

Review of the temporal and geographical distribution of measles virus genotypes in the prevaccine and postvaccine eras.

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**Table: Temporal and geographical distribution of measles genotypes 1950 - 2004**

(data reflects publications available as of August 2005)

**(\*country)**- country specified confirmed as source of importation/history of travel to country specified within accepted incubation dates for disease

**(?country)** - history of recent travel to country specified, however not confirmed as source of importation

**(\*unknown)** -source country of importation not known

\*\* Unique type strain, sequence analyses revealed isolate least divergent from wild-type A strain [1]

# Indicates suspected year of original infection for SSPE cases

Personal communication      Doris Chibo, VIDRL, Melbourne Australia

Genotype	Year of circulation	Country where measles identified (*country identified as source of importation)	Published reference
A (Wild-type)	1950s - 1960s	Japan & Russia & Finland & Romania & USA	[2, 3]
	1956 <sup>#</sup>	Northern Ireland (SSPE case**)	[1]
	1960	Czech Rep. & Slovakia	[4]
	1970s	Brazil	[5]
	1988; 1996	Russia	[4]
	1990 - 1998	USA & UK (*Russia) & Russia & China & Argentina	[2, 6-10]
B1	1983	Cameroon	[3, 11]
B2	1984	Gabon	[3, 11]
	2002; 2003	South Africa (*Angola); Angola	[12]
B3	1993	Gambia	[13]
	1994	France (*West Africa)	[14]
	1994; 1995	USA (*Kenya)	[2, 15]
	1994 - 1998	Gambia & Nigeria	[16]
	1997 - 1998	Nigeria & Ghana	[17]
	1998; 2001; 2002	UK (*unknown; unknown; unknown)	[8, 18]
	1997 - 2003	Sudan	[19, 20]
	2000	Germany (*unknown)	[21]
	2001, 2003	Spain (*Algeria, Equatorial Guinea)	[22]
	2001	Cameroon	[13]
	2001	Burkino Faso & Democratic Republic of Congo & Republic of Congo	[23]
	2002	USA (*Nigeria)	[24]
	2002: 2003	Tunisia : Libya	[25]

Genotype	Year of circulation	Country where measles identified (*country identified as source of importation)	Published reference
C1	1955 <sup>#</sup> ; 1956 <sup>#</sup> 1968 <sup>#</sup> ; 1971 <sup>#</sup> ; 1984 <sup>#</sup> Early 1970s 1970 - 1979; 1981 1979 Mid 1980s 1984; 1985 1992; 1993 1991 - 1994	Northern Ireland (SSPE cases) Japan (SSPE cases) USA (SSPE cell line) Spain (wild-type; SSPE) Canada Germany (SSPE cases) Japan Germany Argentina	[1] [26] [27] [22, 27, 28 ] [29] [27] [27, 30] [27, 28 ] [31]

Genotype	Year of circulation	Country where measles identified (*country identified as source of importation)	Published reference
C2	1972 - 1983 1977 Mid 1980s 1984 1990 - 1991 1991; 1992; 1994 1990; 1992; 1993  1992 - 1995 1994; 1995; 1996 1996 1996; 1997; 1998 1996 - 1997 1996; 1997 1997; 1998 1997 1998 1998 - 1999 1999 - 2000; 2002; 2003 2002; 2003	Denmark USA Austria (SSPE) Canada Australia Netherlands Czech Rep. & Slovakia & Spain; Germany UK USA (*unknown; Italy; Germany) Brazil UK (*Europe) Luxembourg (*Belgium & unknown) Germany; Denmark USA (*Germany; Zimbabwe) Canada (*Germany & France) Netherlands Morocco Germany  Spain	[32] [3] [27] [29] [33] [27, 28, 34, 35] [4, 22, 27, 28, 34]  [34, 36] [2, 15] [37] [8] [35] [4, 38] [39] [29] [40] [41] [21, 42]  [22]
D1	1960s <sup>#</sup> & 1970s <sup>#</sup> 1973 - 1981 1974; 1980 <sup>#</sup> 1983; 1986	Northern Ireland & UK (SSPE cases) Australia UK (wild-type; SSPE) Northern Ireland	[1, 36] [33] [1, 27] [36]

