CHAPTER 5
Health Status and Health Problems of Thai People

1. Overall Physical Health Status Indicators

Over the past three decades, the overall physical health status of the Thai people has a promising trend of improvement as evidenced by the following:

1.1 Life Expectancy at Birth

In 2002, the life expectancy at birth of Thai people was 69.1 years. Though higher than that of the people in other developing countries and of the world population, life expectancy of Thai people is still lower than that for several other ASEAN countries (Table 5.1). However, during 1964-2000, Thais' life expectancy at birth substantially increased from 55.9 years to 69.4 years for males and 62.0 years to 74.1 years for females. In 2025, it is expected that the life expectancy of Thai citizens will reach 74.8 years for males and 80.3 years for females (Table 5.2). It is noteworthy that female's life expectancy is higher than male's; however, the gap has been gradually narrowing from 6.1 years for the period 1964-1965 to 4.7 years for the period 1995-2000.

The World Health Report 2003 also revealed that, in 2002, Thailand's healthy life expectancy (HALE) was 60.1 years: 57.7 for males and 62.4 for females, which were lower than those for several other ASEAN countries (Table 5.1).

Table 5.1 Life Expectancy at Birth of Thai People in Comparison with Those for Other Countries

Group of countries	Life expectancy at birth			Healthy life expectancy (2002) [4]		
	1998[1]	2001[2]	2002 [3]	Total	Male	Female
WHO/SEAR						
Sri Lanka	73.3	72.3	72.5	61.6	59.2	64.0
Thailand	68.9	68.9	69.1	60.1	57.7	62.4
Indonesia	65.6	66.2	66.6	58.1	57.4	58.9
Maldives	65.0	66.8	67.2	57.8	59.0	56.6
India	62.9	63.3	63.7	53.5	53.3	53.6
Bhutan	61.2	62.5	63.0	52.9	52.9	52.9
Myanmar	60.6	57.0	57.2	51.7	49.9	53.5
Bangladesh	58.6	60.5	61.1	54.3	55.3	53.3
Nepal	57.8	59.1	59.6	51.8	52.5	51.1
ASEAN						
Singapore	77.3	77.8	78.0	70.1	68.8	71.3
Brunei	75.7	76.1	76.2	65.3	65.1	65.5
Malaysia	72.2	72.8	73.0	63.2	61.6	64.8
Thailand	68.9	68.9	69.1	60.1	57.7	62.4
Philippines	68.6	69.5	69.8	59.3	57.1	61.5
Vietnam	67.8	68.6	69.0	61.3	59.8	62.9
Indonesia	65.6	66.2	66.6	58.1	57.4	58.9
Myanmar	60.6	57.0	57.2	51.7	49.9	53.5
Laos53.7	53.9	54.3	47.0	47.1	47.0	
Cambodia	53.5	57.4	57.4	47.5	45.6	49.5
High human development index						
Japan	80.0	81.3	81.5	75.0	72.3	77.7
Canada	79.1	79.2	79.3	72.0	70.1	74.0
Ireland	79.1	79.6	79.9	72.8	72.1	73.6
Sweden	78.7	79.9	80.0	73.3	71.9	74.8
Switzerland	78.7	79.0	79.1	73.2	71.1	75.3
World	**66.9**	**66.7**	**66.9**	-	-	-
High human development index	**77.0**	**77.1**	**77.4**	-	-	-
Medium human development index	**66.9**	**67.0**	**67.2**	-	-	-

Source: [1] UNDP, Human Development Report 2000.
[2] UNDP, Human Development Report 2003.
[3] UNDP, Human Development Report 2004.
[4] WHO, World Health Report 2003.

Table 5.2 Life Expectancy at Birth of Thai People

Year	Male	Female	Female-male difference
1964-1965[(1)]	55.9	62.0	6.1
1974-1976[(1)]	58.0	63.8	5.8
1985-1986[(1)]	63.8	68.9	5.1
1990-1995[(2)]	68.6	73.4	4.8
1995-2000[(2)]	69.4	74.1	4.7
2000-2005[(3)]	67.9	74.9	7.0
2005-2010[(3)]	69.6	76.2	6.6
2010-2015[(3)]	71.3	77.5	6.3
2015-2020[(3)]	73.1	78.9	5.8
2020-2025[(3)]	74.8	80.3	5.5

Sources: [(1)] Reports on Population Change Surveys, 1964-1965, 1974-1976, 1985-1986, 1989, 1991, and 1995-1996. National Statistical Office.

[(2)] Chiraphan Kallapravit et al. Adjustments of Population Estimates for Thailand in1990-2020, June 1998.

[(3)] Population Projection for Thailand, 2000-2025. Office of the National Economic and Social Development Board, 2003.

1.2 Maternal Mortality

The maternal mortality ratio (MMR) in Thailand has declined from 374.3 per 100,000 live births in 1962 to 13.7 per 100,000 live births in 2003 (Figure 5.1). However, MMR estimates from several surveys are higher than the reported figure. For example, the 1995-1996 RAMOS[1] survey on mortality among women of reproductive age revealed a MMR of 44.1, while the Safe Motherhood Project[2] reported the MMR for the same period at 16.3, and the 2003 study of Yongjuea Laosirithavorn[3] reported a MMR of 52.2 for the period.

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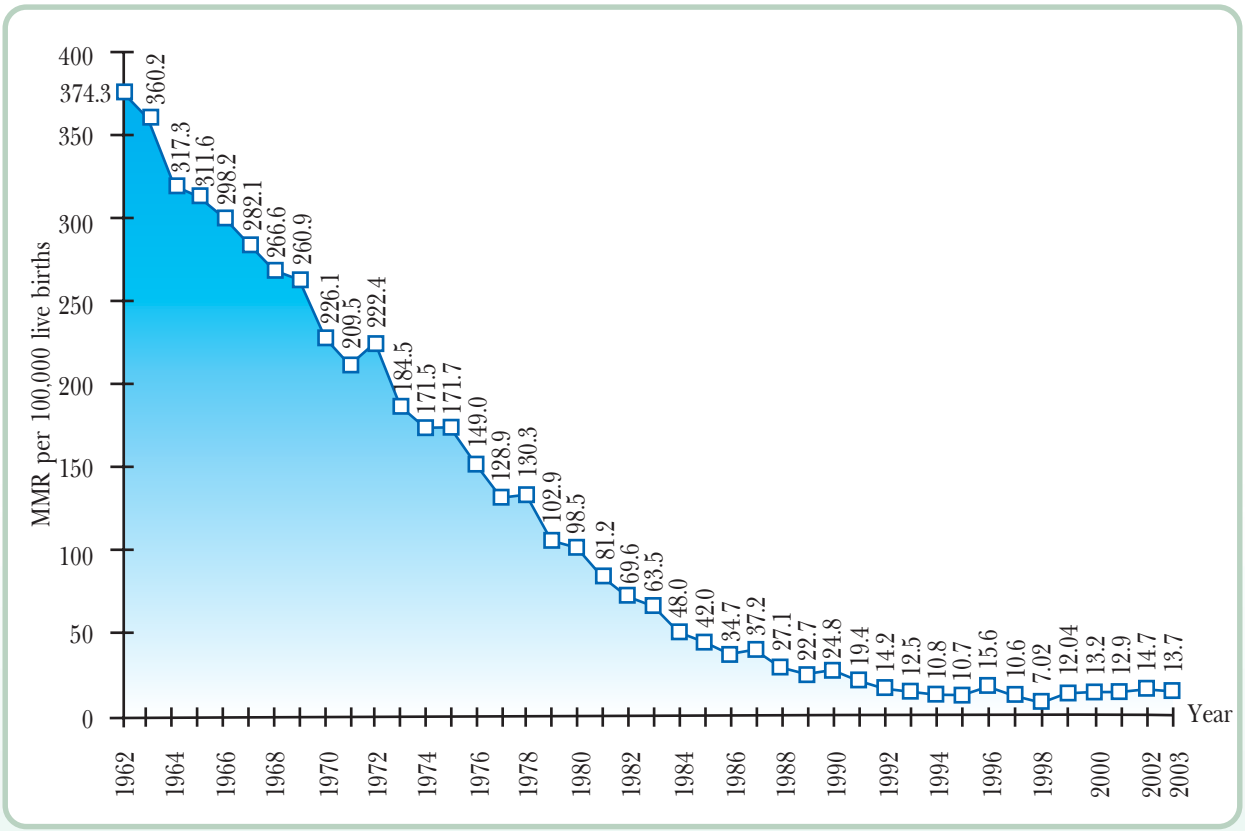
1 Survey on Mortality among Women of Reproductive Age Using the Reproductive Age Mortality Survey Method. Bureau of Health Promotion, Department of Health.

2 Bureau of Health Promotion, Department of Health. Report on Maternal in Thailand. Safe Motherhood Project, 1995-1996.

3 Yongjuer Laosirthavorn. Situation and Report on Maternal Mortality Resulting from Pregnancy and Childbirth in Thailand, 1995-1996, 2003.

Figure 5.1 Maternal Mortality Ratio, Thailand, 1962-2003

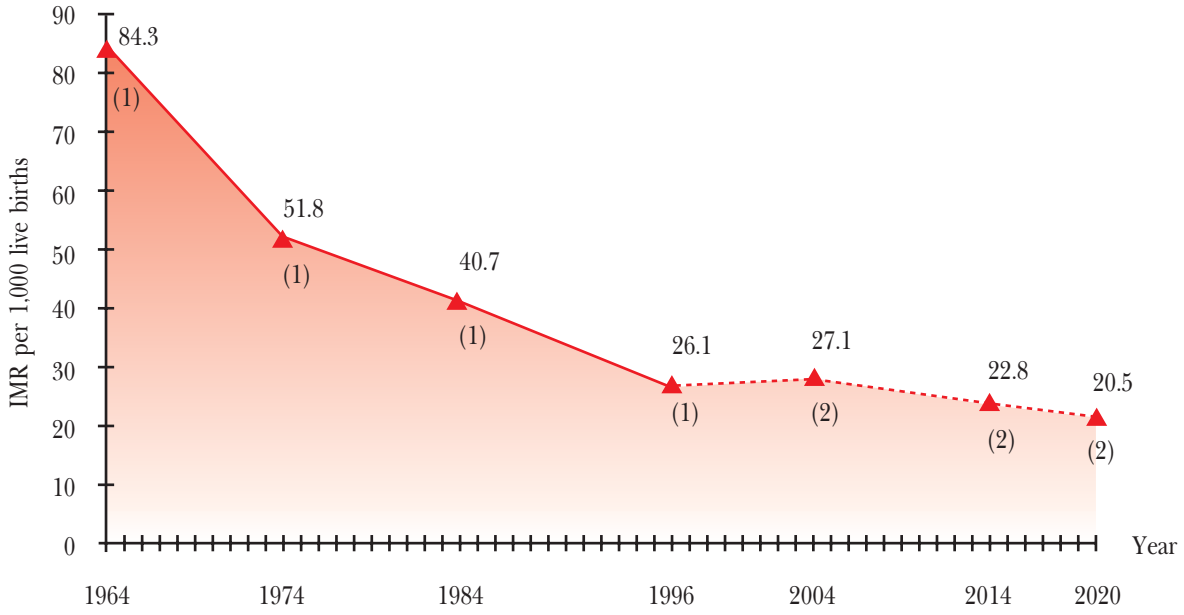


Source: Bureau of Policy and Strategy, Ministry of Public Health.

1.3 Infant Mortality

In Thailand, the infant mortality rate (IMR, per 1,000 live births) rapidly declined from 84.3 in 1964 to 40.7 in 1984 and to 26.1 in 1996. It is expected that the IMR will drop further to 20.5 in 2020 (Figure 5.2). However, although IMR for Thailand is lower than the global average, it is still higher than that for some other countries in the same region such as Singapore and Malaysia (Table 5.3).

Figure 5.2 Infant Mortality Rate for Thailand, 1964-2020



Sources: (1) Estimates were derived from the data from the Population Changes Survey. National Statistical Office.

(2) Estimates from Population Projection for Thailand, 1990-2020. Office of the National Economic and Social Development Board.

Table 5.3 Infant Mortality Rate and Child Mortality Rate for Thailand in Comparison with Thos for Other Countries, 1980, 2001 and 2002

Group of countries	IMR per 1,000 live births			CMR per 1,000 live births		
	1980	2001	2002	1980	2001	2002
WHO/SEAR	32	42	42	43	55	65
Sri Lanka	34	17	16	48	19	19
Thailand	49	24	24	58	28	28
Indonesia	90	33	32	125	45	43
Myanmar	109	77	77	134	109	108
India	115	67	65	173	93	90
Nepal	132	66	62	195	91	83
Bangladesh	132	51	48	205	77	73
Maldives						
Bhutan						
ASEAN						
Singapore	12	3	3	13	4	4
Malaysia	30	8	8	42	8	8
Brunei						
Thailand	49	24	24	58	28	28
Philippines	52	29	28	81	38	37
Vietnam	57	30	20	70	38	26
Indonesia	90	33	32	125	45	43
Myanmar	109	77	77	134	109	108
Laos	127	87	87	200	100	100
Cambodia						
High human development index						
Sweden	7	3	3	8	3	3
Japan	8	3	3	10	5	5
Switzerland	9	5	5	11	6	6
Canada	10	5	5	13	7	7
Ireland	11	6	6	14	6	6
World	**80**	**56**	**55**	**121**	**81**	**81**
High income	**13**	**5**	**5**	**15**	**7**	**7**
Middle income	**57**	**31**	**30**	**80**	**38**	**37**
Low income	**116**	**80**	**79**	**171**	**121**	**121**

Source: The World Bank. World Development Indicators, 1999, 2000/2001, 2002, 2003 and 2004.

