

## Pneumococcal vaccination among adults 65–70 years of age before and during the COVID-19 pandemic

Table 1. Report of any prior pneumococcal vaccination ( $\geq 1$  dose) by age and birth year 1948-1956, NHIS 2015-2021\*

Birth year	N	By age 65 <sup>+</sup>	By age 66	By age 67	By age 68	By age 69	By age 70	Combined age 65-70 in 2018, 2019 (pre-pandemic), 2020, and 2021 (during pandemic) <sup>‡</sup>
1948	2,011			53.6 (48.2, 58.8)	65.1 (59.8, 70.0)	71.1 (64.6, 76.8)	70.3 (65.0, 75.0)	61.2 (58.9, 63.4)
1949	2,567		51.5 (45.2, 57.8)	59.6 (53.9, 65.1)	64.0 (58.5, 69.1)	65.8 (60.4, 70.8)	69.3 (63.8, 74.2)	59.7 (57.5, 61.8)
1950	3,168	48.6 (43.2, 54.0)	60.9 (55.5, 66.1)	62.0 (56.7, 66.9)	66.8 (61.5, 71.7)	66.1 (61.5, 70.5)	69.5 (64.3, 74.4)	60.1 (57.9, 62.3)
1951	3,087	44.7 (39.7, 49.8)	57.4 (51.7, 63.0)	63.1 (57.9, 68.0)	65.8 (61.1, 70.2)	64.8 (59.8, 69.4)	64.2 (59.0, 69.1)	58.5 (56.4, 60.5)
1952	2,515	49.2 (44.0, 54.4)	58.0 (52.4, 63.3)	61.3 (56.3, 66.1)	66.0 (60.9, 70.7)	66.9 (61.9, 71.6)		
1953	2,152	45.4 (40.2, 50.8)	56.2 (51.4, 60.8)	59.4 (54.4, 64.3)	59.7 (54.9, 64.4)			
1954	1,719	42.9 (38.4, 47.4)	57.3 (52.5, 61.9)	61.0 (55.7, 66.0)				
1955	1,107	44.9 (39.8, 50.1)	55.3 (50.7, 59.8)					
1956	508	44.4 (39.4, 49.6)						
Combined 2020-2021 (during pandemic) by age <sup>§</sup>	6496	44.7 (41.1, 48.3)	56.3 (53.0, 59.5)	60.2 (56.6, 63.7)	62.8 (59.3, 66.1)	65.8 (62.4, 69.2)	66.9 (63.3, 70.4)	59.3 (57.8, 60.8)

\*Table cells are shaded according to whether persons with the indicated birth year (rows) reached the age indicated (columns) in 2015–2017 and 2019 or 2018 (pre-pandemic, shaded in orange or yellow) or in 2020 or 2021 (during pandemic, shaded in blue). Cells shaded in yellow were used as the pre-pandemic referent cell (those reaching the age in 2018) for comparisons with pandemic cells, for each age indicated (column).

+ Age based on year of birth and survey year. For example, data for persons born in 1950 who reached age 65 were obtained from the 2015 NHIS, and some could have still been age 64 when interviews were conducted.

‡ Combined age 65–70 in 2018 or 2019 (pre-pandemic, shaded in yellow or orange; n=2,718 for 2018 and n=3,365 for 2019) and 2020 or 2021 (during pandemic, shaded in blue; n=3,509 for 2020 and n=2,987 for 2021).

§ Combined 2020–2021 (during pandemic) by age, persons with the indicated birth year (rows) reached the age indicated (columns) in 2020–2021 (combined two blue cell shadings) (e.g., for coverage by age 65 years, people born in 1955 or 1956 reached 65 in 2020 or 2021, which was during pandemic).