Genotype	Year of circulation	Country where measles identified (*country identified as source of importation)	Published reference
D2	1978 - 1996 1992; 1999 - 2002 1999 - 2000 1999; 2000 2000	South Africa Zambia Ireland UK (*unknown & Spain; Ireland) USA (*Ireland)	[16, 34, 43] [16, 44](unpublished data) [45] [8] [39]
D3	1983; 1989 - 1992 1983 - 2001 1991 - 1994 1994 1988; 1991; 1994 - 1995 1996 1997 1997 1993 <sup>#</sup> ; 1999 1999 1999 2000; 2001; 2002; 2004 2001 2001 2002	USA Japan Micronesia Taiwan UK  USA (*Philippines) Denmark (*unknown) South Africa (SSPE) Papua New Guinea (SSPE cases) Australia (*Japan) Canada (*Japan) USA (*all from Philippines)  Australia (*USA) Canada (*unknown) Papua New Guinea	[15, 27] [5, 30, 46, 47] [48] [49] [36, 50]  [9] [38] [51] [52] [53] [29] [24, 39]  [53] [29] (Chibo, personal communication)

Genotype	Year of circulation	Country where measles identified (*country identified as source of importation)	Published reference
D4	1978 - 1997	South Africa & Namibia	[16, 34, 43]
	1988 - 1989	Canada	[3, 29]
	1989	Pakistan	[32, 54]
	1995 - 1997; 1999; 2000; 2001	USA (*unknown; India & Kenya; Japan & Ethiopia; Pakistan & Kenya)	[2, 15, 39]
	1995; 1996; 1997; 1998; 2000; 2001	UK (*India & USA; Pakistan; India; Pakistan; Pakistan & India; Afghanistan)	[8]
	1997 - 1998	India	[55]
	1998	Denmark (*unknown)	[38]
	1998	Australia (*unknown)	[33]
	1998; 1999	Netherlands (*India); Nepal	[49]
	1998 - 1999	Ethiopia	[56]
	1998 - 2000; 2002	Russia	[57]
	2000; 2002	Germany (*unknown; unknown)	[21, 42]
	2002	Spain (*unknown)	[22]
	2002	UK (*Pakistan)	[18]
	2002	Canada (*India)	[29]
	2002	Australia (*unknown & Ethiopia)	(Chibo, personnel communication)
	2002	Kenya	[58]
	2002; 2003	USA (*Pakistan; Lebanon)	[24]
	2003	Syria & Iran	[25]
	2003 - 2004	Croatia	[59]

Genotype	Year of circulation	Country where measles identified (*country identified as source of importation)	Published reference
D5	1985 - 2001	Japan	[30, 46, 47, 60]
	1993	Micronesia (Island of Palau (*Japan))	[48]
	1993	Korea	[61]
	1993 - 1994	Thailand	[15]
	1994; 1995; 1996	USA (*Japan & unknown; Japan; Japan)	[2, 15]
	1995; 1997; 2000;	UK (*unknown; Malaysia; Bangladesh;	[8]
	2001	Thailand & Sth America)	
	1996	Canada (*?USA)	[29]
	1997	Namibia	[16]
	1998	Australia (*unknown)	[33]
	1997 - 2001	USA (*Japan & unknown)	[39]
	1999; 2000; 2001	Australia (*Thailand; unknown; Japan &	[53]
	2001	Guam & Thailand & UK & unknown)	
	2001	Brazil (*Japan)	[37]
	2001	Canada (*unknown & Germany & New	[29]
	2001 - 2002	Zealand)	
	2002	Cambodia	[62]
2002	Germany (*unknown)	[63]	
2002	UK	[64]	
2002	Guam (*unknown) & Thailand	[65]	
2002	Australia (*Thailand)	[66]	

Genotype	Year of circulation	Country where measles identified (*country identified as source of importation)	Published reference
D6	1990s #; 1992 - 1995 1993; 1994 1993 - 1996 1993 - 1996 1994 - 1997  mid - late 1990's 1995 - 2001 1996; 1999  1996 - 1997 1997 - 1999 1997 1997; 1998 1993; 1999 - 2000 1997; 1998 1999 1997; 1999; 2000  1997 - 2000 1999 - 2001; 2003 2000 - 2001 2001 2003	UK (SSPEcase); UK UK; Spain Spain Germany USA (*Spain & Germany & UK & Austria & Italy & Greece & Ukraine & Brazil) Croatia Russia UK (*Greece & Germany; Poland & Ireland) Luxembourg (*Italy & Bosnia) Argentina Brazil Norway & Germany; Denmark Netherlands (*unknown) Russia; Poland Uruguay Canada (*unknown & ?USA; Netherlands; Bolivia & ?Belgium) USA (*UK & Europe & Brazil & Turkey) Germany Turkey Dominican Rep. & Haiti USA (*Israel)	[1, 36] [34] [27, 28] [4] [2, 15]  [67] [6] [8]  [35] [31, 68, 69] [70, 71] [38] [72] [4] [73] [29]  [39] [21, 42, 63] [74] [75] [24]

