

SUPPLEMENTARY TABLE S1. Geometric mean concentrations (µg/mL) and 95% confidence intervals before and after PPSV23 vaccination in COPD patients in Tangshan City, Hebei Province, China during September to December, 2019.

Serotype	Age group						Severity of COPD						Comorbidities						Total	
	<65 years		≥65 years		Mild and moderate		Severe and very severe		Yes		No		Pre		Post		Pre	Post		
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post						
1	1.61 (1.25-2.07)	9.93 (7.01-14.08)	1.83 (1.48-2.28)	8.91 (6.62-11.99)	1.69 (1.39-2.05)	10.02 (7.43-13.50)	1.75 (1.28-2.42)	8.47 (5.89-12.16)	1.81 (1.40-2.35)	8.49 (5.92-12.17)	1.63 (1.31-2.03)	10.35 (7.66-13.98)	1.71 (1.45-2.02)	9.45 (7.52-11.87)						
2	3.56 (2.85-4.45)	29.46 (20.33-42.69)	4.74 (3.78-5.94)	33.30 (23.84-46.51)	3.96 (3.30-4.75)	34.76 (25.50-47.37)	5.87 (3.08-5.87)	25.43 (16.57-39.01)	4.30 (3.32-5.58)	30.95 (20.54-46.66)	3.86 (3.15-4.73)	31.36 (22.95-42.84)	4.06 (3.46-4.76)	31.17 (24.33-39.94)						
3	0.34 (0.27-0.42)	1.14 (0.86-1.51)	0.42 (0.33-0.55)	0.93 (0.72-1.19)	0.38 (0.31-0.48)	0.98 (0.75-1.27)	0.36 (0.28-0.46)	1.15 (0.90-1.47)	0.43 (0.33-0.57)	1.01 (0.73-1.40)	0.33 (0.27-0.40)	1.06 (0.85-1.32)	0.38 (0.32-0.44)	1.03 (0.86-1.25)						
4	0.40 (0.27-0.59)	1.99 (1.18-3.37)	0.38 (0.24-0.58)	1.78 (1.36-2.33)	0.42 (0.31-0.59)	1.90 (1.25-2.89)	0.34 (0.19-0.60)	1.88 (1.25-2.84)	0.35 (0.21-0.58)	1.39 (0.80-2.44)	0.43 (0.32-0.59)	2.46 (1.82-3.31)	0.39 (0.29-0.52)	1.89 (1.40-2.56)						
5	1.20 (1.00-1.44)	5.71 (4.39-7.42)	1.21 (0.98-1.48)	7.32 (5.41-9.91)	1.25 (1.06-1.48)	7.28 (5.60-9.46)	1.11 (0.87-1.42)	5.03 (3.81-6.65)	1.21 (0.96-1.52)	6.12 (4.36-8.58)	1.20 (1.02-1.41)	6.66 (5.27-8.41)	1.20 (1.05-1.38)	6.40 (5.26-7.79)						
6B	2.03 (1.63-2.53)	7.96 (5.42-11.69)	2.15 (1.71-2.71)	7.45 (5.62-9.87)	2.04 (1.71-2.44)	9.06 (6.52-12.60)	2.18 (1.59-2.98)	5.71 (4.22-7.73)	2.07 (1.59-2.71)	7.30 (5.04-10.58)	2.10 (1.73-2.54)	8.09 (5.85-11.20)	2.09 (1.78-2.44)	7.72 (6.07-9.81)						
7F	1.28 (1.07-1.52)	10.01 (7.41-13.52)	1.62 (1.28-2.06)	10.00 (7.14-13.99)	1.49 (1.23-1.80)	10.39 (7.89-13.68)	1.32 (1.05-1.65)	9.32 (6.35-13.68)	1.59 (1.23-2.05)	11.09 (7.49-16.43)	1.30 (1.11-1.53)	9.16 (7.18-11.68)	1.43 (1.23-1.65)	10.00 (8.03-12.46)						