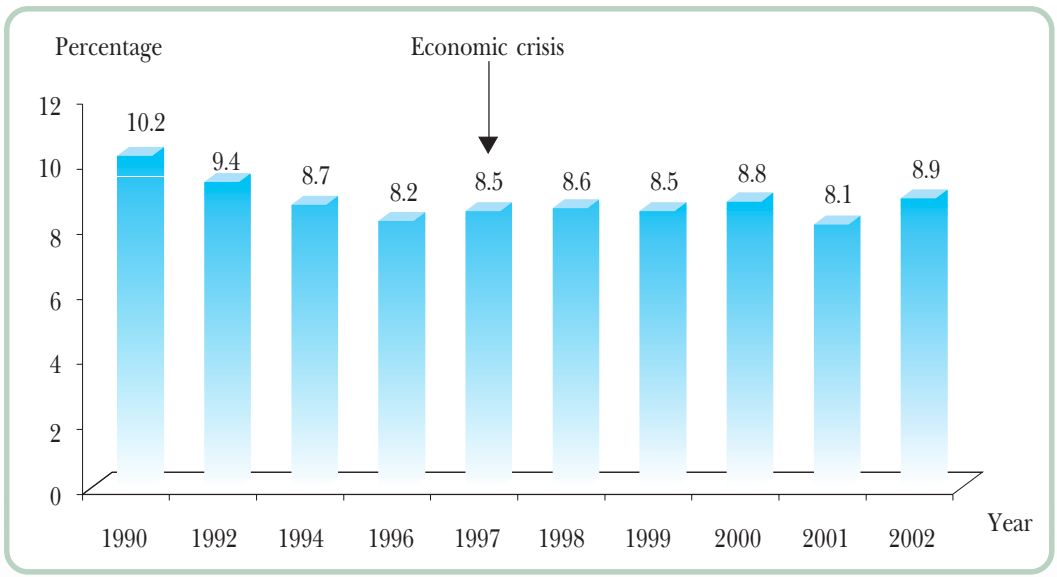
Note: CMR per 1,000 live births among children under 5 years of age.

1.4 Low Birth Weight

Overall, the rate of low-birth-weight newborns (weighing less than 2,500 grams) has dropped from 10.2% in 1990 to 8.9% in 2002 (Figure 5.3). However, it has been noted that since the 1997 economic crisis, the problem of low birth weight has been more serious, especially among the poor and unemployed, the rate being significantly higher than in the better-off group. It has also been found that the rate is highest in the South and the Northeast[4].

[4] Preeda Tae-arak, Panbaudee Ekachampaka, Suthisarn Wattanamano and Rujira Taverat. Health Status of Pregnant Women Attending ANC Clinics and Those Delivering Babies at State Hospitals after the Economic Crisis, 2003.

Figure 5.3 Percentage of Low-birth-weight Newborns (weighing less than 2,500 grams), 1990-2002

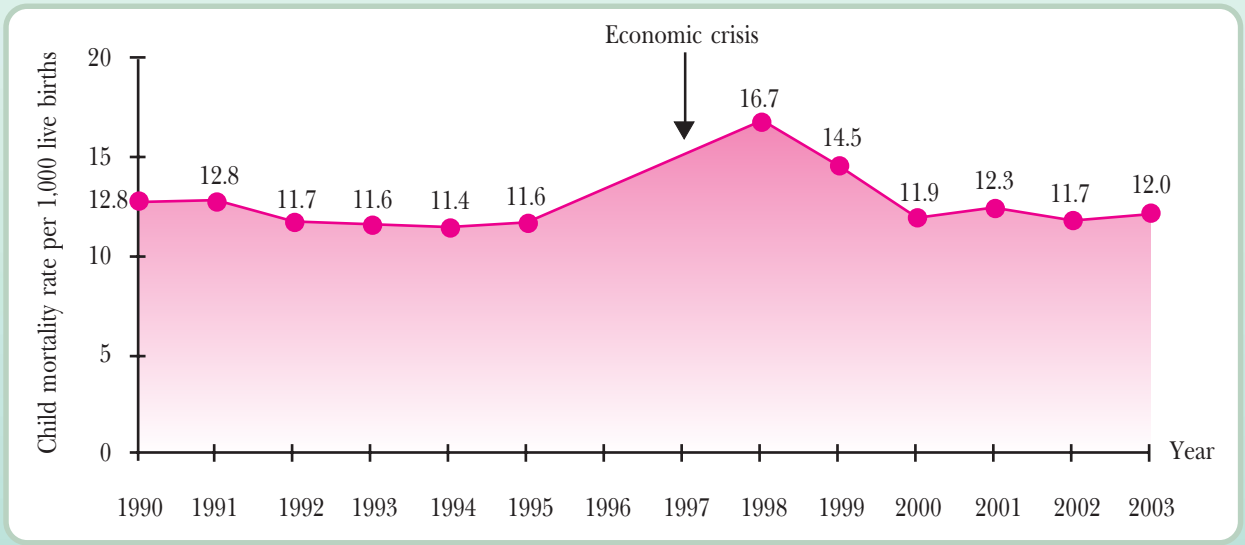


Source: Department of Health, Ministry of Public Health.

1.5 Mortality Rate of Children

The child mortality rate (among children aged under 5 years per 1,000 live births) has not significantly changed from 12.8 in 1990 to 12.0 in 2003. It is noteworthy that during the first stage of the economic crisis the rate rose to 16.7 in 1998 and has had a tendency to drop since 1999 (Figure 5.4). It is also noted that the rate reported by the civil registration office tends to be lower than reality, whereas the rate of 31.4 was derived from the 1996 population change survey.

Figure 5.4 Child Mortality Rate in Thailand, 1990-2003

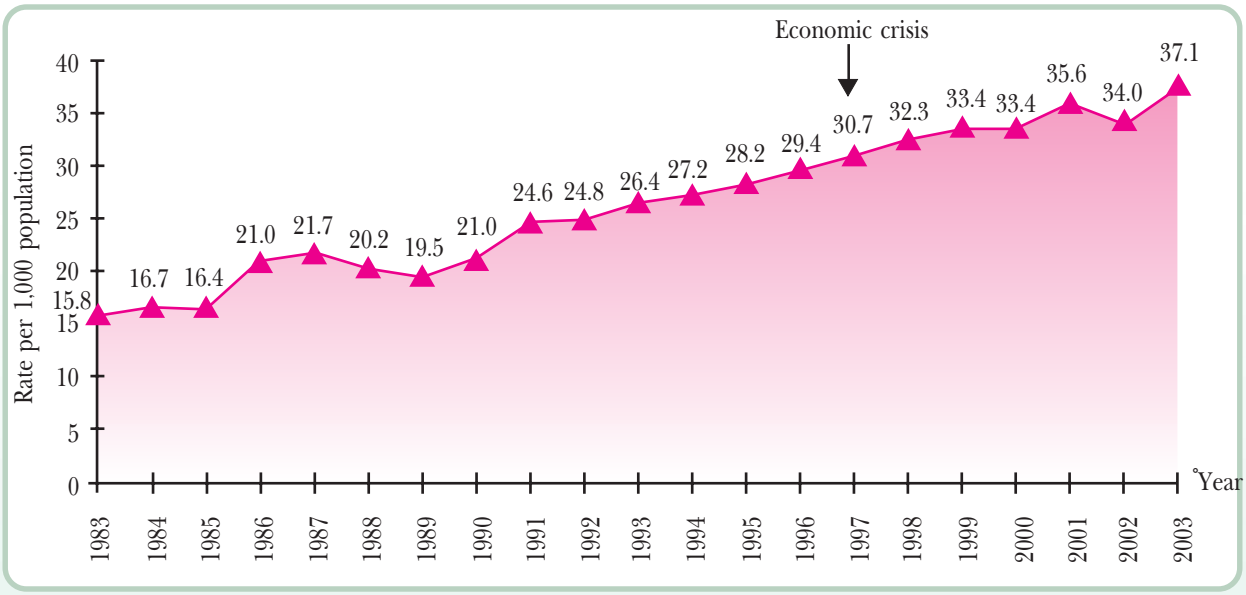


Source: Bureau of Policy and Strategy, Ministry of Public Health.

2. Mental Health Indicators

Mental health indicators, derived from reports on mental disorders and suicide situation, tend to be worsening among the Thai people as the rate of outpatients attending mental health clinics has increased from 24.6 per 1,000 population in 1991 to 37.1 per 1,000 population in 2003 (Figure 5.5); and the numbers of patients with psychosis, depression and epilepsy are on the rise (Table 5.4).

Figure 5.5 Rate of Outpatients with Mental and Behavioural Disorders, 1983-2003



Source: Outpatient Report. Bureau of Policy and Strategy, Ministry of Public Health.

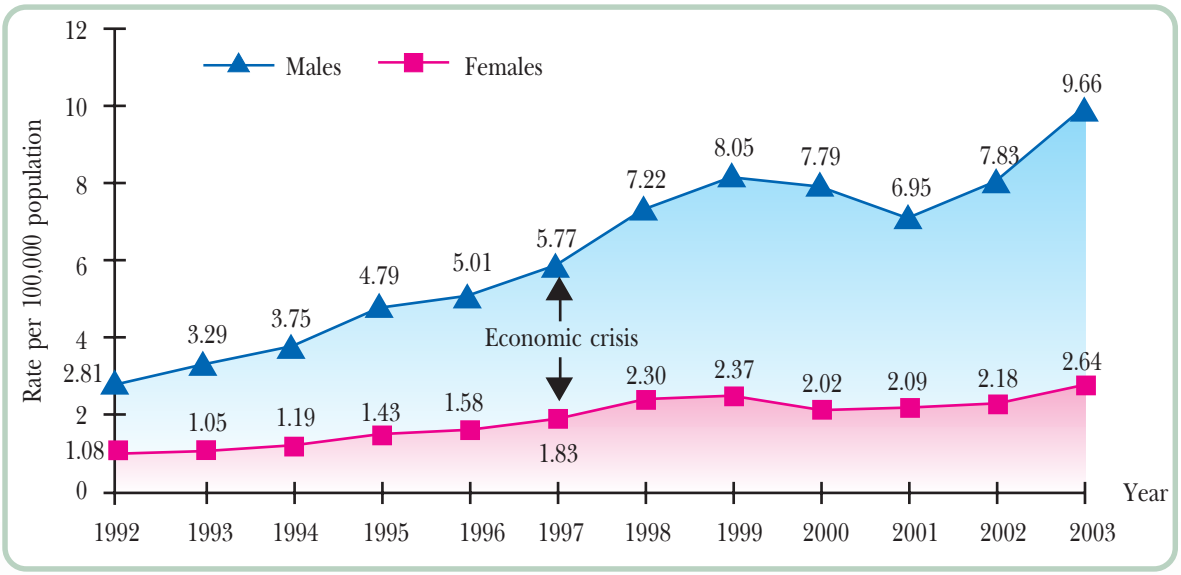
Table 5.4 Prevalence of Mental Disorders, 1997-2001

Mental disorder	Prevalence per 100,000 population				
	1997	1998	1999	2000	2001
- Psychosis	440.1	435.3	424.8	451.0	519.6
- Anxiety disorder	789.9	822.6	764.7	812.2	776.0
- Major depression	55.9	74.3	99.5	130.3	94.9
- Mental retardation	44.7	52.9	58.2	52.4	51.7
- Epilepsy	109.3	125.8	n.a.	149.8	182.5

Source: Department of Mental Health, Ministry of Public Health.

Suicide is one of the indicators reflecting serious mental conditions. According to a report of the Royal Thai Police, after the 1997 economic crisis the suicidal rate tended to be on the rise; the rate in males being almost four times greater than that in females (Figure 5.6).

Figure 5.6 Rate of Suicides, 1992-2003



Source: Royal Thai Police.

3. Epidemiological Transition

3.1 Causes of Death

Overall, according to a death certificates analysis, the major and rising causes of death among Thai citizens are non-communicable diseases, accidents, and HIV/AIDS (which is currently a major health problem of the country). The prevalence rates of communicable diseases, which used to be significant health problems, have been declining except for re-emerging diseases such as tuberculosis that is associated with HIV/AIDS (Figure 5.7). This is consistent with the results of the Burden of Diseases Study which revealed that the disease burdens in terms of disability-adjusted life years (DALYs) from non-communicable diseases were twice as much as those from communicable diseases, and that the longer the people live, the greater the tendency for them to have non-communicable diseases (Table 5.5).

Nevertheless, a study on the causes of death among Thai people during a one-year period between 1997 and 1999 in 16 provinces using the verbal autopsy method, conducted by the MoPH Bureau of Policy and Strategy, revealed that only 29.3% of specified causes of death were consistent with those stated in the death certificates. The categories of diseases with high levels of consistency were “unclear causes”, followed by cancer and tumors, external causes and infectious diseases, whereas other categories had a very low consistency level.

