



WHO/CDS/CSR/ISR/2000.1

**WHO Report on Global Surveillance of Epidemic-prone
Infectious Diseases**

World Health Organization

Department of Communicable Disease Surveillance and
Response

This document has been downloaded from the WHO/CSR Web site. The original cover pages are not included. See <http://www.who.int/emc> for more information.

© World Health Organization

This document is not a formal publication of the World Health Organization (WHO), and all rights are reserved by the Organization. The document may, however, be freely reviewed, abstracted, reproduced and translated, in part or in whole, but not for sale nor for use in conjunction with commercial purposes.

The views expressed in documents by named authors are solely the responsibility of those authors. The mention of specific companies or specific manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned.

CHAPTER 5

MENINGOCOCCAL DISEASE

Background of the disease

Meningococcal disease is a contagious bacterial disease caused by the meningococcus (*Neisseria meningitidis*) with high case fatality rates. It is spread by person-to-person contact through respiratory droplets of infected people.

N. meningitidis is a common inhabitant of the mucosal membranes of the nose and throat, where it usually causes no harm. Up to 5-10% of a population may be asymptomatic carriers. These carriers are crucial to the spread of the disease; most cases are acquired through exposure to asymptomatic carriers. A small minority of the persons who contract the disease will develop an acute inflammation of the meninges, the membranes covering the brain and the spinal cord. The disease is mainly affecting young children, but is also common in older children and young adults.

There are two clinical forms of meningococcal disease. Meningococcal meningitis is the more common entity, especially during epidemics, and the less common entity is meningococcal septicaemia. Meningococcal meningitis is the only form of bacterial meningitis which causes epidemics. The data presented in this report refer to both clinical forms of meningococcal disease.

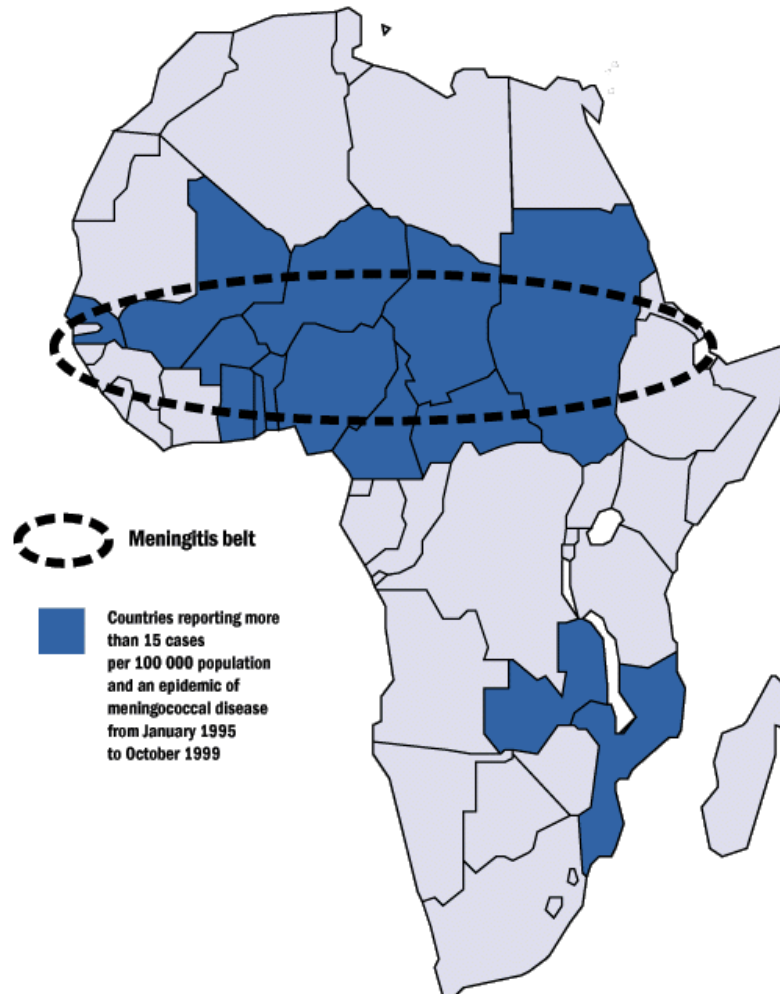
Meningococcal disease occurs as both an endemic and epidemic disease, and both forms cause substantial illness, and death, as well as persistent neurological defects, particularly deafness. Other consequences of the disease are loss of limbs, mental retardation and paralysis. Because of the severe consequences of meningococcal disease, access to treatment with antimicrobials as early as possible is very important. In the case of epidemics, mass vaccination campaigns are used to control epidemics.

Three serogroups, A, B and C, account for up to 90% of all disease. All three serogroups may cause epidemics, however the risk of epidemic meningococcal meningitis differs between serogroups. Serogroup A meningococcus has historically been the main cause of epidemic meningococcal disease and still dominates in Africa during both endemic and epidemic periods.

The highest number of cases and the highest burden of disease occur in sub-Saharan Africa in an area that is referred to as the meningitis belt. This is the area between Senegal and Ethiopia (Map 5.1). Epidemics occur in seasonal cycles between the end of November and the end of June, depending on the location and climate of the country, and decline rapidly with the arrival of the rainy season. Within the meningitis belt, meningococcal disease occurs in epidemic cycles which last between 8 to 15 years. The mechanisms that cause these cycles are not well understood, but are thought to be related to variations in herd immunity.

Although the highest burden of disease is currently in Africa, epidemics can occur in any part of the world. Asia has had some major epidemics of meningococcal disease in the last 30 years (China 1979 and 1980, Viet Nam 1977, Mongolia 1973-1974 and 1994-1995, Saudi Arabia 1987, Yemen 1988). There have also been epidemics in Europe and in the Americas during the last 30 years, but they have not reached the very high incidence levels of epidemics in other parts of the world.

In January 1997, the International Coordinating Group on Vaccine Provision for Epidemic Meningitis Control (ICG) was developed to regulate and coordinate the procurement of meningococcal disease vaccine, after large epidemics in sub-Saharan Africa in 1995-1996 largely exhausted global vaccine stocks. In order for the ICG to function properly, timely information on meningococcal disease from each country is required. This has accelerated improvements in the surveillance system in African countries – which now have an increased incentive to report cases.

