.9%)	18(5.2%)
Chest pain	35(0.6%)	7(1.1%)	37(1.2%)	5(1.4%)
Tachycardia	34(0.6%)	3(0.5%)	21(0.7%)	5(1.4%)
Other	497(8.9%)	85(13.1%)	213(7.0%)	31(9.0%)

\* Number of study participants whose parents or guardians reported any of the symptoms or reactions at least once in the 0-14 days following vaccination.

† Prior COVID-19 was defined as any documentation of SARS-CoV-2 positive laboratory result of COVID-19 diagnosis in electronic health records prior to the date of vaccination, or any self-reported prior COVID-19 infection prior to or at the time of vaccination.



**APPENDIX G.** Diagnosis codes\* for medical encounters 0-21 days following BNT162b2 vaccination among participants who reported seeking medical care for post-vaccine symptoms and reported “other” symptoms (i.e., outside of the pre-selected symptoms), by dose†



\*Pre-fixes of ICD-10 codes correspond to the following disease groups: A & B = Certain infectious and parasitic diseases; E= Endocrine, nutritional and metabolic diseases; F= Mental, Behavioral and Neurodevelopmental disorders; G = Diseases of the nervous system; H = Diseases of the eye and adnexa; I = Diseases of the circulatory system; J = Diseases of the respiratory system; K = Diseases of the digestive system; L = Diseases of the skin and subcutaneous tissue; M = Diseases of the musculoskeletal system and connective tissue; N = Diseases of the genitourinary system; R = Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified; S= Injury, poisoning and certain other consequences of external causes; W & X = External causes of morbidity.

† A participant may be represented more than once on this chart if they have multiple diagnosis codes.