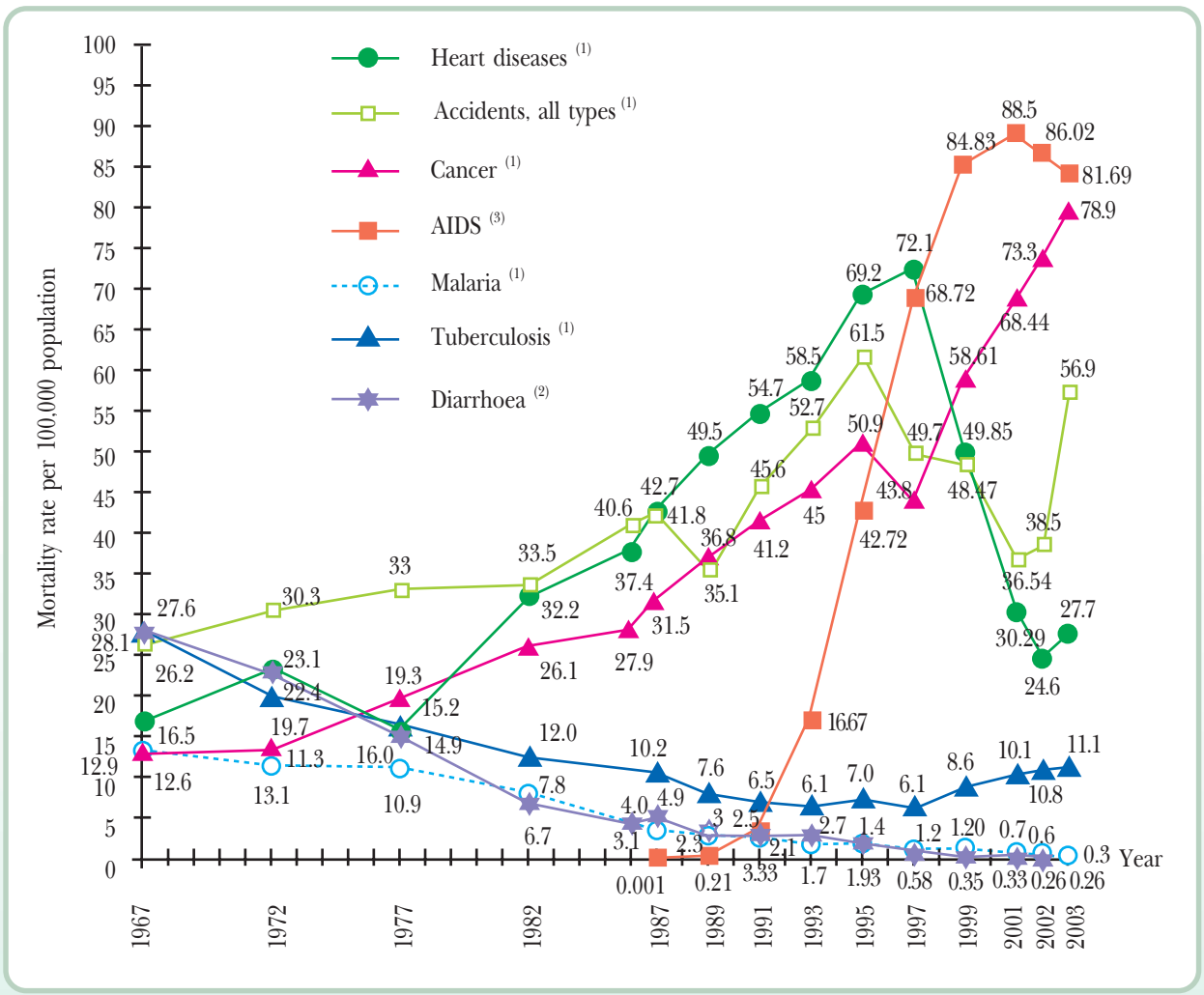
For all age groups, the study revealed that the leading cause of death was the diseases of circulatory system (18.6% of all causes), more than half of which were due to cerebrovascular diseases; the second leading cause was cancer and tumors (16.2%), nearly half of which were liver/bile-duct and lung cancers; the third leading cause was infectious diseases (15.5%), most of which were HIV infection particularly among teenage and young adult males, followed by tuberculosis; and the fourth leading cause was external causes among children and youths (12.4%), i.e. accidental drowning among school-age children and road traffic accidents among teenagers and adults, most of which were associated with motorcycles.

An analysis of the differences in causes of death in males and females revealed a proportion of 21.4% for the diseases of circulatory system and 16.5% for cancer/tumors in females and 18.2% for infectious diseases and 16.6% for the diseases of circulatory system in males, whereas external causes ranked third for males and fifth for females.

By age group and sex, the causes of death are as shown in the table below:

Age group	Major causes of death		Remarks
	Males	Females	
Under 1 year	Premature birth, low birth weight, pneumonia, systemic infection	Premature birth, low birth weight, congenital heart defect, pneumonia	Due to HIV infection, 5.7%
1-4 years	Accidental drowning, pneumonia	Accidental drowning, pneumonia	Due to HIV infection, 13.3%
5-14 years	Accidental drowning, road traffic accident	Accidental drowning, road traffic accident	Due to HIV infection, 7.9%
15-24 years	Road traffic accident, HIV infection, suicide	HIV infection, road traffic accident, suicide	
25-44 years	HIV infection, road traffic accident, suicide	HIV infection, road traffic accident, suicide	
45-59 years	Liver/bile-duct cancer, cerebrovascular diseases	Liver/bile-duct cancer, cerebrovascular diseases, diabetes	
60-74 years	Cerebrovascular diseases, liver/bile-duct cancer, chronic/obstructive pulmonary disease	Cerebrovascular diseases, diabetes, liver/bile-duct cancer	
75 years and over	Cerebrovascular diseases, cancer, chronic/obstructive pulmonary disease, cardiac ischemia	Cerebrovascular diseases, chronic/obstructive pulmonary disease	

Figure 5.7 Mortality Rates due to Major Causes of Death, Thailand, 1967-2003



Sources: (1) Bureau of Policy and Strategy, Ministry of Public Health.

(2) Bureau of Epidemiology, Department of Disease Control.

(3) Working Group on Forecast of HIV-infected Cases. Forecast of HIV-infected Cases in Thailand, 2000 - 2020, 2001.

Table 5.5 Percentage of Causes of Disability-Adjusted Life Years (DALYs) Lost of Thai People by Age Group, 1999

Age group (years)	Percentage of cause of DALY lost					
	0 - 4	5 - 14	15 - 44	45 - 59	60 and over	Total
- Communicable diseases	56.7	32.8	34.8	14.6	11.3	27.7
- Non-communicable diseases	36.6	39.6	42.7	74.7	85.2	58.3
- Accidents	6.7	27.6	22.5	10.8	3.5	14.0

Source: Working Group on Development of Burden of Disease Indicators. Bureau of Policy and Strategy, Ministry of Public Health.

In measuring the health status of Thai people using DALYs[5] as the indicator, it was found that HIV/AIDS is the number one leading cause of DALYs lost in both males and females (17% for males and 10% for females), the second and third causes were road traffic injuries and cerebrovascular disease respectively among males, and cerebrovascular disease and diabetes respectively among females (Table 5.6).

Besides, when considering the health problems by age group, the differences in life-threatening problems are as follows:

- Age group 0-14 years: major health problems are low birth weight and asphyxia;
- Age group 15-29 years: major health problems are HIV/AID, road traffic injuries, drug abuse, schizophrenia, and alcohol use;
- Age group 30-59 years: major health problems are HIV/AID, road traffic injuries, diabetes, and liver cancer;
- Age group 60 years and over: major health problems are cerebrovascular disease, emphysema, and diabetes.

Table 5.6 Major Diseases Attributable to Disability-Adjusted Life Years (DALYs) Lost of Thai People by Sex, 1999

No.	Male			Female		
	Disease	DALYs lost	Percent	Disease	DALYs lost	Percent
1	HIV/AIDS	960,087	17	HIV/AIDS	372,947	10
2	Road traffic injuries	510,907	9	Cerebrovascular diseases	280,673	7
3	Cerebrovascular disease	267,567	5	Diabetes	67,158	7
4	Liver cancer	248,083	4	Major depression	145,336	4
5	Diabetes	168,372	3	Liver cancer	118,384	3
6	Ischemic heart disease	164,094	3	Knee osteoarthritis	117,963	3
7	Emphysema	156,861	3	Road traffic injuries	114,963	3
8	Being assaulted/ murdered	156,371	3	Anaemia (iron deficiency)	112,990	3
9	Suicide or self-inflicted injuries	147,988	3	Ischemic heart disease	109,592	3
10	Drug dependence	137,703	2	Cataract	96,091	2

Source: Bureau of Policy and Strategy. Burden of Disease and Injuries in Thailand, 2002.

[5] Disability-Adjusted Life Years (DALYs): One DALY is one lost year of healthy life; calculated from the formula "DALYs = years lost to premature death+years lost to illness or disability".

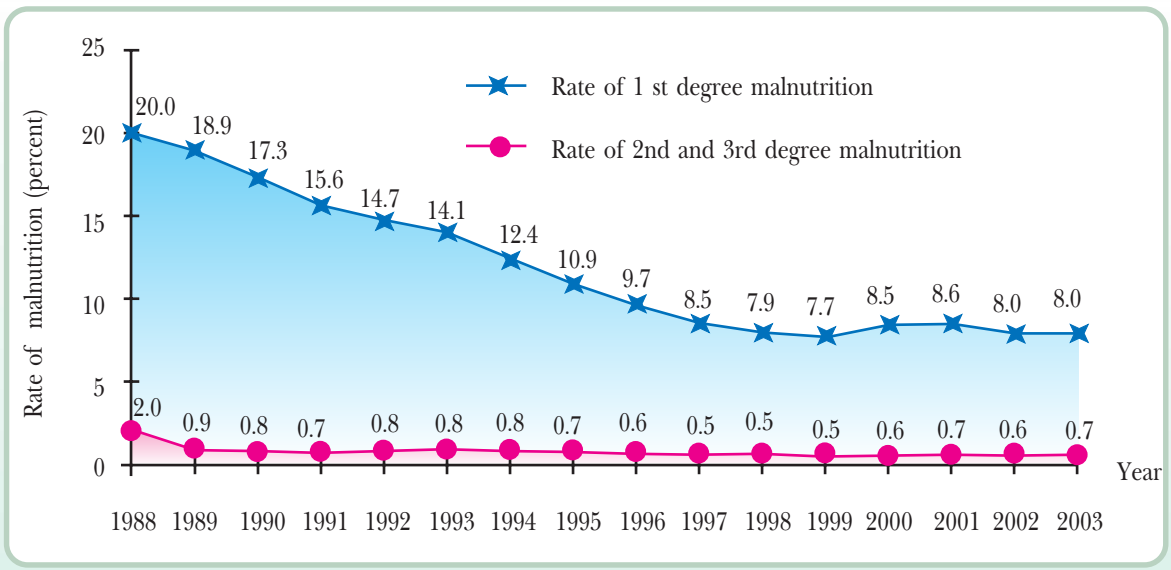
3.2 Public Health Problems with Declining Trends

3.2.1 Malnutrition

The nutritional status of preschool children has generally improved (Figure 5.8). However, with respect to geographical variation, preschool children in the Northeastern and Northern regions are more likely to be malnourished than those in other regions. In particular, the malnutrition rate among preschool children on the highlands (hilltribes) are eight times greater than that for Bangkok (Table 5.7).

According to the World Health Report,[6] it was estimated that in 2000 approximately 27% or 168 million children under 5 years of age worldwide were malnourished (weigh-for-age scale), making them more vulnerable to death due to diarrhoea and pneumonia.

Figure 5.8 Situation of Protein and Energy Malnutrition among Children Aged 0-5 Years, Thailand, 1988-2003



Source: Department of Health, Ministry of Public Health.

[6] Pathom Sawanpanyalert (editor). World Health Report 2002: Reducing Risks and Promoting Health. 2003.

Table 5.7 Rate (Percentage) of Malnutrition among Children Aged 0-5 Years by Region, 1989-2003