Table 2. Difference in vaccine coverage of pneumococcal vaccination (≥1 dose) by age and birth year 1948–1956, National Health Interview Survey 2015–2021\*

		By age 65 <sup>†</sup>	By age 66	By age 67	By age 68	By age 69	By age 70	Combined age 65-70 in 2018 (pre-pandemic), 2020, and 2021 (during pandemic)
Birth year	N							
1948	2011						ref	ref
1949	2567					ref		
1950	3168				ref		-0.8 (-7.9, 6.3)	-1.1 (-4.2, 2.0)
1951	3087			ref		-1.0 (-8.1, 6.1)	-6.1 (-13.2, 1.0)	-2.7 (-5.7, 0.3)
1952	2515		ref		-0.8 (-7.9, 6.3)	1.1 (-6.0, 8.2)		
1953	2152	ref			-7.1 (-14.1, -0.1) <sup>§</sup>			
1954	1719		-0.7 (-7.9, 6.5)					
1955	1107	-0.5 (-7.9, 6.9)	-2.7 (-9.8, 4.4)					
1956	508	-1.0 (-8.4, 6.4)						
Combined 2020–2021 (during pandemic) <sup>†</sup> compared with 2019 (pre-pandemic)		1.8 (-4.0, 7.6)	0.1 (-5.6, 5.8)	-1.1 (-7.2, 5.0)	-3.0 (-8.7, 2.7)	-0.3 (-5.9, 5.3)	-2.4 (-8.7, 3.9)	-0.4 (-3.0, 2.2)
Combined 2020–2021 (during pandemic) <sup>†</sup> compared with 2018 (pre-pandemic year)		-0.7 (-7.1, 5.7)	-1.7 (-8.0, 4.6)	-2.9 (-9.1, 3.3)	-4.0 (-10.1, 2.1)	0.0 (-6.2, 6.2)	-3.4 (-9.5, 2.7)	-1.9 (-4.6, 0.8)
Combined 2020–2021 (during pandemic) <sup>†</sup> compared with 2017 (pre-pandemic year)		-4.5 (-10.8, 1.8)	-1.1 (-7.6, 5.4)	-1.8 (-8.0, 4.4)	-1.2 (-7.5, 5.1)	-5.3 (-12.3, 1.7)		

Combined 2020-2021 (during pandemic) <sup>‡</sup> compared with 2016 (pre-pandemic year)	0.0 (-6.2, 6.2)	-4.6 (-10.8, 1.6)	0.6 (-6.2, 7.4)	-2.3 (-8.4, 3.8)	
Combined 2020-2021 (during pandemic) <sup>‡</sup> compared with 2015 (pre-pandemic year)	-3.9 (-10.4, 2.6)	4.8 (-2.3, 11.9)	6.6 (0.2, 13.0)**		

\* People in these reference birth years reached the given age in 2018 (pre-pandemic year) (e.g., for coverage by age 66 years, people born in 1952 reached 66 in 2018, which was before the pandemic). The pre-pandemic year (reference: yellow cell shading) is compared to pandemic years (2020 and 2021, blue cell shading; or 2020–2021, combined two blue cell shadings).

<sup>†</sup> Age based on year of birth and survey year. For example, data for persons born in 1950 who reached age 65 were obtained from the 2015 NHIS, and some could have still been age 64 when interviews were conducted.

<sup>‡</sup> Combined 2020–2021 (during pandemic) by age, persons with the indicated birth year (rows) reached the age indicated (columns) in 2020–2021 (combined two blue cell shadings) (e.g., for coverage by age 65 years, people born in 1955 or 1956 reached 65 in 2020 or 2021, which was during pandemic).

<sup>§</sup> p<0.05 by t-test for comparisons within each age with the reference level (2018 estimate for each age) as indicated.

\*\* p<0.05 by t-test for comparisons within each age with the reference level (2019, 2017, 2016, 2015 estimates for each age) as indicated.

