

Supplementary Table 3. Seroconversion after one dose of measles vaccine by age at first vaccination

Author, year (strain) (ref)	N ¹	Serocon -version dfn ²	Seroconversion risk by age at MCV1 ³ [95%CI]								
			<6	6	7-8	9	10-11	12	13-14	15	>15
Stewien, 1978 (Schwarz) [108]	38	4-fold			0.42 [0.14-0.70]	0.79 [0.61-0.97]		1.00 [-]			
Mittal, 1979 (Schwarz) [109]	23	4-fold					0.82 [0.59-1]		0.92 [0.76-1]		
Shaoyuan, 1982 ⁴ (Jing55) [110]	82	4-fold	0.20 [0.06-0.34]		0.46 [0.26-0.66]	0.75 [0.54-0.96]		0.92 [0.76-1]			
Dequadros, 1983 (Moraten) [111]	1633	4-fold		0.59 [0.54-0.64]	0.76 [0.73-0.80]	0.87 [0.83-0.91]	0.94 [0.91-0.96]	0.97 [0.94-1]			
Ekunwe, 1985 (Moraten) [52]	108	4-fold		0.74 [0.61-0.88]	0.79 [0.65-0.93]	0.86 [0.71-1]		0.87 [0.69-1]			
Kakakios, 1990 [112] (Schwarz/Moraten)	329	4-fold						0.97 [0.94-1]	0.94 [0.91-0.97]	0.98 [0.95-1]	
Rogers, 1991 (E-Z) [113]	39	4-fold	0.74 [0.58-0.91]	1.00 [-]		1.00 [-]					
Abanamy, 1992 (Schwarz) [114]	78	4-fold		0.56 [0.37-0.75]		0.70 [0.57-0.82]					
Kaan, 1992 (Schwarz) [54]	170	4-fold	0.58 [0.39-0.77]			0.70 [0.62-0.79]			0.79 [0.67-0.92]		
Gans, 1998 (Moraten) [115]	65	4-fold		0.65 [0.46-0.85]		0.90 [0.77-1]		1.00 [-]			
Gans, 2004 (Moraten) [73]	130	4-fold		0.86 [0.74-0.99]		0.95 [0.86-1]		0.98 [0.94-1]			
Miller, 1967 (Schwarz) [116]	46	+/- PRE	0.73 [0.46-0.99]			1.00 [-]		1.00 [-]			
Ruben, 1973 (LFA) [117]	165	+/- PRE		0.61 [0.47-0.76]		0.81 [0.74-0.88]					
Dick, 1975 (Moraten) [56]	64	+/- PRE		0.23 [0-0.46]	0.52 [0.32-0.72]	0.81 [0.64-0.98]		0.80 [0.45-1]			