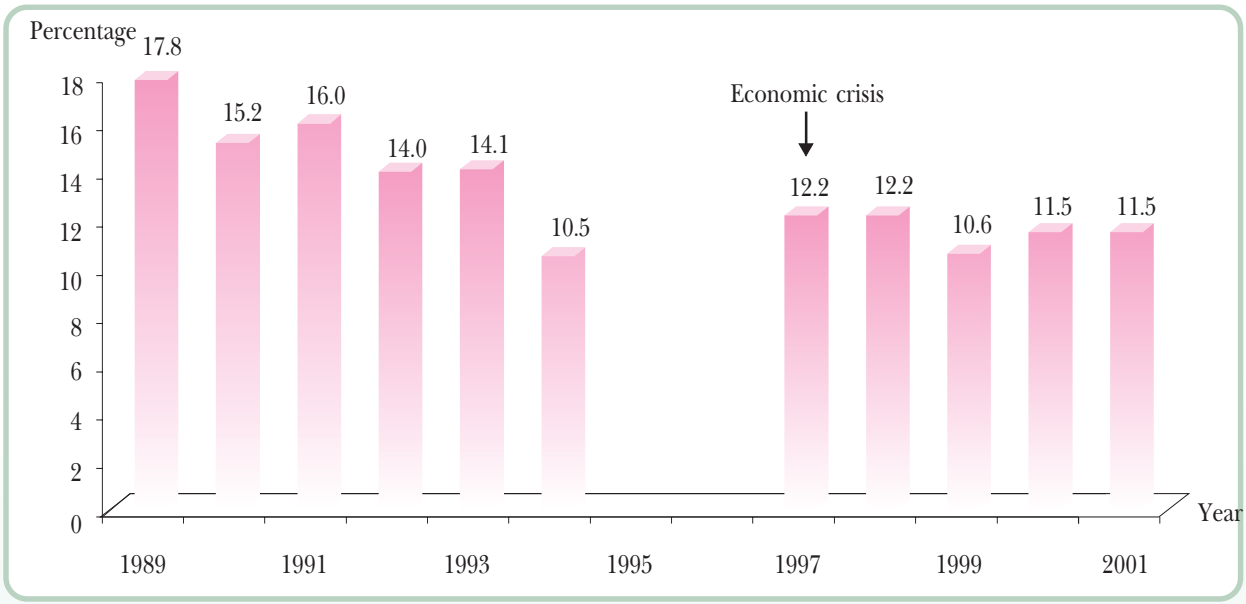
Year	Bangkok		Central		Northeast		North		South		Hilltribes	
	1st degree	2nd & 3rd degree	1st degree	2nd & 3rd degree	1st degree	2nd & 3rd degree	1st degree	2nd & 3rd degree	1st degree	2nd & 3rd degree	1st degree	2nd & 3rd degree
1989	13.08	1.25	9.45	0.28	24.91	1.67	18.76	1.33	16.38	1.37	-	-
1990	5.65	0.43	8.19	0.18	23.46	1.12	17.50	0.96	14.80	0.58	-	-
1991	5.10	0.37	7.30	0.34	21.52	0.89	16.78	0.97	12.56	0.56	-	-
1992	4.33	0.19	6.82	0.18	20.88	0.96	15.87	1.07	11.87	0.54	-	-
1993	3.56	0.19	6.11	0.18	19.51	0.94	15.28	1.12	11.29	0.62	-	-
1994	3.66	0.31	5.56	0.18	17.55	0.99	14.77	0.92	10.47	0.68	-	-
1995	3.76	0.33	4.62	0.17	14.48	0.87	13.56	1.14	9.25	0.62	-	-
1996	2.89	0.23	4.35	0.15	12.56	0.71	10.67	0.83	8.21	0.52	-	-
1997	4.50	0.45	4.04	0.14	10.82	0.65	10.05	0.81	7.27	0.44	30.3	10.6
1998	4.01	0.38	3.86	0.12	10.26	0.65	9.52	0.78	6.55	0.44	18.92	2.84
1999	4.01	0.38	3.79	0.16	10.20	0.65	9.33	0.63	6.61	0.44	23.2	2.48
2000	4.66	0.31	4.19	0.16	10.61	0.85	8.95	0.73	7.35	0.59	17.24	2.55
2001	4.54	0.39	4.94	0.29	10.53	0.92	7.81	0.42	6.09	0.53	14.00	3.02
2002	-	-	3.89	0.24	9.93	0.83	8.52	0.69	7.06	0.56	-	-
2003	-	-	3.62	0.21	9.82	0.95	8.49	0.73	7.28	0.71	-	-
Ratio compared with Bangkok in 2001	1	1	1.1	0.7	2.3	2.4	1.7	1.1	1.3	1.4	3.1	7.7

Sources: (1) Department of Health, Ministry of Public Health.
(2) Bureau of Policy and Strategy, Ministry of Public Health.

Notes: For 1989-1996 and 2002-2003, there was no survey on the hilltribes.
For 2002-2003, there was no survey in Bangkok.

The rate of underweight primary schoolchildren dropped steadily from 17.8% in 1989 to 10.5% in 1994. Nonetheless, during the economic crisis, the rate increased slightly (Figure 5.9).

Figure 5.9 Proportion of Underweight Primary Schoolchildren, 1989-2001



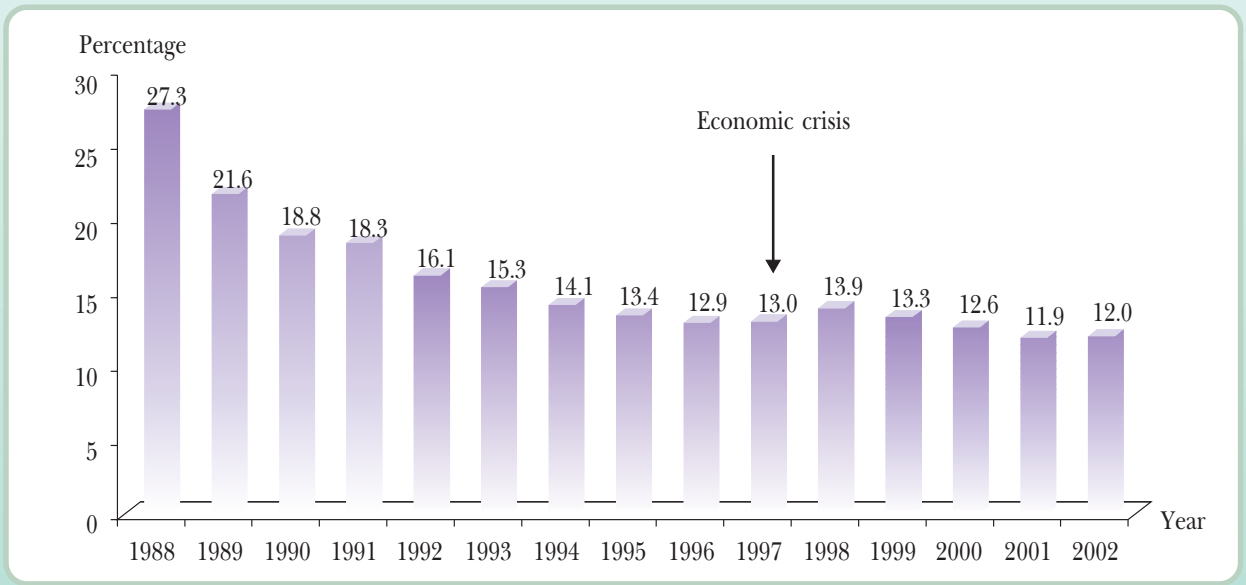
Source: Department of Health, Ministry of Public Health.

Note: For 1995, 1996, and 2002 onward, there were no surveys on malnutrition among primary schoolchildren.

3.2.2 Anemia among Pregnant Women

The rate of anemia among pregnant women had a declining trend, i.e. dropping from 27.3% in 1988 to 12.9% in 1996, but it rose slightly during the economic crisis. However, the rate dropped again to 12.0% in 2002 (Figure 5.10).

Figure 5.10 Propprtion of Anaemic Pregnant Women (Hct <33%), 1988-2002

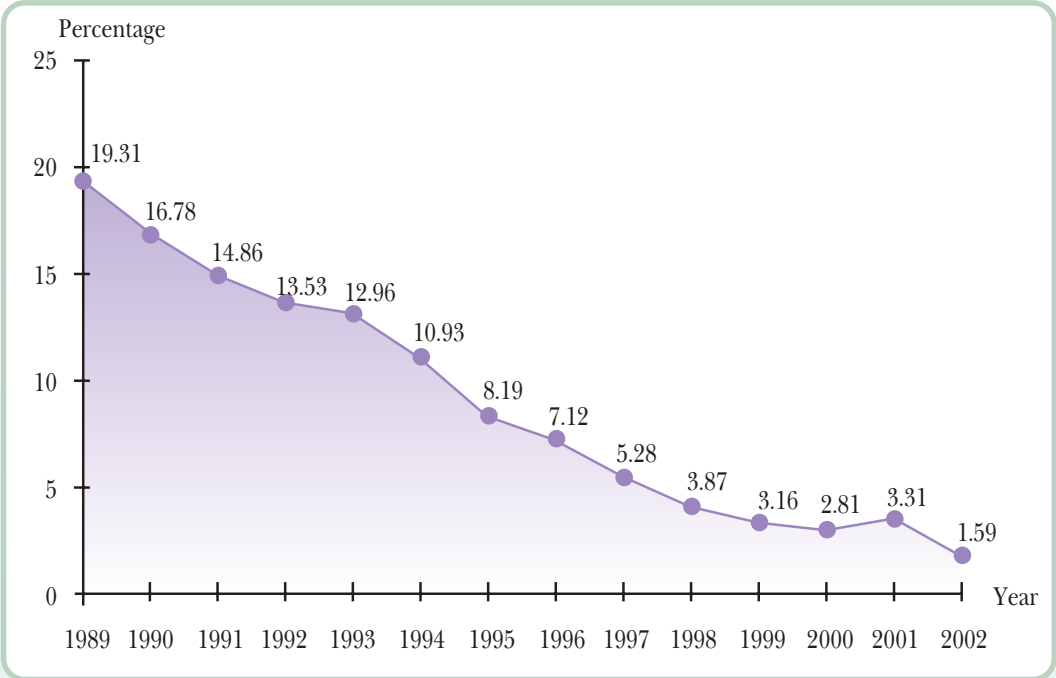


Source: Department of Health, Ministry of Public Health.

3.2.3 Iodine Deficiency Disorders

As a result of strong efforts on the elimination of iodine deficiency disorders (IDD), the prevalence of IDD in primary schoolchildren in 15 provinces with high rates of severe goitre has dropped from 19.31% in 1989 to 1.59% in 2002 (Figure 5.11); and the average goitre prevalence rate has also dropped to 1.3% in 2003.

Figure 5.11 Situation of Iodine Deficiency Disorders among Primary Schoolchildren, 1989-2002



Source: Department of Health, Ministry of Public Health.

Note: Data were collected only from 15 provinces with a severe goitre problem.

3.2.4 Vaccine-preventable Diseases

Since the Ministry of Public Health has launched the Expanded Programme on Immunization (EPI) in target population groups, the immunization coverage has remarkably improved (Table 5.8 and Figure 5.12).

Table 5.8 Coverage of Immunization Against Vaccine-Preventable Diseases in Different Target Groups, 1982-2002

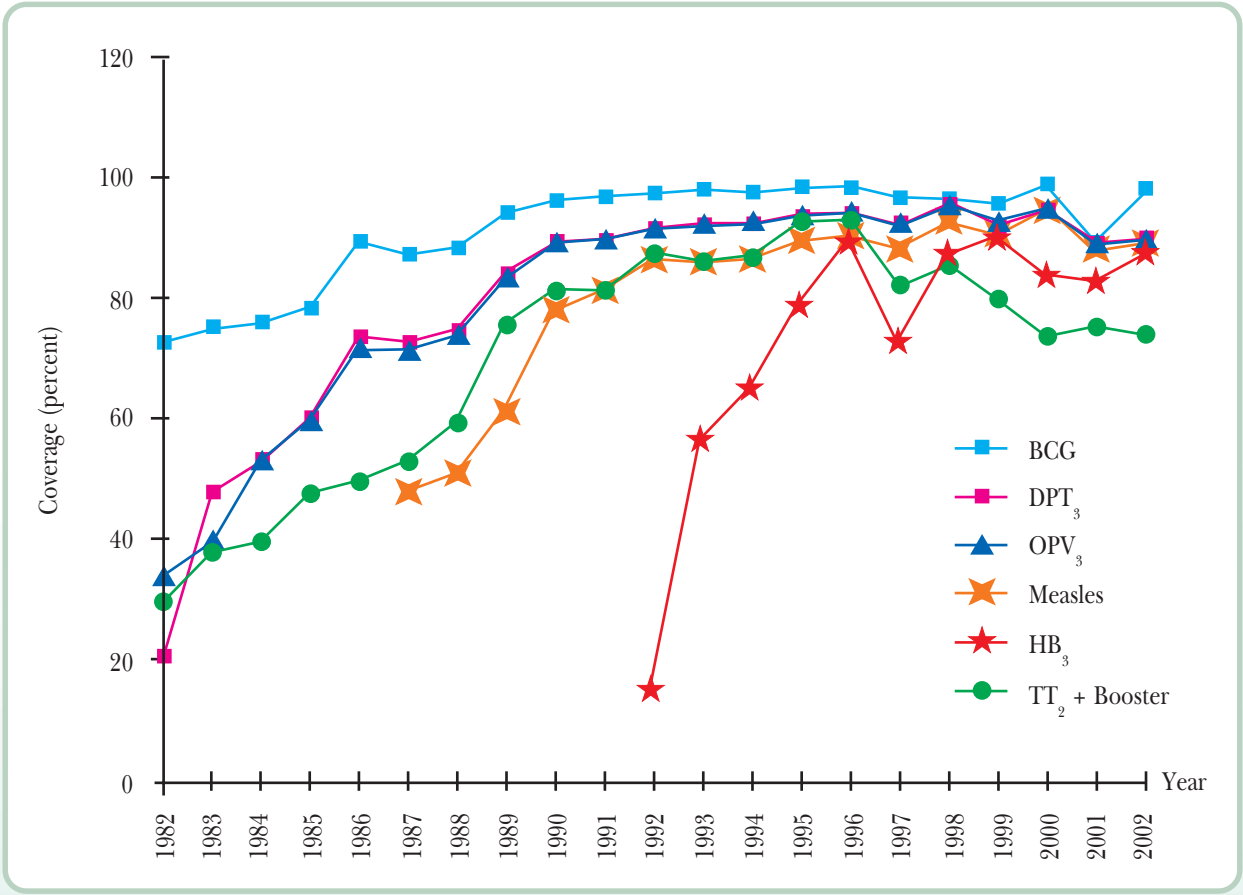
Activity	Coverage (percent)																				
	1982[1]	1983[1]	1984[1]	1985[1]	1986[1]	1987[1]	1988[1]	1989[1]	1990[1]	1991[1]	1992[1]	1993[1]	1994[1]	1995[1]	1996[2]	1997[2]	1998[2]	1999[2]	2000[2]	2001[2]	2002[2]
Children <1 yr																					
BCG (%)	73	75	76	78.4	89.5	87.4	88.6	94.1	96.3	96.8	97.4	98.1	97.9	98.4	98.4	96.9	96.5	95.6	98.8	89.4	98.1
DPT_3 (%)	21	48	53	60.5	73.9	72.8	74.8	84.2	89.4	89.8	91.5	92.2	92.9	93.7	94.3	92.5	95.9	92.1	94.4	89.1	89.8
OPV_3 (%)	34	40	53	59.3	71.8	71.3	73.8	83.2	89.3	89.8	91.5	92.2	92.7	93.7	94.3	92.3	95.8	93.0	94.5	89.3	89.7
Measles(%)	-	-	-	-	-	48.2	51.1	61.4	78.4	81.5	86.3	86.1	86.0	89.8	90.8	73.0	87.2	90.5	83.8	83.1	83.7
HB_3(%)	-	-	-	-	-	-	-	-	-	-	15.4	57.1	65.6	79.3*	90.7	88.5	93.0	90.4	94.9	87.9	88.8
Pregnant women																					
TT_2 + Booster (%)	30	38	40	48	50	53.1	59.6	75.9	81.6	81.6	87.8	86.4	86.9	92.8	93.0	82.5	85.7	80.4	74.0	75.5	74.5

Sources: [1] Data for 1982-1995 were derived from the Department of Communicable Disease Control, Ministry of Public Health

[2] Data for 1996-2002 were derived from the Bureau of Policy and Strategy, Ministry of Public Health, MoPH.