Table 3. Report of any prior pneumococcal vaccination ( $\geq 1$  dose) by age and birth year 1948–1956, Behavioral Risk Factor Surveillance System 2015–2021\*

		By age 65 <sup>†</sup>	By age 66	By age 67	By age 68	By age 69	By age 70	Combined age 65-70 in 2018, 2019 (pre-pandemic), 2020, and 2021 (during pandemic) <sup>‡</sup>
Birth year	N							
1948	37,960			62.3 (60.2, 64.3)	68.1 (66.2, 69.9)	73.9 (71.9, 75.8)	74.3 (72.4, 76.0)	64.3 (63.3, 65.2)
1949	44,648		61.5 (59.4, 63.5)	65.6 (63.4, 67.7)	72.2 (70.0, 74.2)	70.4 (68.1, 72.6)	73.0 (70.9, 74.9)	64.0 (63.1, 64.9)
1950	52,345	50.9 (48.9, 53.0)	60.3 (58.2, 62.3)	67.9 (65.6, 70.1)	68.0 (65.4, 70.5)	71.1 (68.5, 73.5)	68.8 (65.9, 71.5)	60.7 (59.6, 61.9)
1951	52,626	49.2 (47.3, 51.2)	63.6 (61.3, 65.9)	66.4 (64.3, 68.5)	68.9 (66.9, 70.9)	66.8 (63.5, 69.9)	69.9 (67.2, 72.5)	61.4 (60.3, 62.4)
1952	42,472	52.9 (50.7, 55.0)	58.4 (56.1, 60.6)	66.2 (64.0, 68.4)	65.7 (63.1, 68.3)	70.9 (68.7, 73.0)		
1953	33,735	50.2 (48.0, 52.4)	59.6 (57.4, 61.7)	59.4 (56.6, 62.2)	68.3 (66.1, 70.5)			
1954	24,789	47.5 (45.3, 49.7)	60.2 (57.4, 62.9)	61.9 (59.3, 64.5)				
1955	16,611	46.2 (43.4, 49.0)	56.3 (53.6, 59.0)					
1956	9,118	44.7 (42.4, 47.0)						
Combined 2020–2021 (during pandemic) by age <sup>§</sup>		45.5 (43.7, 47.3)	58.3 (56.3, 60.2)	60.7 (58.7, 62.6)	67.0 (65.3, 68.7)	68.8 (66.8, 70.7)	69.3 (67.4, 71.2)	61.0 (60.3, 61.8)

\*Table cells are shaded according to whether persons with the indicated birth year (rows) reached the age indicated (columns) in 2015–2017 and 2019 or 2018 (pre-pandemic, shaded in orange or yellow) or in 2020 or 2021 (during pandemic, shaded in blue). Cells shaded in yellow were used as the pre-pandemic referent cell for comparisons with pandemic cells, for each age indicated (column).

<sup>†</sup> Age based on year of birth and survey year. For example, data for persons born in 1950 who reached age 65 were obtained from the 2015 BRFSS, and some could have still been age 64 when interviews were conducted.

<sup>‡</sup> Combined age 65–70 in 2018 or 2019 (pre-pandemic, shaded in yellow or orange; n=54,257 for 2018 and n=49,526 for 2019) and 2020 or 2021 (during pandemic, shaded in blue; n=46,123 for 2020 and n=50,552 for 2021).

<sup>§</sup> Combined 2020–2021 (during pandemic) by age, persons with the indicated birth year (rows) reached the age indicated (columns) in 2020–2021 (combined two blue cell shadings) (e.g., for coverage by age 65 years, people born in 1955 or 1956 reached 65 in 2020 or 2021, which was during pandemic).