Map 5.1 Meningococcal disease in Africa, 1995-1999

Description of the data

There are three types of data collected on meningococcal disease namely national data on the number of cases and deaths each year, weekly data on the number of cases and deaths in meningitis belt countries, and data on specific epidemics.

Annual national level data

The main function of this global database is to keep track of major epidemics of meningitis and major geographical trends over time. This database includes the number of cases per year per country, (both endemic and epidemic cases) and dates back to 1966. The database contains officially reported data as well as other published reports from countries when available. Twice a year, letters are sent to regional offices asking for data from countries to maintain this database.

Weekly national level data for meningitis belt countries

Since the end of 1997, WHO has been receiving weekly reports of the number of cases and deaths per country in the African meningitis belt during the meningitis season. Outside the meningitis season reporting is once every two weeks. This includes zero reporting.¹

¹ Zero reporting means that if there are no cases during a particular period, instead of sending no report, a report is sent indicating that zero cases were identified.

Local level data on specific epidemics

Since 1992, WHO country offices, Médecins Sans Frontières, the United Nations Children's Fund, International Federation of Red Cross and Red Crescent Societies, and other non-governmental Organizations have been sending data to WHO on local outbreaks of meningococcal disease mainly to justify appeals for vaccination supplies. This data is often on district or county level, and sometimes includes age and sex breakdowns. Population data for calculating rates is sometimes available, especially for requests to the ICG. Supplementary information on specific outbreaks is available at WHO, but is not presented in this chapter.

Strengths and weaknesses of the data

Annual national level data

Since meningococcal disease is an epidemic disease with long cycles between epidemics, it is important to have data over a long period of time to be able to monitor major trends. The data presented here on the annual number of cases and deaths for each country has been collected for over 30 years and is an adequate time period for broadly monitoring major changes in epidemic patterns. Despite some incompleteness, the fact that the data were supplemented by official publications makes it unlikely that major outbreaks have been completely unreported. The data are relatively complete for the African and Eastern Mediterranean regions, but there are other parts of the world where data reporting is less complete. One reason for this is that in many countries meningococcal disease is relatively rare and not notifiable. Other reasons for non-reporting include a reluctance to report for economic reasons.

Weekly national level data for meningitis belt countries

These data provide more detailed information about the timing of the epidemics than the annual data; however, the data have only been collected for two years – so they provide a very short time series.

Case definitions

There are differences in the case definitions used for reporting; some countries report cases comprising both viral and bacterial meningitis, others report bacterial meningitis only; some countries only report laboratory confirmed cases whilst others also report suspected cases. These differences in reporting make it difficult to compare countries.

There are a number of aspects for surveillance which are missing from the data set. For example, it is difficult to trace the spread of different strains of meningococcal diseases because data on strains is not collected systematically. Likewise the data set is not comprehensive enough to study the effects of factors such as mass migration, climate, herd immunity, antimicrobial resistance and vaccination.

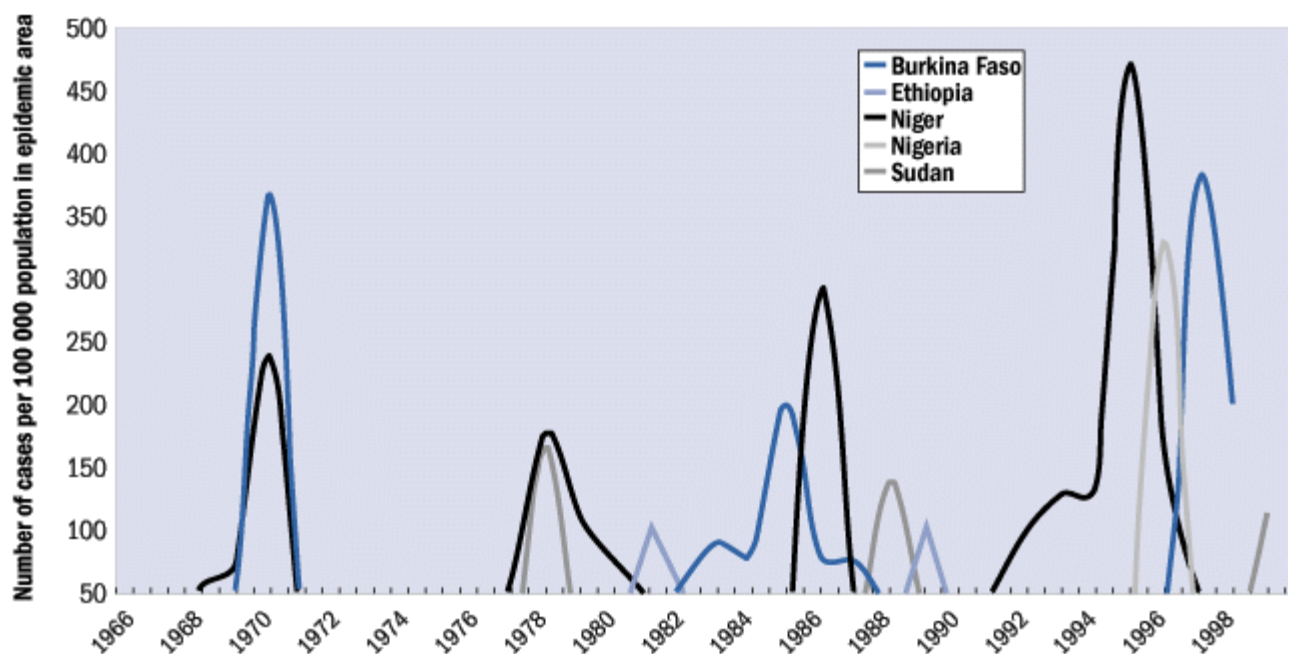
The weekly national level reporting for the meningitis belt in Africa, which has been going on for the last two years is a very promising development. The reporting system is more timely, and provides more detailed and more comparable data than previously available. It makes it possible to follow the control of an epidemic. This system needs to be continued, and further strengthened.