* The 1st Provincial Health Survey (1995).

Figure 5.12 Coverage of Immunization: BCG, DPT_3, OPV_3, HB_3 Measles among Children and TT_2+ Booster among Pregnant Women, 1982-2002



Sources: (1) Department of Disease Control, Ministry of Public Health.
(2) Bureau of Policy and Strategy, Ministry of Public Health.

As a result of such a high immunization coverage, the morbidity rates of such vaccine-preventable diseases have a tendency to decline (Table 5.9 and Figure 5.14), However, it is noteworthy that in 2001-2002, the incidence of measles increased slightly partly due to an epidemic among the hilltribe people (Figure 5.13).

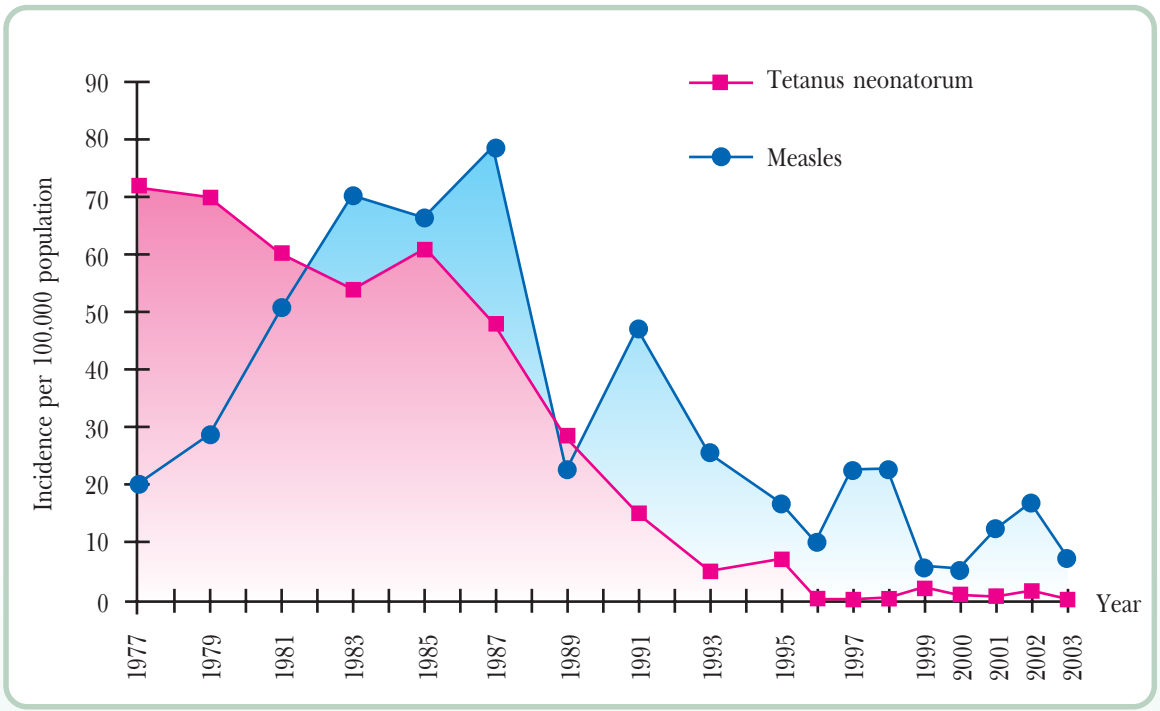
Besides, it was noted that the hepatitis B infection had a rising incidence, probably resulting from a more extensive surveillance effort (Figure 5.15).

Table 5.9 Incidence Rates of Major Vaccine-Preventable Diseases in Thailand, 1977-2003

Incidence of vaccine-preventable diseases per 100,000 population						
Year	**Measles**	**Tetanus neonatorum**	**Diphtheria**	**Pertussis**	**Poliomyelitis**	**Hepatitis B**
1977	20.2	72.1	5.2	7.2	2.1	n.a.
1979	28.9	70.0	4.4	11.2	2.3	0.09
1981	51.1	59.8	1.6	6.2	0.5	0.14
1983	70.2	53.6	2.1	9.8	0.3	0.12
1985	66.2	60.4	1.4	4.8	0.1	0.55
1987	78.3	47.9	1.0	2.7	0.04	1.57
1989	22.5	28.1	0.1	2.2	0.03	3.30
1991	46.9	14.5	0.09	0.5	0.009	5.98
1993	25.2	4.7	0.04	0.6	0.015	4.39
1995	16.4	6.4	0.03	0.2	0.003	3.13
1996	9.5	0.05	0.08	0.13	0.03	2.20
1997	22.03	0.04	0.06	0.17	0.00	2.27
1998	22.39	0.03	0.08	0.16	0.00	2.53
1999	5.38	1.55	0.08	0.08	0.00	2.60
2000	6.67	0.03	0.02	0.16	0.00	2.71
2001	11.86	0.36	0.02	0.12	0.00	2.80
2002	16.48	1.14	0.02	0.02	0.00	3.44
2003	7.17	0.01	0.01	0.04	0.00	3.68

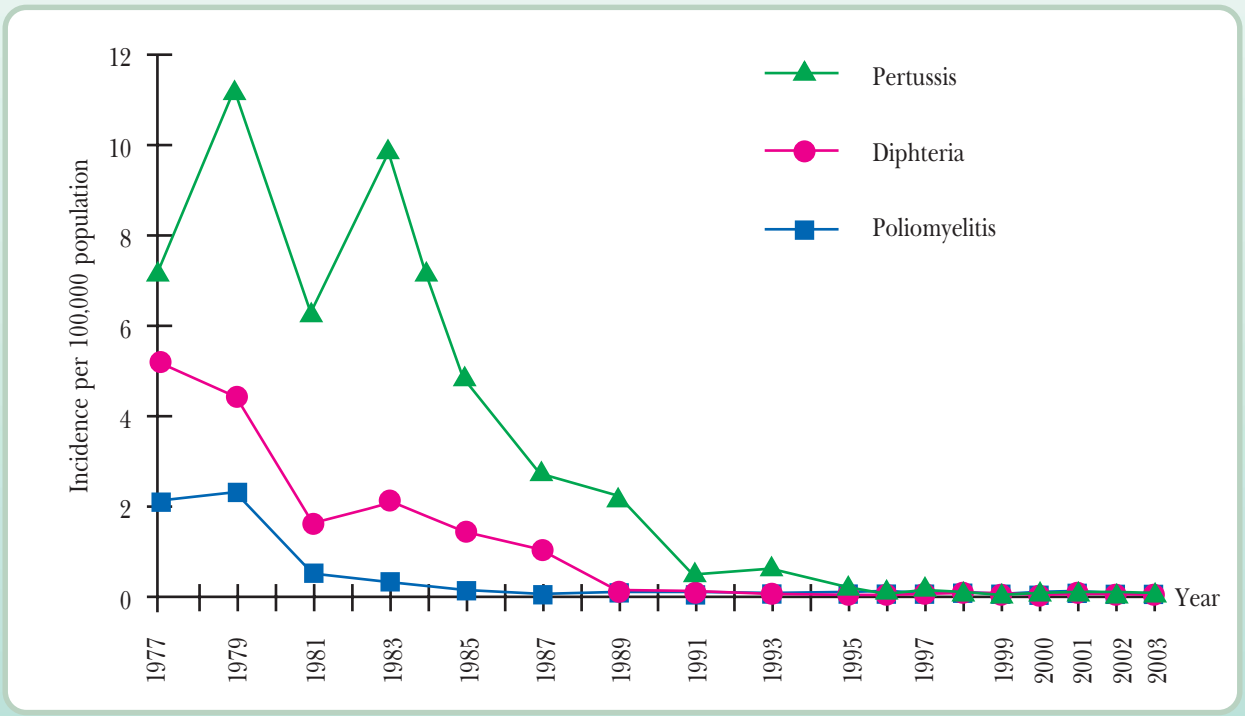
Source: Bureau of Epidemiology, Department of Disease Control.

Figure 5.13 Incidence of Tetanus Neonatorum and Measles in Thailand, 1977-2003



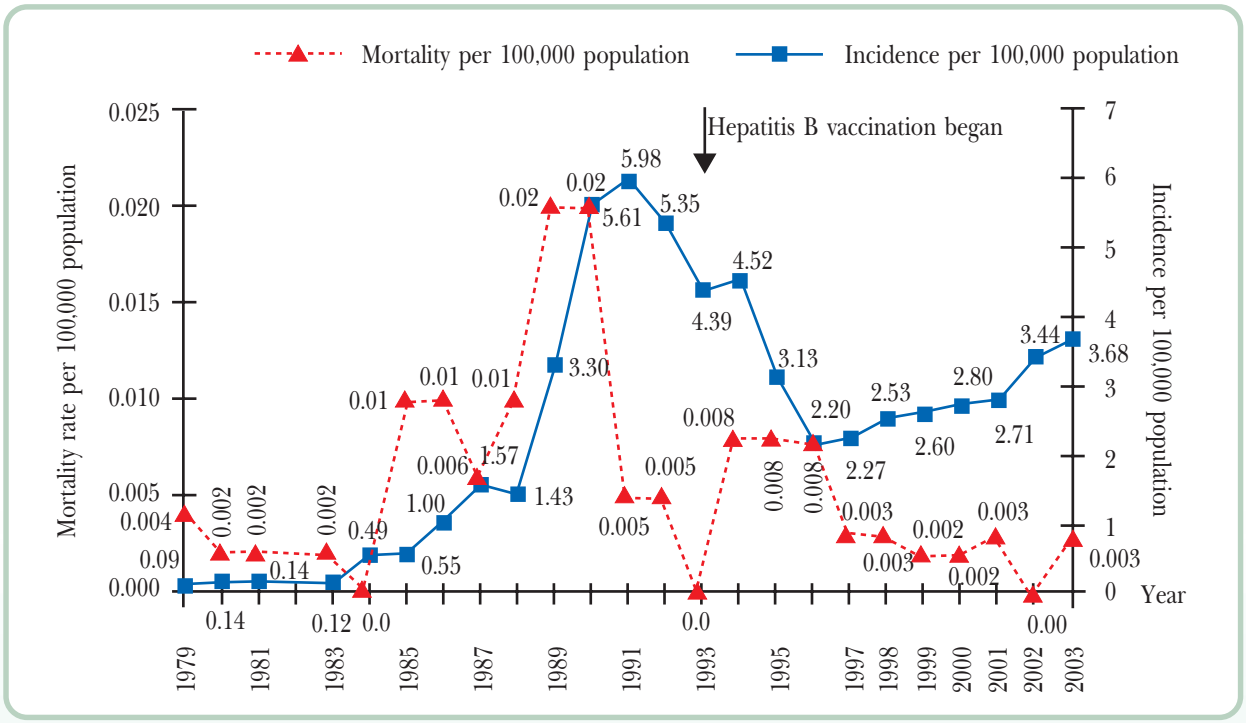
Source: Bureau of Epidemiology, Department of Disease Control.

Figure 5.14 Incidence of Pertussis, Diphtheria, and Poliomyelitis in Thailand, 1977-2003



Source: Bureau of Epidemiology, Department of Disease Control.

Figure 5.15 Incidence and Mortality Rates of Hepatitis B in Thailand, 1979-2003



Source: Bureau of Epidemiology, Department of Disease Control.