8	2.50 (1.96-3.19)	15.09 (11.33-20.08)	2.72 (2.14-3.46)	11.85 (9.21-15.24)	2.41 (1.98-2.93)	13.12 (10.25-16.80)	3.00 (2.18-4.13)	14.23 (10.40-19.47)	3.07 (2.26-4.18)	12.74 (8.92-18.19)	2.26 (1.91-2.67)	14.18 (11.67-17.23)	2.60 (2.20-3.08)	13.50 (11.15-16.34)						
9N	2.22 (1.77-2.78)	21.33 (15.25-29.83)	2.90 (2.20-3.82)	17.71 (13.76-22.79)	2.56 (2.05-3.18)	20.16 (15.21-26.72)	2.42 (1.79-3.29)	18.53 (13.39-25.64)	2.41 (1.83-3.18)	19.35 (13.49-27.75)	2.59 (2.06-3.27)	19.77 (15.29-25.57)	2.51 (2.11-2.99)	19.57 (15.84-24.20)						
9V	1.78 (1.36-2.32)	9.35 (6.90-12.66)	2.59 (2.07-3.26)	11.60 (9.29-14.49)	2.16 (1.70-2.76)	11.02 (8.44-14.40)	2.03 (1.57-2.61)	9.13 (7.20-11.59)	2.18 (1.64-2.90)	10.71 (7.86-14.59)	2.06 (1.63-2.61)	10.00 (7.82-12.79)	2.12 (1.77-2.53)	10.32 (8.53-12.49)						
10A	3.58 (2.93-4.37)	30.60 (20.47-45.75)	3.77 (3.02-4.72)	16.43 (11.11-24.31)	3.40 (2.81-4.11)	21.91 (15.37-31.21)	4.23 (3.36-5.33)	25.13 (15.20-41.57)	3.87 (3.04-4.93)	18.69 (12.39-28.18)	3.50 (2.92-4.21)	27.42 (18.38-40.90)	3.67 (3.17-4.25)	22.98 (17.29-30.53)						
11A	2.17 (1.77-2.65)	7.17 (5.70-9.02)	2.59 (2.14-3.13)	7.95 (6.19-10.22)	2.34 (1.95-2.82)	7.88 (6.30-9.86)	2.37 (1.93-2.90)	6.89 (5.41-8.77)	2.38 (1.89-2.99)	7.73 (5.77-10.36)	2.33 (1.96-2.76)	7.35 (6.07-8.90)	2.35 (2.05-2.70)	7.52 (6.37-8.88)						
12F	0.37 (0.26-0.52)	3.13 (2.09-4.67)	0.54 (0.44-0.66)	3.26 (2.27-4.69)	0.45 (0.34-0.60)	3.52 (2.46-5.04)	0.43 (0.33-0.54)	2.65 (1.79-3.93)	0.50 (0.34-0.73)	3.26 (2.09-5.07)	0.39 (0.32-0.48)	3.13 (2.23-4.40)	0.44 (0.36-0.54)	3.19 (2.44-4.17)						
14	6.45 (5.26-7.91)	28.99 (20.25-41.52)	7.46 (5.88-9.47)	32.03 (22.18-46.27)	6.41 (5.33-7.71)	31.45 (23.27-42.50)	7.91 (5.98-10.46)	28.41 (17.58-45.92)	7.19 (5.52-9.36)	32.97 (22.42-48.49)	6.66 (5.56-7.98)	28.29 (20.05-39.92)	6.90 (5.92-8.04)	30.36 (23.58-39.07)						
15B	3.75 (2.88-4.89)	27.07 (18.44-39.73)	4.17 (3.23-5.38)	26.17 (19.03-35.97)	3.85 (3.09-4.80)	25.71 (18.70-35.35)	4.10 (2.93-5.75)	28.49 (18.75-43.29)	4.27 (3.19-5.71)	23.15 (16.24-33.00)	3.68 (2.91-4.66)	30.05 (21.04-42.92)	3.94 (3.28-4.72)	26.65 (20.78-34.18)						