Genotype	Year of circulation	Country where measles identified (*country identified as source of importation)	Published reference
D7	1980s #	UK (SSPE cases)	[1]
	1985 - 1989	Australia	[33]
	1999 - 2003	Germany	[21, 42]
	1999; 2001	USA (*Sweden; Europe & unknown)	[39]
	2000	Canada (*Mexico)	[29]
	2000; 2001	Australia (*Sri Lanka; Burma)	[53]
	2001 - 2003	Spain	[22]
	2001	El Salvador (*Europe)	[76]
	2001	UK (*France & Spain)	[8]
	2002	Italy & UK (*Italy)	[64]
	2002; 2003	USA (*Italy & unknown; Germany & Italy/France)	[24]
	2003	France	[77]
	2003	India	[78]

Genotype	Year of circulation	Country where measles identified (*country identified as source of importation)	Published reference
D8	1994 1995; 1998; 1999; 2000; 2001 1997 1998 - 1999 1998 1999 1999 1999 2001 2002 2002  2002; 2004  2003 2003 - 2005	UK UK (*Pakistan; Yugoslavia & Albania & Oman; India; Bangladesh; Pakistan) India Ethiopia Canada (*unknown) Nepal Australia (*unknown) USA (*Italy & UK) Australia (*India) UK (*Lithuania & unknown) Australia (*Bangladesh & unknown)  USA (*unknown & India; India & Bangladesh) Spain (*unknown) India	[56] [8]  [55] [56] [29] [49] [53] [39] [53] [18, 64] (Chibo, personal communication) [24]  [22] [79]
D9	1999 2001 - 2002  2004	Australia (*Indonesia (Is of Bali & Java)) Venezuela & Colombia (*Europe) & Indonesia Japan (*unknown)	[53] [65, 80]  [81]
d10	2000 - 2002	Uganda	[82]
E	Mid - late 60s 1970; 1971; late 1970s 1987	Denmark USA (SSPE); Germany (Encephalitis); USA (wild-type & MIBE) Canada	[32] [27, 28 ]  [29]
F	1960's; 1979; 1994	Spain (SSPE)	[22, 27, 28 ]

Genotype	Year of circulation	Country where measles identified (*country identified as source of importation)	Published reference
G1	1983	USA	[3]
G2	1997	Netherlands (*Indonesia)	[83]
	1997; 2000	UK (*Indonesia; Sth Africa & Mexico & Australia)	[8]
	1999	Indonesia & Malaysia	[84]
	2000	USA (*unknown)	[39]
	2000	Australia (*Malaysia & unknown)	[53]
	2001	Germany (*unknown)	[21]
G3	1999	East Timor & Australia (*unknown & East Timor)	[85]
	2002	Indonesia	[86]

Genotype	Year of circulation	Country where measles identified (*country identified as source of importation)	Published reference
H1	1993 - 1994 1993 1995 - 1999; 2001 1996 1997 1997 1997 - 2001 1998 2000 2000 - 2001 2000 - 2001 2000 - 2001 2000; 2001; 2002 2001 2001 2002  2003; 2004  2003; 2004	China Australia (*unknown) China UK Netherlands (*China) New Zealand (*unknown) USA (*China & unknown & Korea) Denmark (*Thailand) UK (*USA ) Australia (*unknown & Japan) Korea Canada (*Korea & Singapore) Japan (*unknown; unknown; unknown) Germany (*Mongolia) Spain (*China) Australia (*unknown) & Mongolia  Rep. of Marshall Islands & Chile (*Japan) & Mexico (*unknown); Mexico (*unknown) USA (*Rep. Marshall Islands & unknown; China)	[10] [33] [87-89] [89] [49] [90] [39] [38] [8] [53] [91] [29] [92, 93] [42, 63] [22] (Chibo, personal communication) [65, 94]  [24]
H2	1994 1997; 2000; 2001 1998 2002	China USA (*Vietnam; unknown; unknown) Vietnam Australia (*unknown)	[10] [39] [88] (Chibo, personal communication)

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