3.2.5 Helminthiases

Overall, the prevalence of intestinal parasitic diseases has been declining, except for liver fluke whose prevalence is relatively increasing in the North (Table 5.10). A survey on liver fluke situation, using the modified Kato-Katz method of faecal examination, revealed that 90.6% of those who had liver fluke infestation had a parasitic egg count of less than 1,000 eggs per gram of faeces.[7]

Table 5.10 Prevalence Rate of Common Helminthiasis

Helminthiasis	Prevalence, percent			
	1981	1991	1996	2001
Hookworm disease	40.56	27.69	21.6	11.4
Ascariasis (roundworm)	4.04	1.46	1.9	1.2
Trichuriasis (whipworm)	4.46	4.34	3.9	1.5
Liver fluke - whole country	14.7	15.2	11.8	9.6
- Liver fluke, Northeast	34.6	24.01	15.3	15.7
- Liver fluke, North	5.6	22.9	29.7	19.3

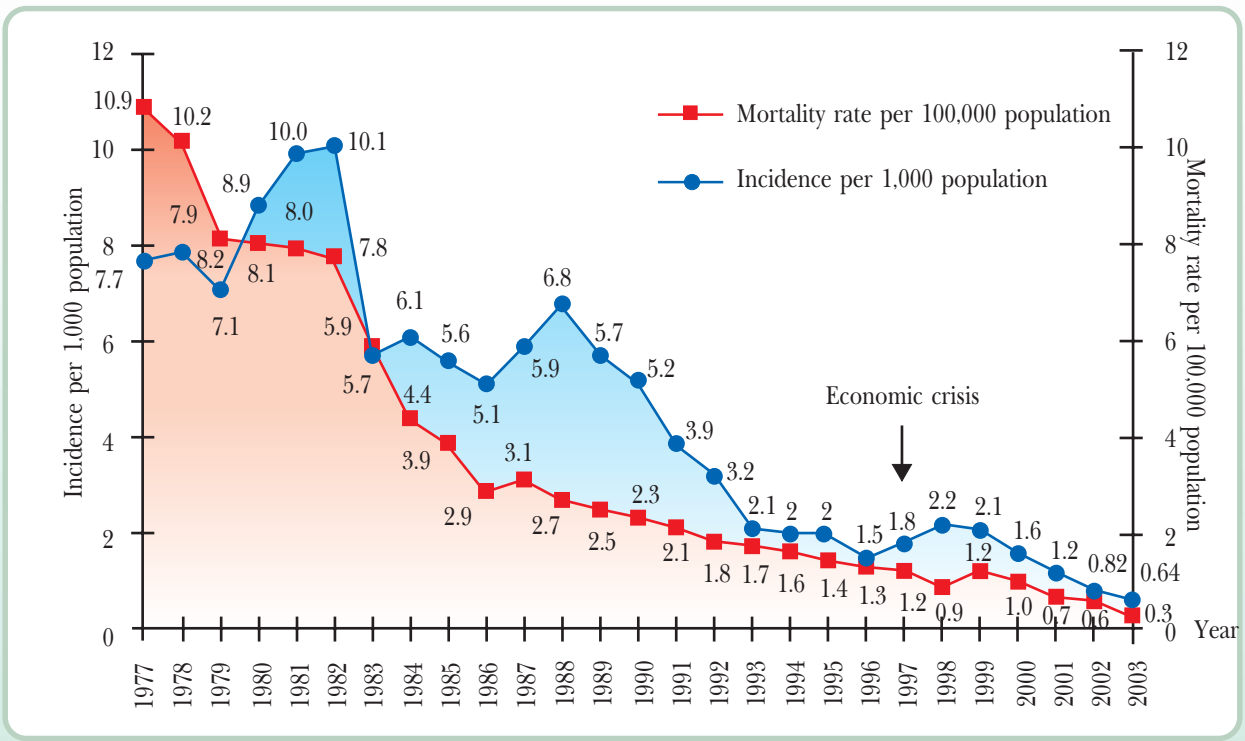
Source: Department of Disease Control, Ministry of Public Health.

[7] Department of Disease Control. Evaluation of the Helminthiasis Control Project in Thailand at the End of the 8th National Health Development Plan, 2001. Division of General Communicable Diseases, Department of Disease Control, 2001.

3.2.6 Malaria

Thailand has succeeded, to a certain extent, in its malaria control efforts, leading to a considerable reduction in incidence and mortality rates (Figure 5.16). However, in some regions particularly the Thai-Myanmar and Thai-Cambodian border areas, the problem remains critical, especially drug resistance. It is noted that **during 1997-1999 the malaria incidence rose slightly but the mortality rate was stable.** This phenomenon is postulated to be involved with the discontinuation of DDT spraying, EI Nino phenomena and the restructuring of communicable disease control programmes. As a result, Malaria Units were upgraded to be "Vector-borne Disease Control Units", which are extensively responsible for the prevention and control of dengue hemorrhagic fever, filariasis and encephalitis. In the beginning, there might be some problems, but since 2000, the incidence and mortality rates have been declining.

Figure 5.16 Incidence and Mortality Rates of Malaria in Thailand, 1977-2003

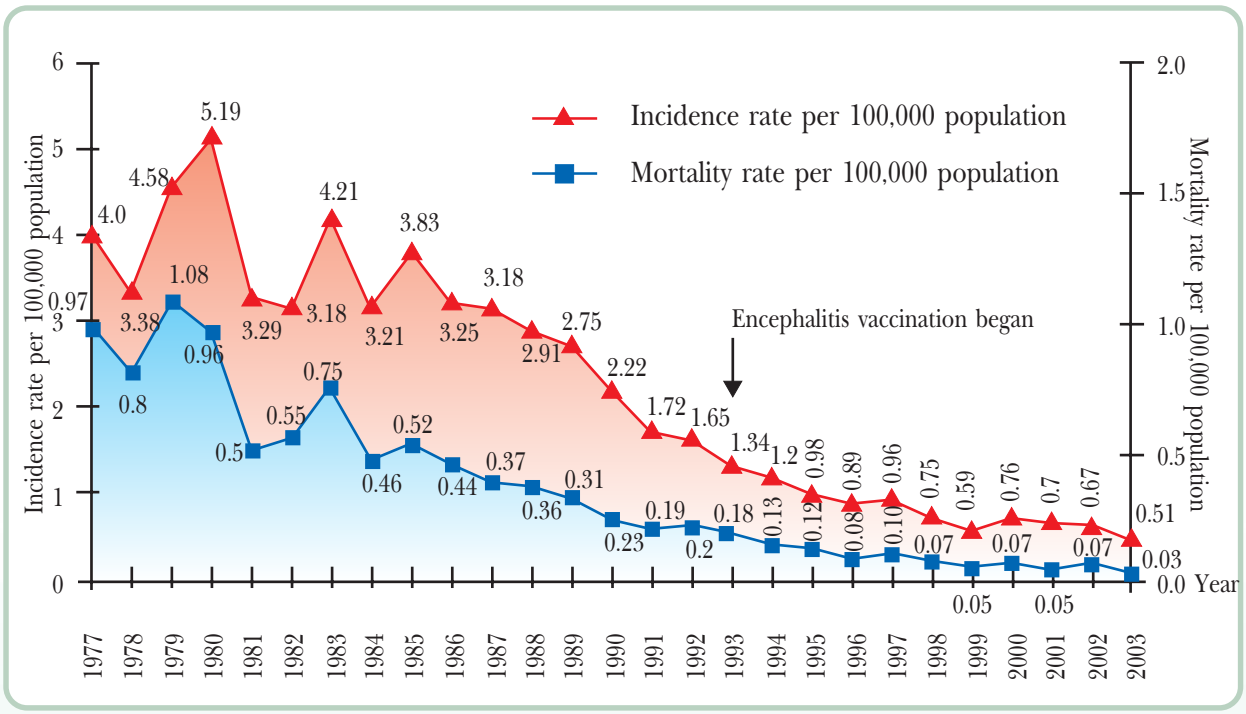


Sources: (1) Department of Disease Control, Ministry of Public Health.
(2) Bureau of Policy and Strategy, Ministry of Public Health.

3.2.7 Encephalitis

As a result of economic and social development and intensive campaigns on immunization for target groups of children in high-risk areas, the incidence and mortality rates of encephalitis have significantly declined (Figure 5.17). In 2003, the incidence of encephalitis was recorded at 0.51 per 100,000 population and the mortality at 0.03 per 100,000 population.

Figure 5.17 Incidence and Mortality Rates of Encephalitis in Thailand, 1977-2003



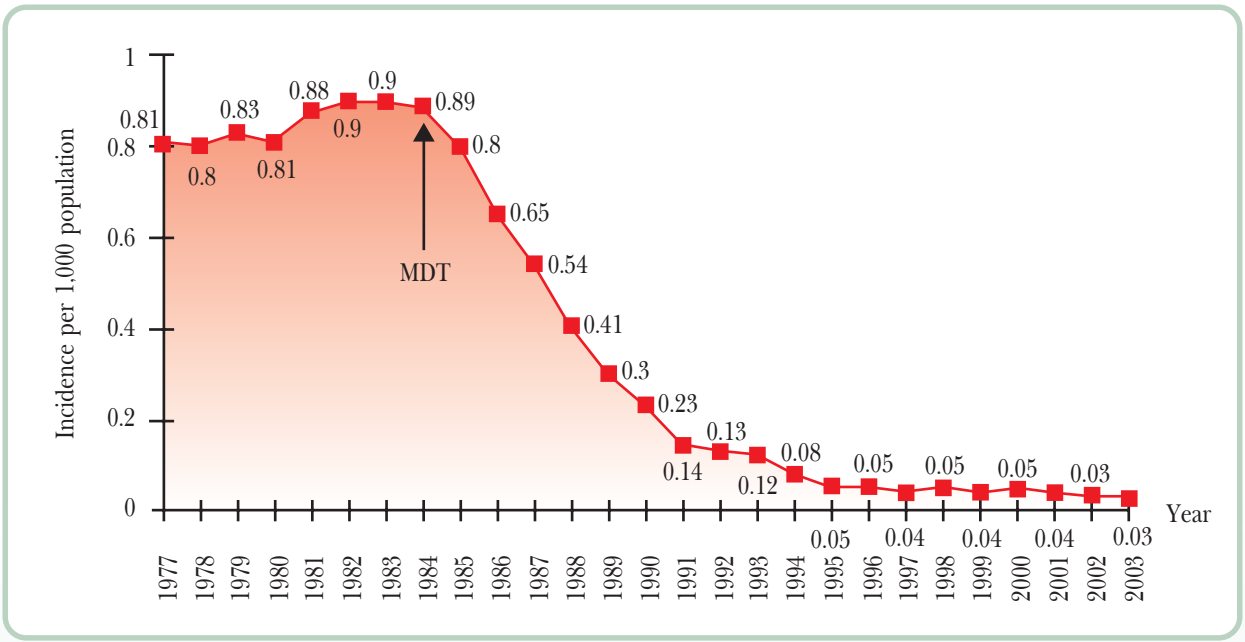
Source: Bureau of Epidemiology, Department of Disease Control.

3.2.8 Leprosy

The Leprosy Control Programme in Thailand has been implemented for over 40 years with the initiation of His Majesty the King and support of the World Health Organization as well as several NGOs. The Programme has been quite successful in reducing the leprosy prevalence rate from 5 per 1,000 population in 1955 to 0.03 per 1,000 population in 2003 - a nearly 100-fold reduction (Figure 5.18). The disease is no longer regarded as a public health problem in Thailand.

The success of the Programme has been partially attributable to the introduction of the short-course multiple-drug therapeutic (MDT) regimens, recommended by the World Health Organization since 1984.

Figure 5.18 Incidence of Leprosy in Thailand, 1977-2003



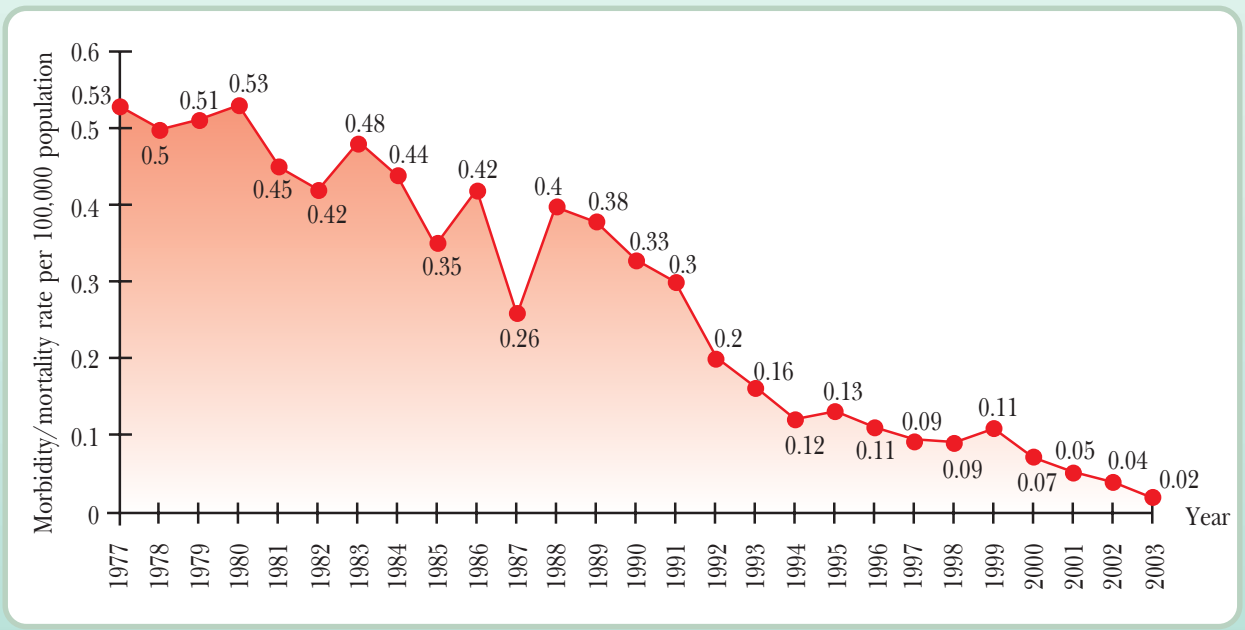
Source: Department of Disease Control, Ministry of Public Health.

Note: MDT = Multiple-drug therapy

3.2.9 Rabies

As a result of the Rabies Control Programme implemented by the Ministry of Public Health in collaboration with the Department of Livestock Development of the Ministry of Agriculture and Cooperatives, the rabies morbidity/mortality rate has dropped considerably from 0.53 per 100,000 population in 1977 to 0.02 per 100,000 population in 2003 (Figure 5.19).