Trends

Incidence

- China and Nigeria (Table 5.1) reported the highest number of cases between 1966 and 1998. Almost all major epidemics in terms of numbers of cases in this period occurred in the meningitis belt. Poland (27 569 cases in 1972), India, the Russian Federation and China (over 100 000 cases in 1979 and 1980), are among the countries that had high numbers of cases and are located outside the meningitis belt.
- The length of the epidemic cycles are not the same for all countries in the meningitis belt (Fig. 5.1), Niger and Nigeria: 8-9 years, Burkina Faso: 10-15 years, Sudan: 10 years.
- The last two epidemics in Ethiopia were preceded within two to three years by an epidemic in Sudan (Fig. 5.1). It is expected that Ethiopia will soon have an outbreak of meningococcal disease, given the outbreak of Sudan in 1999.

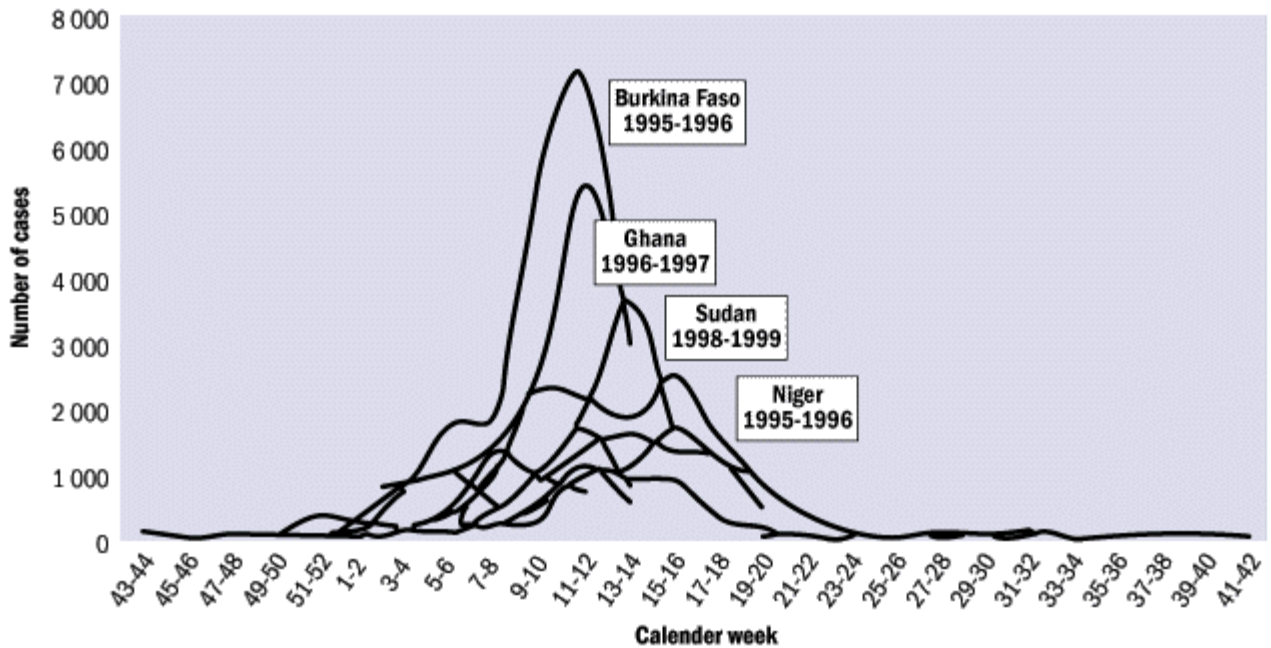
Fig. 5.1 Epidemic cycles, meningococcal disease for selected African countries, 1966-1999



Epidemics

- The number of cases in the years immediately preceding and following large epidemics are often elevated and sometimes reach epidemic levels. An example of this is Burkina Faso in the 1980s (Table 5.1 and Fig. 5.1).
- Some reports arrive late, when there are already a considerable number of cases. For example, Burkina Faso started reporting to WHO when there were already 383 cases (1996). An efficient early warning system would detect an elevated number of cases in the early stage of an epidemic (Fig. 5.2).

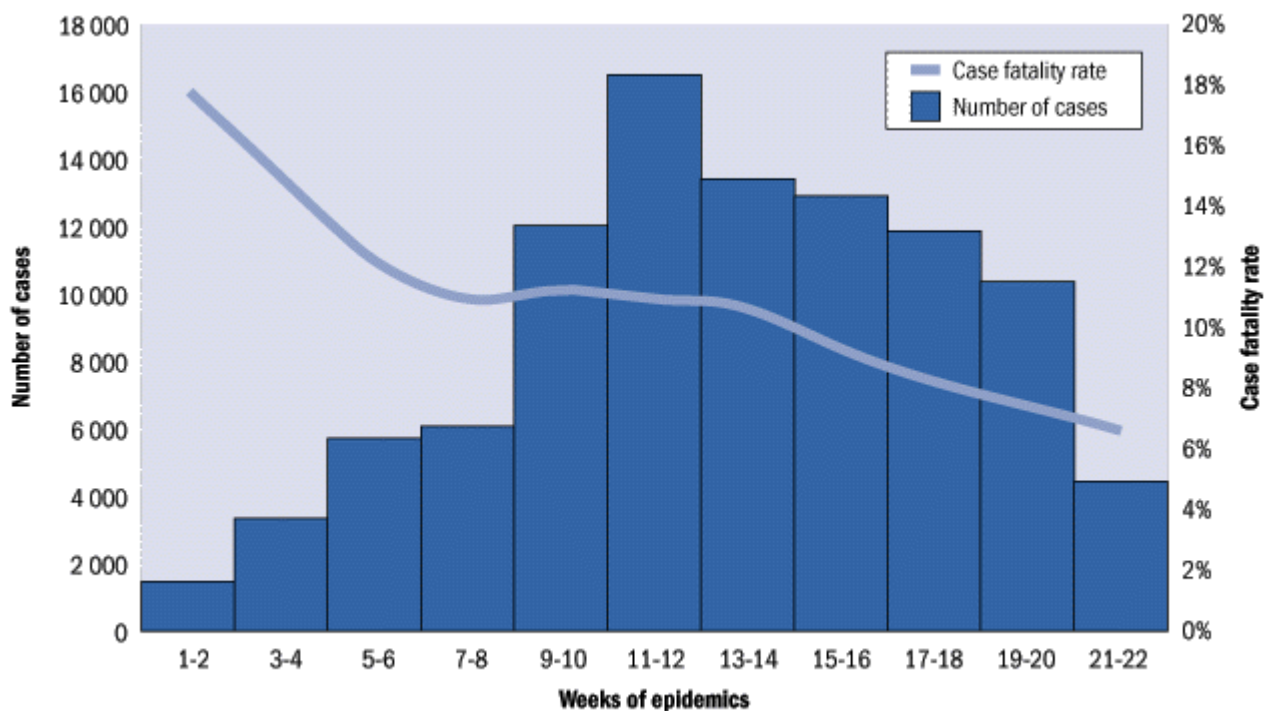
Fig. 5.2 Seasonality of epidemics of meningococcal disease, reported number of cases per calendar week for selected epidemics in Africa, 1995-1999