Table 4. Difference in uptake of pneumococcal vaccination (≥1 dose) by age and birth year 1948–1956, Behavioral Risk Factor Surveillance System 2015–2021\*

Birth year	N	By age 65 <sup>†</sup>	By age 66	By age 67	By age 68	By age 69	By age 70	Combined age 65–70 years in 2018 (pre-pandemic), 2020, and 2021 (during pandemic)
1948	37960						ref	ref
1949	44648					ref		
1950	52345				ref		-5.5 (-8.8, -2.2) <sup>‡</sup>	-3.6 (-5.1, -2.1) <sup>‡</sup>
1951	52626			ref		-3.6 (-7.5, 0.3)	-4.4 (-7.6, -1.2) <sup>‡</sup>	-2.9 (-4.3, -1.5) <sup>‡</sup>
1952	42472		ref		-2.3 (-5.9, 1.3)	0.5 (-2.6, 3.6)		
1953	33735	ref		-7.0 (-10.5, -3.5) <sup>‡</sup>	0.3 (-3.1, 3.7)			
1954	24789		1.8 (-1.8, 5.4)	-4.5 (-7.8, -1.2) <sup>‡</sup>				
1955	16611	-4.0 (-7.6, -0.4) <sup>‡</sup>	-2.1 (-5.6, 1.4)					
1956	9118	-5.5 (-8.7, -2.3) <sup>‡</sup>						
Combined 2020–2021 (during pandemic) <sup>§</sup> compared with 2019 (pre-pandemic)		-2.0 (-4.8, 0.8)	-1.3 (-4.2, 1.6)	-5.5 (-8.4, -2.6)**	-1.9 (-4.5, 0.7)	-2.3 (-5.5, 0.9)	-3.7 (-6.5, -0.9)**	-3.0, (-4.2, -1.8)**
Combined 2020–2021 (during pandemic) <sup>§</sup> compared with 2018 (pre-pandemic)		-4.7 (-7.5, -1.9) <sup>‡</sup>	-0.1 (-3.1, 2.9)	-5.7 (-8.6, -2.8) <sup>‡</sup>	-1.0 (-4.1, 2.1)	-1.6 (-4.6, 1.4)	-5.0 (-7.6, -2.4) <sup>‡</sup>	-3.3 (-4.5, -2.1) <sup>‡</sup>
Combined 2020–2021 (during pandemic) <sup>§</sup> compared with 2017 (pre-pandemic)		-7.4 (-10.2, -4.6)**	-5.3 (-8.3, -2.3)**	-7.2 (-10.2, -4.2)**	-5.2 (-7.9, -2.5)**	-5.1 (-7.9, -2.3)**		
Combined 2020–2021 (during pandemic) <sup>§</sup> compared with 2016 (pre-pandemic)		-3.7 (-6.4, -1.0)**	-2.0 (-4.8, 0.8)	-4.9 (-7.8, -2.0)**	-1.1 (-3.6, 1.4)			

Combined 2020–2021 (during pandemic) <sup>§</sup> compared with 2015 (pre-pandemic)	-5.4 (-8.1, -2.7)**	-3.2 (-6.0, -0.4)**	-1.6 (-4.4, 1.2)	
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\*People in these reference birth years reached the given age in 2018 (pre-pandemic year) (e.g., for coverage by age 66 years, people born in 1952 reached 66 in 2018, which was before the pandemic). The pre-pandemic year (reference: yellow cell shading) is compared to pandemic years (2020 and 2021, blue cell shading; or 2020–2021, combined two blue cell shadings).

† Age based on year of birth and survey year. For example, data for persons born in 1950 who reached age 65 were obtained from the 2015 BRFSS, and some could have still been age 64 when interviews were conducted.

‡ p<0.05 by t-test for comparisons within each age with the reference level (2018 estimate for each age) as indicated.

§ Combined 2020–2021 (during pandemic) by age, persons with the indicated birth year (rows) reached the age indicated (columns) in 2020–2021 (combined two blue cell shadings) (e.g., for coverage by age 65 years, people born in 1955 or 1956 reached 65 in 2020 or 2021, which was during pandemic).

\*\* p<0.05 by t-test for comparisons within each age with the reference level (2019, 2017, 2016, 2015 estimates for each age) as indicated.