Figure 5.19 Morbidity/Mortality Rate of Rabies in Thailand, 1977-2003

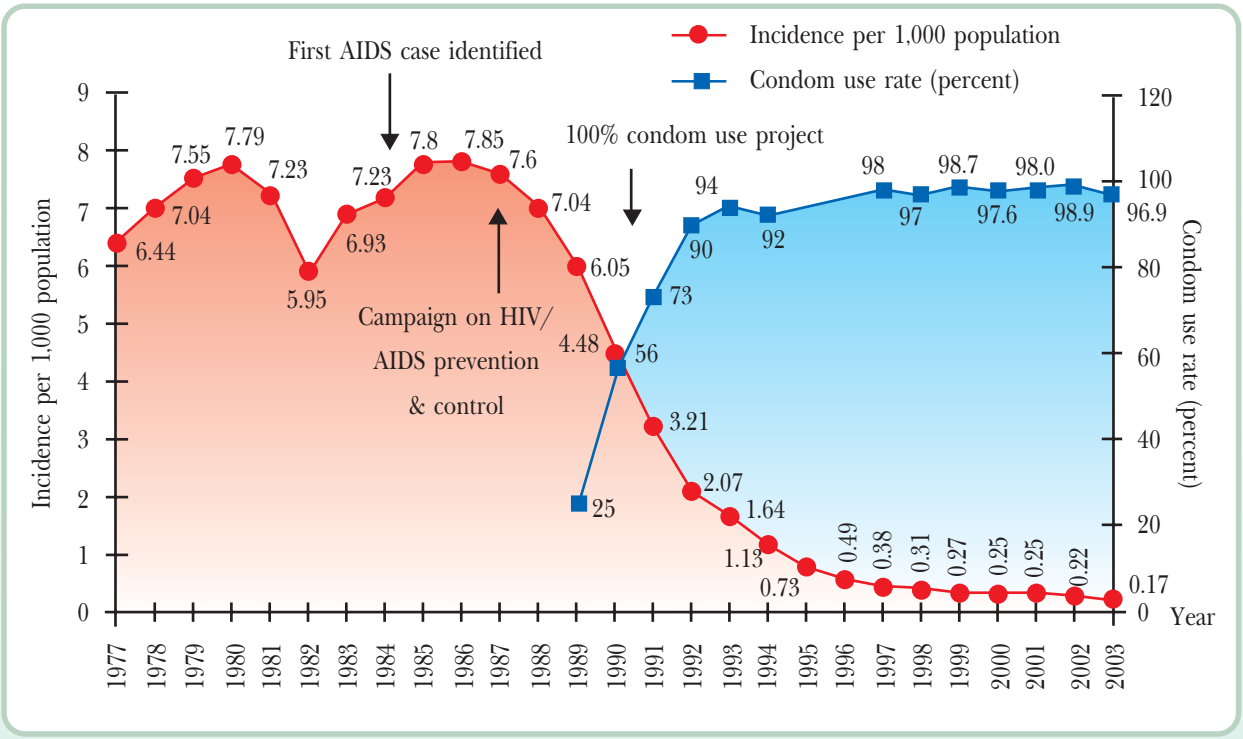


Source: Bureau of Epidemiology, Department of Disease Control.

3.2.10 Sexually Transmitted Infections (STIs)

Overall, the trends in STI prevalence in Thailand between 1977 and 2003 have been improving. In particular, after 1986, the prevalence rate of STIs has fallen from 7.85 per 1,000 population in 1986 to 0.17 per 1,000 population in 2003 (Figure 5.20) as a result of the intensive campaigns on HIV/AIDS prevention and control.

Figure 5.20 Incidence of Sexually Transmitted Infections and Condom Use Rate among Female Commercial Sex Workers (CSWs), Thailand, 1977-2003



Source: Bureau of Epidemiology and Cluster of STIs, Department of Disease Control.

Note: Sexually transmitted infections include syphilis, gonorrhoea, chancroid, lymphogranuloma venereum, granuloma inguinale, and pseudogonorhoea.

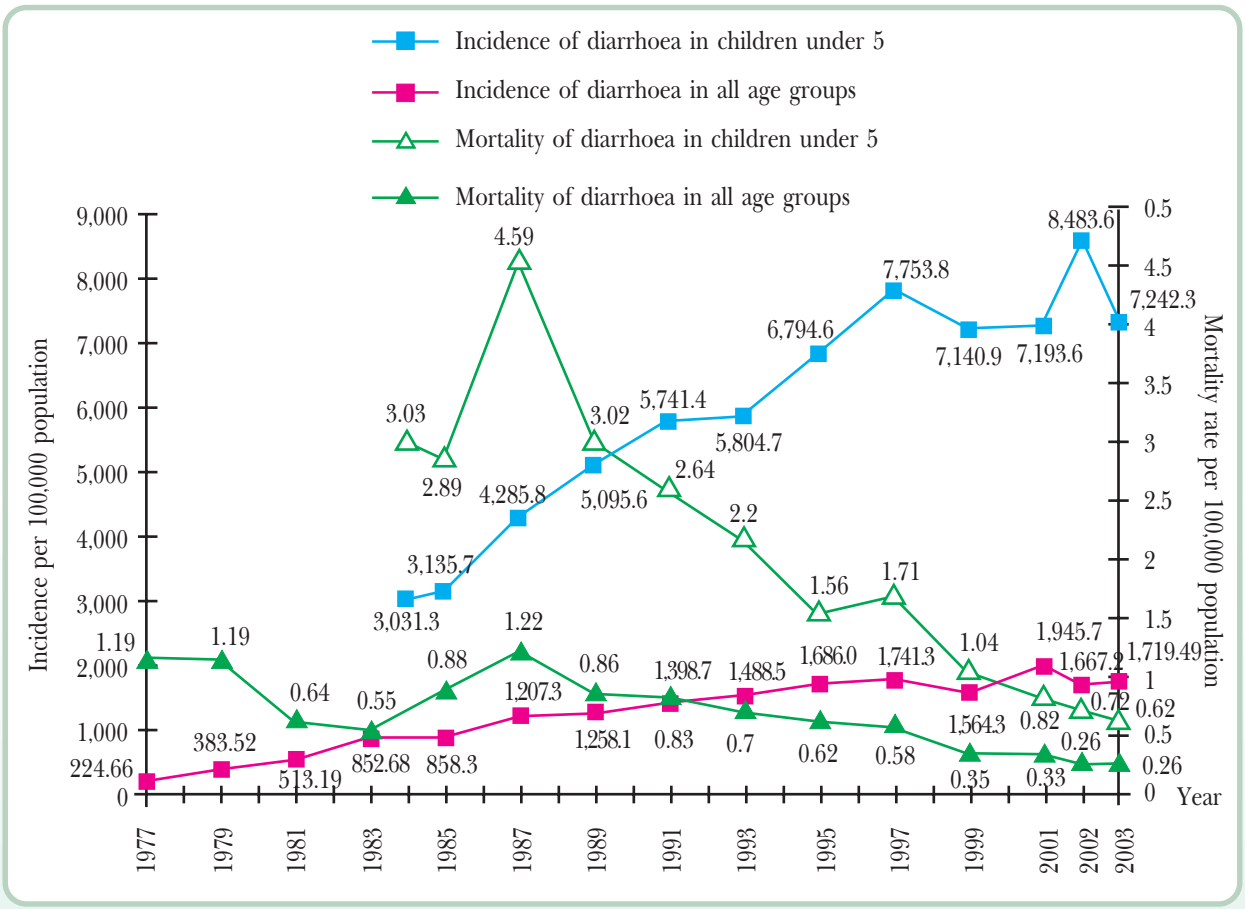
3.3 Public Health Problems with Minimal Changes

3.3.1 Diarrhoea

Acute diarrhoea is still a crucial public health problem with a relatively slight change in incidence among both children and adults, particularly among children under five years of age whose incidence is higher than that in adults (Figure 5.21). A recent provincial health status survey revealed that the diarrhoea incidence in children has been declining over the past five years from 6.0 episodes/person/year in 1995 to 3.6 episodes/person/year in 2001.[8] Neverthless, the incidence is still higher than the target of not exceeding 1 episode/person/year (Table 5.11). However, the mortality rate has been declining considerably due to improved health services and extensive coverage as well as the success of the campaign on oral rehydrtion therapy (ORT).

[8] Bureau of Policy and Strategy, Ministry of Public Health. In-depth Analysis of the Data of Provincial Health Status Survey, 2003.

Figure 5.21 Incidence and Mortality Rates of Diarrhoea in Thailand, 1977-2003



Source: Bureau of Epidemiology, Department of Disease Control.

Table 5.11 Episodes of Illness with Diarrhoea among Children under 5 Years of Age,1995-2001

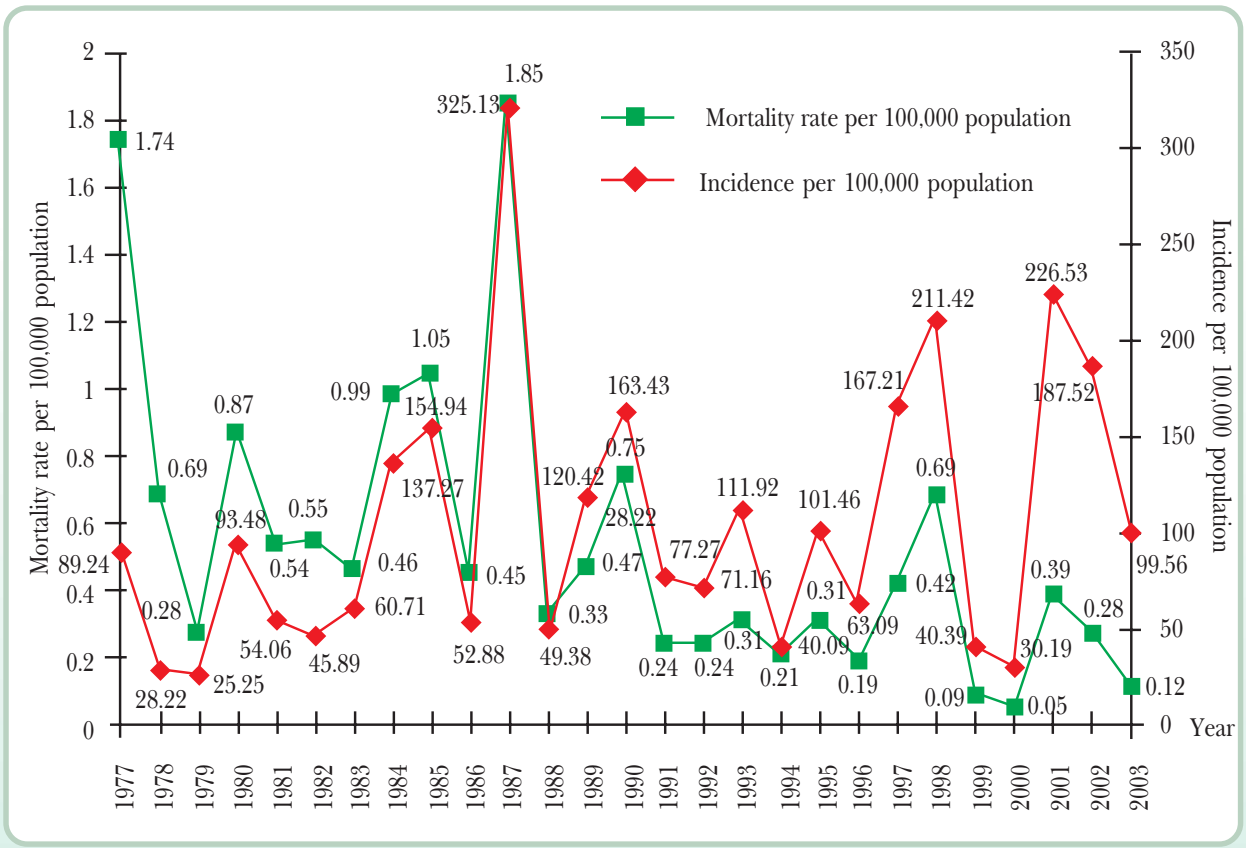
	Illness (episodes/person/year)			
Type of areas	**1995**	**1996**	**2001**	**Target, 8th Plan**
Municipality	4.9	3.1	3.4	
Non-municipality	5.2	3.4	3.9	
Total	**6.0**	**3.4**	**3.6**	**Not exceeding 1**

Source: Provincial Health Status Surveys, 1995,1996, and 2001.

3.3.2 Dengue Haemorrhagic Fever

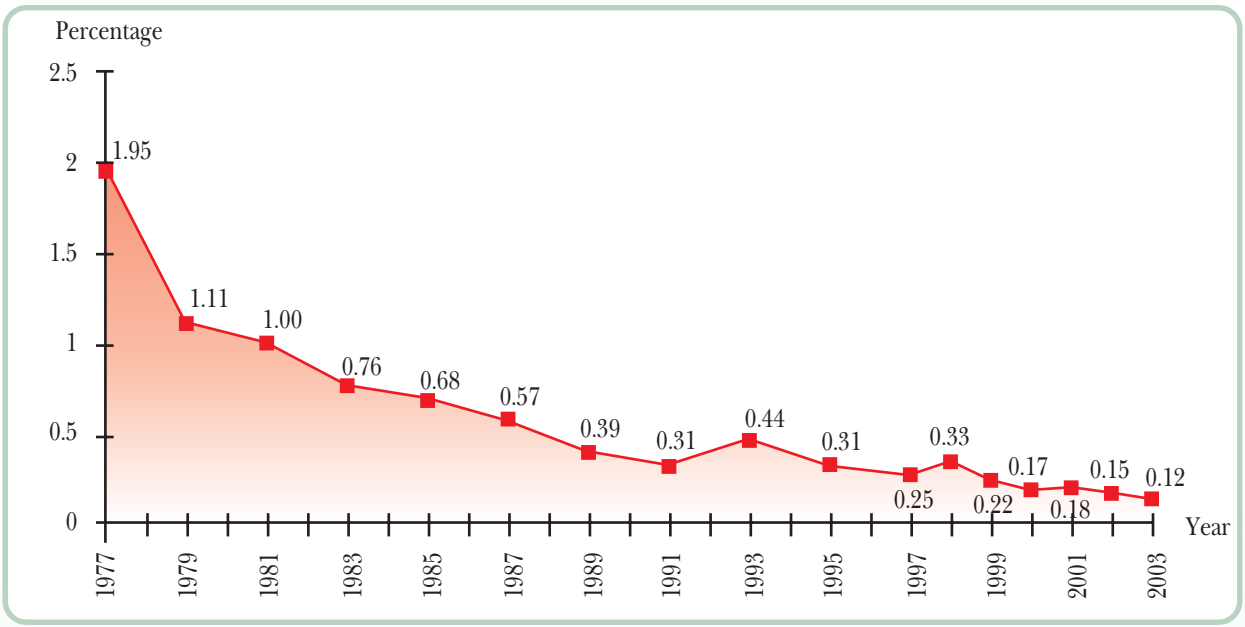
Dengue haemorrhagic fever has been a major public health problem of the country over the past 30 years without a declining trend. In particular, in 1997, 1998, 2001 and 2002, there was a rising trend with an epidemic occuring every two years. However, the DHF case-fatality rate has been declining (Figure 5.22, 5.23)

Figure 5.22 Incidence and Mortality Rates of Dengue Haemorrhagic Fever, Thailand, 1977-2003



Source: Bureau of Epidemiology, Department of Disease Control.