Deaths

- The reported case fatality rate is higher in the beginning of an epidemic than at the end. Apart from a genuine change caused by better treatment, a major reason for this is a change in reporting practices. At the start of an epidemic there is a tendency for underreporting of less severe cases and the reverse as the epidemic progresses (Fig. 5.3).

Fig. 5.3 Number of cases and case fatality rate of meningococcal disease outbreaks (n=22) in selected meningitis belt countries, 1993-1999



Conclusions

1. The number and intensity of epidemics of meningococcal disease in the meningitis belt has been increasing since the late 1970s with many large epidemics affecting tens of thousands of people.
2. Endemic bacterial meningitis is a major public health problem of at least equal proportions² to epidemic disease that is often neglected. It is most common in children; 50-60% of all cases of endemic meningococcal disease occur in children 3 months to 5 years old.
3. The epidemiology of meningococcal disease is complex, and although we have some knowledge about risk factors for epidemics, much more needs to be learned about disease transmission in order to develop effective strategies for prevention.

References

Publications and Documents

International Co-ordinating Group (ICG) on vaccine provision for epidemic meningitis control. Summary report of the fourth meeting, World Health Organization, 2000, WHO/EMC/DIS/ICG/2000.2.

International Co-ordinating Group (ICG) on vaccine provision for epidemic meningitis control. Summary report of the fourth meeting, World Health Organization, 1999, WHO/EMC/DIS/ICG/99.1.

International Co-ordinating Group (ICG) on vaccine provision for epidemic meningitis control. Summary report of the third meeting, World Health Organization, 1998, WHO/EMC/DIS/ICG/98.1.

International Co-ordinating Group (ICG) on vaccine provision for epidemic meningitis control. Summary report of the second meeting, World Health Organization, 1997, WHO/EMC/DIS/ICG/97.10.

International Co-ordinating Group (ICG) on vaccine provision for epidemic meningitis control. Summary report of the first meeting, World Health Organization, 1997, WHO/EMC/DIS/ICG/97.9.

Tikhomirov E., Santamaria M. and Esteves K, Meningococcal disease: public health burden and control, *World Health Statistics Quarterly*, 1997, 50, 170-177.

Response to epidemic meningitis in Africa, 1997. Report by IFRC-MSF-UNICEF-WHO to the International Co-ordinating Group (ICG), World Health Organization, 1997, EMC/DIS/ICG/97.8.

Lapeyssonnie, L. La méningite cérébrospinale en Afrique. *Bulletin of the World Health Organization*, 1963, 28 (supplement):3-114.

Control of epidemic meningococcal disease, WHO practical guidelines, World Health Organization, 1998, WHO/EMC/BAC/98.3

Web pages

Meningococcal disease fact sheet:
<http://www.who.int/inf-fs/en/fact105.html>

Meningococcal disease in Disease Outbreak News:
http://www.who.int/emc/outbreak_news/disease_indices/men_index.html

WHO Meningitis web pages:
<http://www.who.int/health-topics/meningitis.htm>

² Estimates in the WHO practical guidelines *Control of epidemic meningococcal disease* indicate that at least 1.2 million endemic cases of meningococcal disease occur each year and that 135 000 of these patients die.

Number of cases and deaths reported to WHO 1998:
<http://www.who.int/emc/diseases/meningitis/1998meningtable.html>

Number of cases and deaths reported to WHO 1999:
<http://www.who.int/emc/diseases/meningitis/1999meningtable.html>

Number of cases and deaths reported to WHO 2000:
<http://www.who.int/emc/diseases/meningitis/2000meningtable.html>

Table 5.1 Cases of meningococcal disease reported to WHO and number of countries reporting, 1966-1999