17F	1.63 (1.36-1.95)	11.37 (8.35-15.49)	1.92 (1.49-2.48)	13.47 (10.45-17.36)	1.75 (1.47-2.08)	13.43 (10.39-17.35)	1.77 (1.31-2.39)	10.43 (7.51-14.48)	1.74 (1.36-2.23)	10.73 (7.84-14.68)	1.77 (1.46-2.14)	13.81 (10.61-17.98)	1.76 (1.51-2.04)	12.29 (10.06-15.02)						
18C	1.49 (1.19-1.88)	8.54 (6.52-11.18)	1.92 (1.57-2.35)	9.49 (7.09-12.71)	1.62 (1.34-1.97)	9.13 (7.12-11.70)	1.78 (1.36-2.34)	8.67 (6.24-12.05)	1.68 (1.29-2.18)	9.89 (7.01-13.96)	1.68 (1.40-2.02)	8.25 (6.63-10.26)	1.68 (1.44-1.96)	8.97 (7.38-10.89)						
19A	3.44 (2.74-4.32)	17.96 (12.62-25.56)	4.19 (3.29-5.32)	18.74 (13.75-25.54)	3.69 (3.06-4.46)	19.82 (14.73-26.66)	3.91 (2.82-5.41)	15.79 (11.35-23.39)	3.95 (3.02-5.17)	16.24 (11.55-22.82)	3.62 (2.94-4.44)	20.30 (14.61-28.20)	3.77 (3.20-4.44)	18.31 (14.50-23.13)						
19F	2.75 (2.15-3.51)	15.02 (10.95-20.60)	3.52 (2.82-4.40)	16.05 (11.73-21.96)	2.85 (2.40-3.39)	18.28 (13.94-23.96)	3.55 (2.47-5.10)	11.35 (7.86-16.40)	3.18 (2.44-4.16)	13.97 (9.72-20.06)	3.00 (2.41-3.72)	16.91 (12.87-22.24)	3.08 (2.61-3.64)	15.49 (12.44-19.28)						
20	3.19 (2.2-4.60)	19.14 (13.31-27.52)	4.33 (3.61-5.18)	19.84 (14.96-26.31)	3.50 (2.63-4.65)	17.82 (13.22-24.02)	4.02 (2.94-5.51)	22.93 (15.82-33.24)	3.17 (2.16-4.66)	17.88 (12.56-25.45)	4.16 (3.33-5.21)	20.91 (15.28-28.63)	3.67 (3.17-4.25)	19.46 (15.45-24.50)						
22F	2.63 (2.19-3.16)	8.53 (6.49-11.20)	3.09 (2.58-3.70)	9.19 (7.23-11.69)	2.82 (2.43-3.27)	9.87 (7.87-12.36)	2.87 (2.24-3.67)	7.20 (5.32-9.75)	3.01 (2.48-3.66)	10.11 (7.65-13.36)	2.69 (2.26-3.20)	7.89 (6.21-10.02)	2.83 (2.50-3.22)	8.83 (7.37-10.57)						
23F	1.28 (1.04-1.56)	6.11 (4.44-8.40)	1.55 (1.22-1.98)	6.79 (5.03-9.15)	1.39 (1.15-1.67)	6.63 (4.99-8.81)	1.41 (1.06-1.89)	6.01 (4.26-8.48)	1.47 (1.12-1.93)	6.33 (4.59-8.75)	1.34 (1.13-1.59)	6.48 (4.78-8.77)	1.40 (1.20-1.63)	6.41 (5.16-7.96)						
33F	3.03 (2.45-3.76)	25.41 (17.99-35.87)	3.33 (2.69-4.11)	25.72 (19.66-33.64)	3.29 (2.75-3.94)	28.02 (21.02-37.35)	2.93 (2.22-3.87)	21.50 (15.31-30.20)	2.98 (2.36-3.76)	21.90 (15.35-31.24)	3.33 (2.73-4.06)	29.15 (22.09-38.45)	3.16 (2.73-3.67)	25.55 (20.52-31.81)						

Abbreviations: PPSV23=23-valent pneumococcal polysaccharide vaccine; COPD=chronic obstructive pulmonary disease.