Wallace, 1976 (Schwarz) [118]	136	+/- PRE			0.64 [0.47-0.80]				0.89 [0.83-0.95]			
Guyer, 1977 (Schwarz) [57]	21	+/- PRE		0.50 [0.22-0.78]				0.89 [0.68-1]				
Wilkins, 1979 (Moraten) [119]	851	+/- PRE		0.32 [0.16-0.49]	0.64 [0.50-0.78]	0.72 [0.60-0.84]	0.92 [0.86-0.98]	0.95 [0.93-0.97]	0.96 [0.91-1]	0.93 [0.79-1]	0.95 [0.82-1]	
Ogunmekan, 1981 (Moraten) [120]	77	+/- PRE	0.06 [0-0.16]	0.25 [0.08-0.42]	0.40 [0.21-0.59]	0.60 [0.30-0.90]						
Ogunmekan, 1981b (Schwarz) [121]	171	+/- PRE		0.56 [0.42-0.69]		0.55 [0.45-0.66]		0.40 [0.21-0.59]				
Shaoyuan, 1982 ⁴ (Jing55) [110]	1070	+/- PRE	0.64 [0.55-0.74]		0.84 [0.79-0.89]	0.94 [0.92-0.97]		0.97 [0.95-0.99]				
De Haas, 1983 (Sw/Moraten) [122]	56	+/- PRE			0.57 [0.31-0.83]	0.87 [0.73-1]			0.84 [0.68-1]			
Sehgal, 1983 (Schwarz) [123]	99	+/- PRE		0.80 [0.68-0.92]				0.83 [0.73-0.93]				
Climie, 1984 ⁵ (Schwarz) [124]	172	+/- PRE				1.00 [-]	0.96 [0.88-1]	1.00 [-]	1.00 [-]	0.97 [0.93-1]		
Job, 1984 (Moraten) [125]	181	+/- PRE		0.87 [0.80-0.94]		0.97 [0.93-1]		1.00 [-]				
Chen, 1985 (Schwarz) [126]	798	+/- PRE				0.95 [0.91-0.99]	0.95 [0.93-0.98]	0.99 [0.97-1]	0.98 [0.97-0.99]			
Halsey, 1985 (Moraten) [59]	333	+/- PRE		0.45 [0.31-0.59]	0.74 [0.65-0.83]	0.84 [0.75-0.94]	0.95 [0.90-0.99]	1.00 [-]				
Maluf, 1985 (NR) [61]	223	+/- PRE		0.50 [0.42-0.58]		0.52 [0.33-0.71]	0.77 [0.61-0.93]	0.70 [0.42-0.98]	0.80 [0.55-1]	0.81 [0.62-1]		
Soerensen, 1985 (Schwarz) [72]	1206	+/- PRE			0.53 [0.49-0.56]	0.75 [0.69-0.82]	0.79 [0.67-0.90]					
Lhuillier, 1989 (Schwarz) [127]	132	+/- PRE	0.96 [0.91-1]			0.98 [0.95-1]						
Tidjani, 1989 (AIK-C) [128]	130	+/- PRE	0.96 [0.93-1]			0.87 [0.73-1]						
Huang, 1990	160	+/- PRE						0.88		1.00		

Vesikari, 2012 (Moraten) [46]	1401	+/- PRE				0.73 [0.69-0.77]	0.88 ⁹ [0.85-0.91]	0.90 [0.87-0.93]			
Martins, 2014 (E-Z) [51]	489	+/- PRE	0.87 [0.82-0.92]			0.96 [0.93-0.98]					
WHO, 1977 (Schwarz) [48]	196	4 fold & +/- PRE	0.59 [0.47-0.71]	0.57 [0.41-0.74]	0.93 [0.86-1]		1.00 ⁹ [-]				
Saha, 1985 (Schwarz) [60]	769	4 fold & +/- PRE		0.33 [0.19-0.46]		0.53 [0.46-0.59]		0.42 [0.33-0.50]		0.41 [0.36-0.46]	
Diaz-Ortega, 1986 (Schwarz) [139]	237	4 fold & +/- PRE			0.55 ⁶ [0.33-0.77]	0.67 [0.54-0.80]	0.58 [0.46-0.70]	0.67 [0.54-0.81]		0.68 [0.55-0.80]	
Deivanayagam, 1990 (Schwarz) [53]	71	4 fold & +/- PRE		0.48 [0.26-0.69]	0.50 [0.36-0.64]						
Markowitz, 1990 (Schwarz) [140]	274	4 fold & +/- PRE	0.57 [0.49-0.65]		0.85 [0.79-0.91]						
Markowitz, 1990 (E-Z) [140]	322	4 fold & +/- PRE	0.77 [0.70-0.84]		0.96 [0.94-0.99]						
Bolotovskii, 1994 (AIK-C) [141]	281	4 fold & +/- PRE		0.83 [0.77-0.88]		0.94 [0.89-0.97]					
Bolotovskii, 1994 (E-Z) [141]	296	4 fold & +/- PRE		0.67 [0.59-0.74]		0.91 [0.86-0.95]					
Bolotovskii, 1994 (L16) [141]	288	4 fold & +/- PRE		0.75 [0.68-0.81]		0.95 [0.91-0.98]					
Bolotovskii, 1994 (Schwarz) [141]	301	4 fold & +/- PRE		0.66 [0.58-0.73]		0.95 [0.91-0.98]					
Ndumbe, 1995 (Schwarz) [142]	45	4 fold & +/- PRE	0.57 [0.39-0.75]	0.71 [0.49-0.92]							
Ndumbe, 1995 (Conraught) [142]	68	4 fold & +/- PRE	0.59 [0.44-0.74]	0.82 [0.64-1]	0.83 [0.62-1]						
Klinge, 2000 (Moraten) [4]	118	4 fold & +/- PRE				0.85 [0.74-0.95]		0.97 [0.90-1]		1 [-]	
Redd, 2004 (Moraten) [5]	990	4 fold & +/- PRE				0.87 [0.84-0.91]		0.95 [0.93-0.97]		0.98 [0.97-1]	
He, 2014	280	4 fold &			0.99 ⁶			0.99			