Africa	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Algeria			1,330	1,356	1,939	1,657	1,739	1,264	996	1,211	847		993	2,821	829		
Angola	95	83	107	104	147	215	133	132	138			1,151	33	130	361	32	
Benin	415	847	1,222	1,767	1,366	1,333	1,074	485	374	287	272	400	479	214	253	270	247
Botswana	14									4		34	72	0	111	102	97
Burkina Faso	1,259	1,010	962	3,045	19,960		2,921	2,301	1,317	1,321		1,092	1,359	1,813	1,867	4,231	6,675
Burundi	46	98	118	7	22		14	44	31	41		34	58	718	43	76	58
Cameroon	395	1,708	532	248	264	114	3,071	2,003	26			265	819		746	1,503	1,688
Cap Verde	1	1	2			0		80	76			0	10	10	29	7	17
Central African Republic	144	241	354	401	384	230	392	192	320	401	158	232	217	204	226	202	209
Chad	575	657	785	287	3,721	672	4,868	2,376	2,289	1,486	791	1,594	439	82	0	17	84
Comoros					25	34	4										
Congo	17	15	22	41	41	103	102	103	78	57	118	171	198	209	160	88	7
Cote d'Ivoire	216	341	275	341	351	148	154		30				44	96		67	51
Dem. Rep. of the Congo	191	329	549		345	552		1,705	563			1,149	945	1,975	1,036	563	797
Djibouti	41	24	0	2	9	11	24	21	38	18	36	11	37	19			
Egypt	514	204	264		239	302	285	1,185	6,777	492	330	245	319	294	296	812	2,061
Equatorial Guinea	5	0		62													
Eritrea																	
Ethiopia	205	222	252	126					398	603	1,188	1,296	430	70	4,002	38,698	8,168
Gabon	42	31	42	30	13		51	71	70			290	90	196	66	7	188
Gambia	85	668	154	73	52	60	31	39	18		10	87	316	40	95	63	
Ghana	122	79	27	629	912	617	784	455	101	401	190	225	441	501	302
Guinea	71		173	26	77	145	25	179	139		17	26	21	15		13	168
Guinea-Bissau	7	3	7	13	1	8	6	13	7		224	47	30	19	11	37	14
Kenya	256	232	153	216	127	83	36	97			507	1,557	1,640	1,625	1,013	1,355	537
Lesotho	14	15	45	29		2			13		40	64					51
Liberia	12			0				18	23			181	235	132	145	214	204
Libyan Arab Jamahiriya	405	343		39	117	159	138	87	449	274	66	13	31	21	11	10	7
Madagascar	43	134	109	156	100	177	14	3		0	13	0	2			8	
Malawi		108			245	184						2,451				1,030	
Mali	329	276	752	13,228	4,573	1,813	628	1,005	416		233	267	248	432	391	4,601	2,936
Mauritania	21			177	158	152	10		106	44	34	1	1				
Mauritius	1	1	3	4	1	1	1	0		0		0	0	0	0	0	0
Morocco	6,336			1,876	945	475	557	619	408	580	507	505	567	619	680	715	677
Mozambique	33	33	93	139	89	74	114	94	60	119	39	136	272	254	243	193	166
Namibia																	
Niger	947	453	2,231	3,074	9,907		2,233				1,172	3,034	9,245	6,011	4,203	2,567	995
Nigeria	5,799	2,116	1,861	4,291	9,712	7,897	5,365	38				13,496	37,090	3,515	1,605	461	1,092
Reunion (France)	4	3	1	1	8	13	9	5	7		4	4	15	14	6	16	12
Rwanda	56	36	30	41	15	75	8	59	49	18		8	3,165	5,169	1,447	658	162
Sao Tome and Principe	11	8	7			3						0	1	4	1		

Table 5.1 Cases of meningococcal disease reported to WHO and number of countries reporting, 1966-1999

Africa	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Senegal	351	1,655	1,477	1,363	2,624	1,322	1,131	368	445	367	247	363	377	358	336	360	960
Seychelles												0		0		0	3
Sierra Leone	349	27	14		15	16	3	17					1	287	229	10	
Somalia																	
South Africa	878	1,994	2,135	1,934	1,490		2,080										
Sudan	2,914		6,607	5,662	2,774		4,231			179	1,151	522	29,170	141	4,447	1,650	1,025
Swaziland	8	9	6	7	20	15	17	16	85	27	31						
Togo	174	199	145	112	87	397	1,017	526	524		245	840	619	326	213	28	119
Tunisia		96	215	167	162	403	529	729	376	407	189	126	174	153	132	150	216
Uganda	51	41	46	32	32	122	24	118	118	194		2,098	668	81	372	124	127
United Rep.of Tanzania	213	316	254	264	391				124				6,412			124	679
Zambia	72									257		164	498	265	285	458	519
Zimbabwe	8	8	9	14	90	93	84	64	80					29	32	28	49
Total no. of cases	23,745	14,664	23,370	40,755	62,638	19,689	34,035	16,673	17,752	8,842	8,580	34,355	97,530	28,586	26,363	62,100	31,316
No. of countries reporting	46	41	41	40	41	38	39	36	36	25	28	42	43	41	38	43	37

Table 5.1 Cases of meningococcal disease reported to WHO and number of countries reporting, 1966-1999

Africa	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Senegal	3,712		512	825	98	20	2	...			0	0	41	11	13	977	4,939
Seychelles	8	9	12	13	15	3	12	5	16	6	10	7					
Sierra Leone	4	18	168										157				8
Somalia	32	7	3	16		22	106										0
South Africa	612	588	528	501	664	934	873	850	760	510	87						
Sudan	3,028	541	317	452	443	32,016	7,051	1,326	737	716	1,147	391	276	340	297	697	33,313
Swaziland	50																
Togo	332	237	243	333	554	171	884	158			339	228	619	693	3,262	335	249
Tunisia	717	631	676	972	1,557	699	580	459	430	451	422	325	278				0
Uganda	1,804	97				90	1,501	3,498	1,529	1,079	1,230						
United Rep. of Tanzania						0	1,249	686	6,923	4,279	2,289		1,286	194			372
Zambia			178	180	1,508	1,480	1,426	1,772	3,272	3,622	2,092		1,897	130	122		100
Zimbabwe	113	81	445		43	33	77	31	118	29					58	77	10
Total no. of cases	38,542	32,514	25,710	55,010	38,137	71,979	105,587	43,575	37,880	68,287	45,372	34,802	59,756	189,690	71,339	37,819	66,764
No. of countries reporting	42	40	41	34	39	43	42	38	30	29	32	24	20	24	28	33	35

Table 5.1 Meningococcal disease, cases reported to WHO and number of countries reporting, 1966-1999

The Americas	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Antigua and Barbuda										2								
Bahamas														2				
Barbados		2				2	1					1						
Belize		4					7	4	4	1	3							
Bermuda									2									
Bolivia	6	3								11								
Brazil																		
Canada	51	58	56	99	145	154	252	270	224	268	241	241	347					
Cayman Islands															0	0	1	0
Chile	171	97								28	37	46	64	202	151	222	162	107
Colombia	307	313	327							86	386	623	372	262	266	293	201	220
Costa Rica										16	5	8	1		4			
Cuba	15	15	15	37	40	38		27	41	31	72	78	185		560			
Dominica													4					
Ecuador								5	3			14			13			
El Salvador																		
French Guiana						1				2	3	2	2					
Grenada													3					
Guadeloupe	1						2	7	4	3		6						
Guatemala															2			
Haiti					70	40	26		176	47	51		43	1				
Honduras			42	48											5	6	3	4
Jamaica	8	6				9	39	27	20	2								
Martinique								1										
Mexico											11	4	6	4				
Nicaragua																		
Panama	2	6	2	10	5	5	4	1	2	1	7	11			15	14	10	19
Paraguay	18	15		45	29		54	95	65	133	101	51	10	59	69	60	15	13
Peru	103	53		70	101	89		75	192	122	181	169	98	213	170			
Puerto Rico	20	15	20	29	5	14	5	13	6				13	10	13			
Saint Kitts and Nevis						1	1	1		1								
Suriname															4			
Trinidad and Tobago	4		1				3	1									6	1
Turks and Caicos Islands														2				
United States of America	3,381	2,161	2,623	2,951	2,505	2,262	1,323	1,378	1,346	1,478	1,605	1,828	2,505	2,724	2,840	3,525	3,056	2,736
Uruguay	5	3	3		4	2	492	530	85	278	336	63	52	22	27	17	24	11
Venezuela	2	13	13	5		8	12	16	15	20								
Total no. of cases	4,094	2,764	3,102	3,294	2,904	2,625	2,221	2,451	2,185	2,530	3,039	3,145	3,705	3,501	4,139	4,137	3,478	3,111
No. of countries reporting	15	15	10	9	9	13	14	16	15	19	14	15	15	11	15	8	9	9

Table 5.1 Meningococcal disease, cases reported to WHO and number of countries reporting, 1966-1999

The Americas	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Antigua and Barbuda															
Bahamas															3,114
Barbados															
Belize															1
Bermuda															0
Bolivia															
Brazil									702	863	971	1,106			149
Canada	221	202	248	299	319	419	429	419	443	379	334	281	185		126
Cayman Islands	0	0	0	1	0	0	0	1	0	0					
Chile	98	137	125	151	176	230	257	322	391	490					536
Colombia	79	72	106	109	161	280	143	248	197	53					148
Costa Rica															
Cuba															42
Dominica															
Ecuador															
El Salvador															9
French Guiana															
Grenada															
Guadeloupe															
Guatemala															2
Haiti															
Honduras	11	10	4	7	4	7	3	5	3						0
Jamaica															
Martinique															
Mexico															0
Nicaragua															55
Panama	15	25	19	71	86	103	112	54	40	31					20
Paraguay	28	14	6	9	8	8	5	12	25	17					7
Peru															84
Puerto Rico															
Saint Kitts and Nevis															
Suriname															
Trinidad and Tobago	1	0	0	2	1	1	3	2	6	4					13
Turks and Caicos Islands															
United States of America	2,746	2,479	2,594	2,930	2,964	2,727	2,451	2,130	2,134	2,637	2,886	3,243	3,437		2,633
Uruguay	24	28	21	40	45	62	107	86	87						12
Venezuela								36	55	43	73				
Total no. of cases	3,223	2,967	3,123	3,619	3,764	3,837	3,510	3,315	4,083	4,517	4,264	4,630	3,622		6,951
No. of countries reporting	10	10	10	10	10	10	10	11	12	10	4	3	2	0	19

Table 5.1 Meningococcal disease, cases reported to WHO and number of countries reporting, 1966-1999

Asia	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Afghanistan	0														3	3	9
Bahrain	51	2	21	38	1	13	1	10	18	10	6	3	2	4	1	2	3
Bhutan																	
Brunei Darussalam							1		1		1						
Cambodia														10			
China													109,304	108,774			
Cyprus	12	7	17	2	6	1	9	5	1	2	6	1	0	0	3	2	1
Hong Kong SAR	10	55	32		10	5	10	11	11	13	9	10	4	33	29	18	15
India																	
Iran (Islamic Republic of)	3,985	5,977	3,585	3	285	853	807	540	1,446	858	250	571	1,467	176	108	400	412
Iraq	1,224	1,177	1,087	925	643	984	892	1,005	1,345	1,901	58	44	160	220	56	108	1,914
Israel	52	42	69	35	46	21	29	39	26	51	40	43	57	61	42	35	48
Japan	144	117	122		72	49	58	45	27	33	33	42	28	25	24	23	15
Jordan	143	210	212	104	80	102	130	159	291	182	166	185	98	103	64	102	69
Kuwait	44	21		12	1			15	115	31	17	20	10	0	5	3	4
Kyrgyzstan																	
Lao People's Dem. Republic																	
Lebanon	150	188	130	85	68			39								1	1
Macao SAR		20	5				2							0	5	0	
Malaysia													15		86		
Maldives																	
Mongolia									2,765						359	502	634
Myanmar								36								8	
Nepal																	
Oman										88	75	24	52	32	34	40	0
Pakistan						597	451	516	222	374	471	391	1,583	2,804	2,042	1,188	1,097
Philippines	1,091	816	840	212	635	909	846	1,198									
Qatar		11	5	4	3	6	10						5	0		0	
Republic of Korea		9	15	3	4	7			2		2				3		
Saudi Arabia										850	353	216	160	107	169	146	165
Singapore							3										
Sri Lanka																	
Syrian Arab Republic		1	6	0	1	1	3	6	4	13	6	10	16	21	253	195	213
Thailand								7	19	25	41	33	32	26	25	21	13
Turkey															509	1,027	1,354

Table 5.1 Meningococcal disease, cases reported to WHO and number of countries reporting, 1966-1999

Asia	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
United Arab Emirates										28	5	15		29	62	90	55
Viet Nam	83						836					5,477		1,988	2,627	1,559	1,087
West Bank and Gaza Strip																	
Yemen										61		325	152		946	593	243
Total no. of cases	6,989	8,653	6,146	1,423	1,855	3,548	4,088	3,631	6,293	4,520	1,539	7,410	3,841	114,943	116,229	6,066	7,352
No. of countries reporting	13	15	14	12	14	13	16	15	15	16	17	17	17	20	24	24	21