(Hu 191) [47]		+/- PRE			[0.97-1]				[0.96-1]			
Gendrel, 1988 (Schwarz) [64]	37	Other (1)	0.45 ¹⁰ [0.23-0.67]	0.41 ¹¹ [0.18-0.65]								
Hussey, 1996 (Schwarz) [143]	45	Other (2)		0.92 [0.81-1]		0.95 [0.86-1]						
Lee, 1983 (Moraten) [144]	113	+		0.82 [0.64-1]	0.93 [0.84-1]	1 [-]	1 [-]	1 [-]				
McGraw, 1986 (Moraten) [62]	111	+			0.88 [0.77-0.99]	0.90 [0.80-1]	0.88 [0.76-1]				0.95 [0.86-1.04]	
Swami, 1987 (Schwarz) [63]	60	+	0.43 [0.22-0.64]			0.73 [0.54-0.91]			0.64 [0.42-0.87]			
Berry, 1992 (EZ) [55]	239	+	0.67 [0.58-0.76]			0.94 [0.90-0.98]						
Sakatoku, 1994 (Schwarz) [146]	159	+	0.46 [0.31-0.60]	0.87 [0.69-1]	0.93 [0.88-0.99]	0.92 [0.78-1]	0.91 [0.83-0.99]					
Garly, 2001 (EZ) [50]	292	+		0.95 [0.90-1]		0.99 [0.97-1]						
Garly, 2001 (Schwarz) [50]	416	+		0.78 [0.70-0.86]		0.97 [0.95-0.99]						
Zanetta, 2001 (Biken-CAM) [146]	290	+		0.31 [0.23-0.39]	0.44 [0.37-0.52]							
Fowlkes, 2011 (EZ) [45]	988	+		0.62 [0.58-0.66]		0.76 [0.72-0.80]						

Abbreviations: CI=Confidence interval; E-Z=Edmonston-Zagreb; NR=Not reported; MCV1= dose one of measles-containing vaccine

¹ Number of cases for the calculation of the age effect

² 4-fold= fourfold increase in paired samples pre and post-vaccination; +/-PRE= seropositivity among seronegative pre-vaccination; += seropositivity among all participants; other(1)= twofold increase; other(2)= fourfold rise two weeks after immunization or twofold rise three months after immunization or titer >200 mIU/ml;

³ By age in months of administration of MCV1

⁴ Data presented separately for seronegative and seropositive pre-vaccination

⁵ Age categories: 8.5 to 9.4 months; 9.5 to 11.4 months; 11.5 to 12.4 months; 12.5 to 14.4 months; 14.5 to 23 months

⁶8 months

⁷7 months

⁸8 to 15 months

⁹11 months

¹⁰3 to 4 months

¹¹5 to 7 months