Oceania	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
American Samoa				1	1				1					12	11	9	2
Australia														84	71	53	54
Cook Islands															17	11	1
Fiji				73	83								1	131	103	112	66
French Polynesia	3	1					5					1	4	80	108	167	135
Guam												1	1	20	22	7	15
Kiribati														14	81	23	30
Marshall Islands																	
Micronesia (Fed. States of)														17	19	6	10
Nauru														1	0	2	0
New Caledonia	6			14	36									28	2	0	7
New Zealand	162	157	74	46	39	23	41	33	38	54				48	26	19	12
Niue														0	1		0
Northern Mariana Islands																	
Palau																	
Papua New Guinea																	
Samoa												30	38	4	20	4	29
Solomon Islands														14	1	0	
Tokelau														1	0		0
Tonga			3					16			1			2	20	0	0
Tuvalu									37	9	39			0	6	6	6
Vanuatu	1	2												5	18	2	4
Wallis and Futuna														0	0	2	
Total no. of cases	172	160	77	134	159	28	41	49	76	63	40	32	44	461	526	423	371
No. of countries reporting	4	3	2	4	4	2	1	2	3	2	2	3	4	18	19	17	17

Table 5.1 Meningococcal disease, cases reported to WHO and number of countries reporting, 1966-1999

Asia	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Afghanistan		16		331	218	388	426									27
Bahrain	4	4	6	3	27	5	4	4	0	10	1	2	0	8		15
Bhutan				188												
Brunei Darussalam													3			
Cambodia																
China											5,000	5,863	5,771	5,730	4,751	
Cyprus		4	2	3	2	5	0	2	0	0	1	0	4	8		0
Hong Kong SAR	12								2	1	0	3	1	2		
India			10,466	20,972	9,080	16,834	22,263	16,757	11,995	8,112				3,460	4,443	4,297
Iran (Islamic Republic of)	888	830	813	676	565	711	709	500	546	281	322	306	156	102	45	304
Iraq	1,583	1,597	1,666	1,415	1,010	1,814	2,259		5,792	4,534	3,923	3,427	211	131	188	40
Israel	68	65	52	57	94	87	81	67	52	71	104	81	78	51		92
Japan	1								10	11	7	6	3	4	5	6
Jordan	45	83	72	47	71	78	110	58	29	39	45	35	44	27		37
Kuwait	2	5	7	6	26	17	21	15	4	6	7	6	9		16	49
Kyrgyzstan													298	478	336	
Lao People's Dem. Republic										258	481	561	860	1,103		
Lebanon										3	5	20	54			9
Macao SAR	2,032								0	0	0	0				
Malaysia																
Maldives													1	0	3	3
Mongolia	477	589	574	606	585	711	735	776	748	411	393	3,084	2,739	881	480	263
Myanmar										143			65			3
Nepal								703	786	759						18
Oman	3	12	9	7	126	41	33		27	7	15	2	4	7		4
Pakistan		5,590	592	6,048	5,927	5,918	4,481	5,309	5,143	5,505			6,621	7,998		0
Philippines																
Qatar	0	58	54	2	13	1	0	1	0	1			8	10		8
Republic of Korea																13
Saudi Arabia	360	142	85	59	1,841	305	92	101	74	88	52	30	58	38		40
Singapore																
Sri Lanka								36	68	89	41	70	61	68	54	71
Syrian Arab Republic	238	245		393	506	510	614	478	232	443	285	371	190	190		0
Thailand	21	66	100	50	90	95	98	23	25	28			75	71	60	68
Turkey	1,414	1,352	1,419	1,361	1,422	1,943	1,966	2,030	1,878			1,195	1,071			

Table 5.1 Meningococcal disease, cases reported to WHO and number of countries reporting, 1966-1999

Asia	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
United Arab Emirates	69	52	20	73	248	108	45	73	62	47	166	56	14	10		23
Viet Nam	2,413								1,846	1,917	1,794	2,272	2,236	1,468		
West Bank and Gaza Strip				0	1	0	12	11	2	4	2	7	0	2		0
Yemen	546	849	1,229	682		8,211	4,264			646	433					0
Total no. of cases	10,176	11,559	17,166	32,979	21,852	37,782	38,213	26,944	29,321	23,414	13,077	17,397	20,635	21,847	10,381	5,390
No. of countries reporting	19	18	17	21	19	20	20	18	24	27	22	22	28	24	11	26

Oceania	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
American Samoa	1								1	0		0				
Australia	77							295	285	292	378	383	382	426		421
Cook Islands									4	4	4	4		6		
Fiji	132								75	57	195	89				
French Polynesia	188								72	74	47	21				
Guam	18								11	25	19	23	15	10		
Kiribati									6	38	48	32				
Marshall Islands										3	8	7				
Micronesia (Fed. States of)	4								5		3					
Nauru									1			2				
New Caledonia	6								104	123	84	73				
New Zealand	32													87		
Niue									1	0	1	0		2		
Northern Mariana Islands									1	1	2	0				
Palau												2				
Papua New Guinea									1,575	1,593	1,676	1,651	1,517			
Samoa	2								39	44	35	36				
Solomon Islands									47	55	54	93	50	4		
Tokelau										1	0	0				
Tonga									2	1	0	1				
Tuvalu									2							
Vanuatu									15	35	21	15				
Wallis and Futuna									1	2	5	9				
Total no. of cases	460								2,247	2,348	2,580	2,441	1,964	535		421
No. of countries reporting	9	0	0	0	0	0	0	1	19	18	18	20	4	6	0	1

Table 5.1 Meningococcal disease, cases reported to WHO and number of countries reporting, 1966-1999

Europe	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Albania															29	30	51
Austria	190	146	124	103	128	122	110	80	90	90	73	56	72	72	69	59	58
Belgium	41	50	39	131	352	518	519	428	228	136	94	114	121	100	158	127	124
Bulgaria	104	150	156	155	159	114	139	128	117	134	136	128	104	106	107	128	103
Croatia																	
Czech Republic																	
Czechoslovakia ¹	77	76	67	79	75	66	46	51	57	57	79	90			136	143	172
Denmark	6	5	9	5	7	13	9	15	21						113	120	115
Estonia																	
Finland	19	29	23		136	105	111	255	646	456	120	147	84	55	64	66	62
France	614	516	782	910	1,105	1,360	1,440	1,560	1,109	1,505	1,591	1,596	2,016		1,661	1,359	1,080
Germany	1,405	1,405	1,166	1,211	1,869	1,704	1,660	1,482	1,552	1,366	1,234	1,161	1,331	1,400	1,161	1,348	1,202
Greece	198	374	1,075	540	639	383	481	765	313	306	208	241	282	219	188	147	131
Hungary	99	91	84	82	95	69	73	62	55	60	75	55	95	74	103	82	59
Iceland	9	7	8	9	3	4	9	13	5	35	83	55			14	18	10
Ireland	17	19	22	17	17	22	29	29	37	45	41	32	30		104	114	
Italy	984	1,604	2,714	2,412	2,916	2,510	1,516	1,250	790	848				597	625	676	585
Latvia															168	165	169
Lithuania																	277
Luxembourg	3	3	1	3	3	6	5	3	4	3	5	2	1	4		4	2
Malta	2	0	0	2	0	0	0	0	1	0	0				0	0	0
Monaco						1		2									0
Netherlands	516	303	253	211	183	202	248	171	161	95	129	117	186	181	171		136
Norway	43	54	63	92	104	79	78	119	176	327	321	271	327	328	227	260	255
Poland	915	951	1,102	1,163	246	201	228	233	228	208	241	248	272	305	5,100	5,400	27,569
Portugal	405	301	253	196	525	836	701	733	351		249	183	249	209	193	253	211
Romania	189	120	103	687	1,052	396	252	279	212	191	216	261	355	417	496	503	425
Russian Federation	491	532	656	2,012	4,912	6,716	13,326	21,353	16,956	15,290	15,677	15,712	6,907	6,694	8,062	10,375	10,781
Slovakia																	
Slovenia																	
Spain	657	766	857	753	1,510	3,663	2,620	2,244	2,090	1,909	1,860	2,550	4,419	6,618	4,807	5,177	4,029
Sweden	164	106	118	107	98	105	92	100	160	233	205	142	139	116	110	89	97
Switzerland	104	62	67	96	139	148	142	107	113	86	92	73	68	87	80	93	87
United Kingdom	584	424	752	1,360	1,645	2,298	1,825	2,394	2,799	3,207	2,152	1,543	243	236	84	6	9
Yugoslavia	1,143	1,497	1,367	17	2,608	2,420	1,788	1,593	1,119	1,322	847	1,011	986	712	542	617	603
Total no. of cases	8,979	9,591	11,861	12,353	20,526	24,061	27,447	35,449	29,390	27,909	25,728	25,788	18,287	18,530	24,572	27,359	48,402
No. of countries reporting	26	26	26	25	26	27	26	27	26	24	24	23	21	20	27	27	29

¹ Czechoslovakia dissolved on 31 December 1992.

Table 5.1 Meningococcal disease, cases reported to WHO and number of countries reporting, 1966-1999

Europe	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Albania	55	47	79	111	73	77	115	86	97			103	42				
Austria	65	49	53	57	63	77	57	49	38			60	81	98			
Belgium	114	53	43	38	35	51	59	45	39			121	193	210			9
Bulgaria	104	105	136	150	161	142	124	80	102								82
Croatia																	52
Czech Republic											193	195	232	216			73
Czechoslovakia ¹	167	180	128	135	106	113	99	98	90								
Denmark	121	139	138	202	195	175	199	201	183	226		220	235	226			
Estonia													24	18			7
Finland	49	49	50	37	51	20	25	31	29			42		76			54
France	886	867	840	859	620	511	513	426	429	442		365	310	364			
Germany	1,124	1,144	1,279	1,260	1,112	4,417		807	813			708	655	687	809	729	
Greece	102	106	105	88	85	76	87	131	69				143	79			
Hungary	67	70	53	53	53	33	53	34	41					20	12	26	
Iceland	20	14	13	11	9	7	6	6	12			26	22	17			
Ireland						73	42					95	271	199			
Italy	776	708	842	610	478	377	338	309	141			63	138	164			113
Latvia	162	183	154	145	132	117	81	97	62			17	43	45			8
Lithuania	289	307	277	155	188		106	112	103								16
Luxembourg																	
Malta	0	0	2	1	1	1	2	2	1			3	4	10			29
Monaco	1	3	0	0	0	1	0	0	1								
Netherlands	123	144	166	205	205	236	472	505	443	518	563	422	460	583			505
Norway	367	306	322	278	253	165	186	171	163	197	126	102	158	138			
Poland	7,823	7,596	6,613	6,587	6,297	4,847	5,139	3,952	3,713			176	167	145	142		
Portugal	247	271	480	602	298	276	266	221	181				183	172			126
Romania						1,077	580					13	11	15			
Russian Federation	12,446	12,830	12,054	10,092	9,009	8,430	7411	6,615	5,860	5,167			3,839				
Slovakia												12	29	98			87
Slovenia												12	9	11			4
Spain	4,456	3,392	2,911	2,670	2,197	1,505	1,636	1,258	1,308	1,377		255	970	1481			
Sweden	85	68	78	83	95	80	103	102	130	114	88	66	99	84			
Switzerland	107	93	94	131	77	123	120	121	143	106	120	104	119	95			121
United Kingdom						148		1,415	1,390	1,559	1,651	1,541	2,097	1,777			
Yugoslavia	682	587	547	542	421	462	543	472	320								
Total no. of cases	30,438	29,311	27,457	25,102	22,214	23,617	18,362	17,346	15,901	9,706	2,741	4,721	10,534	7,028	963	2,041	
No. of countries reporting	26	26	26	26	26	28	27	27	27	9	6	23	26	26	3	17	

¹ Czechoslovakia dissolved on 31 December 1992.