Figure 5.23 Case-Fatality Rate of Dengue Haemorrhagic Fever, 1977-2003

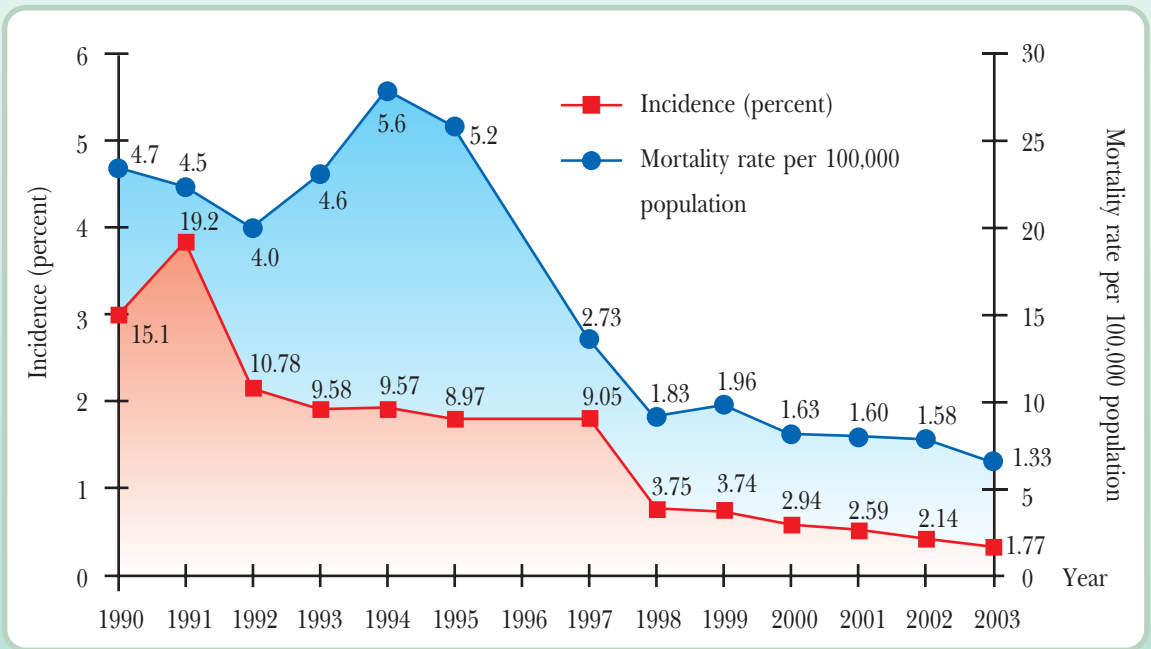


Source: Bureau of Epidemiology, Department of Disease Control.

3.3.3 Acute Respiratory Infection among Children

Currently acute respiratory infection is still a crucial public health problem in Thailand. **Pneumonia is the number one cause of death, among all infectious diseases, in children under five.** The incidence of pneumonia in children has fallen from 5.2% in 1995 to 1.33% in 2003; and its mortality rate (per 100,000 population) has steadily dropped from 15.1 in 1990 to 1.77 in 2003 (Figure 5.24).

Figure 5.24 Incidence and Mortality of Pneumonia in Children under Five in Thailand, 1990-2003



Sources: (1) Department of Disease Control, Ministry of Public Health
(2) Bureau of Epidemiology, Department of Disease Control.

3.4 Public Health Problems with Rising Trends

3.4.1 HIV/AIDS

(1) HIV Infection Situation

According to the report on sentinel surveillance of HIV infection in the seven major target groups of population, implemented in all provinces during the period 1989-2003, the situation and trends can be summarized as follows:

Blood Donors. The prevalence increased from 0.28% in 1989 to 0.81 % in 1992, and then gradually dropped to 0.27% in 2003 (Figure 5.25).

Pregnant Women Attending Antenatal Care Clinics. The prevalence climbed from 0.68% in 1991 to 2.29% in 1995, and then gradually reduced to 1.23% in 2003 (Figure 5.25).

Injecting Drug Users. The prevalence was approximately 30-43% throughout the period 1989-1997. After 1997, the prevalence has been soaring to 50.77%, and fell to 33.33% in 2003 (Figure 5.26).

Male Clients Attending STI Clinics. The prevalence jumped from 2.50% in 1990 to 8.5% in 1994 and remained stable at 7-9% during 1995-1999, but declined to 4% in 2003 (Figure 5.26).

Direct Female CSWs. The prevalence rose from 3.47% in 1989 to 33.15% in 1994, and fell to 10.63% in 2003 (Figure 5.26).

Indirect Female CSWs. The prevalence escalated from 2% in 1990 to 10.14% in 1996. Since then the rate has gradually declined to 3.88% in 2003 (Figure 5.26).

Military Recruits or Conscripts. The prevalence increased from 1.6% in 1990 to 4% in 1993, and since then has dropped to 0.5% in 2003 (Figure 5.27).

Among the drug addicts admitted to the Northern Regional Centre of Drug Dependence Treatment, a survey revealed that, in the past decade, a rising trend in HIV infection was found among the hilltribe people; an increase from 2.7% 1989 to 9.5% in 1998. In contrast, the HIV infection rate among the Thai people dropped from 27.1% to 16.2% during the same period. In regard to their demographic, social, and behavioural characteristics, the HIV infection among this population group is not only a result of injecting drug use, but also of sexual transmission [9] (Figure 5.28).

In general. the HIV/AIDS epidemic in Thailand originated in homosexual males during the period 1986-1987, then it spread to injecting drug users, female commercial sex workers, male sex seekers and, eventually, to families.

Nevertheless, the reduction in the HIV transmission in the heterosexual group during 1995-1996 was possibly a result of intensive health education campaigns among the high-risk group, coupled with the 100% condom use campaigns among female CSWs (Figure 5.20).

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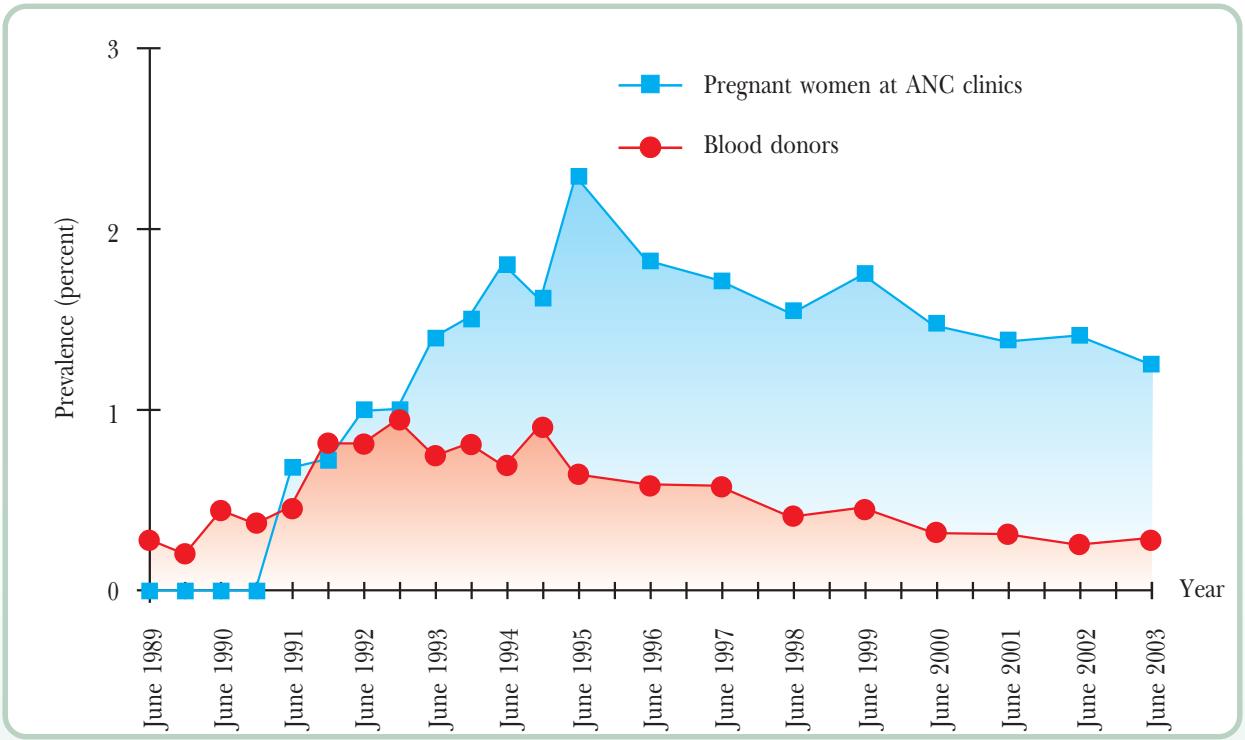
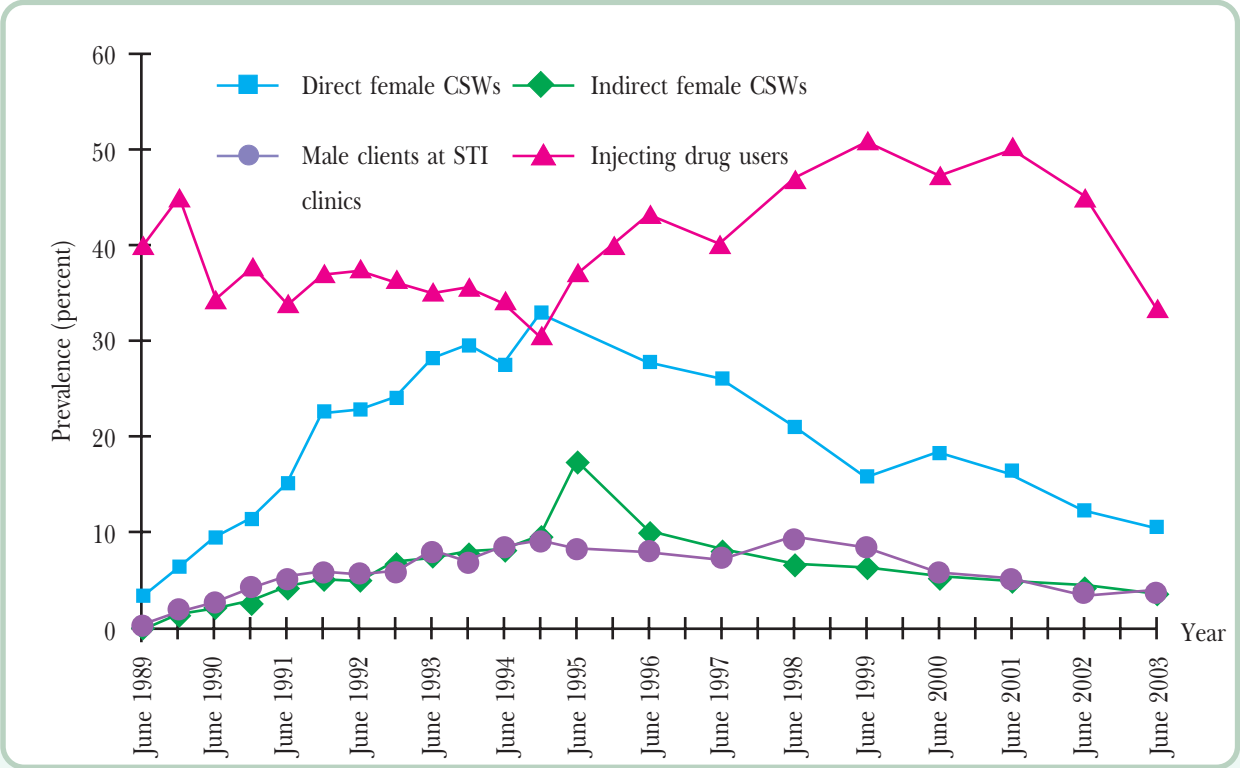
[9] Usanee Puengpan and La-iad Thirawat. HIV Infection among the Drug Addicts Admitted to the Northern Regional Centre of Drug Dependence Treatment, 1989-1998, 2000.

Figure 5.25 Prevalence of HIV Infections in Blood Donors and Pregnant Women at the ANC Clinics in Government Hospitals, 1989-2003



Source: Bureau of Epidemiology, Department of Disease Control.

Figure 5.26 Prevalence of HIV Infections in Direct and Indirect Female CSWs, Male Clients at STI Clinics, and Injecting Drug Users, Thailand, 1989-2003

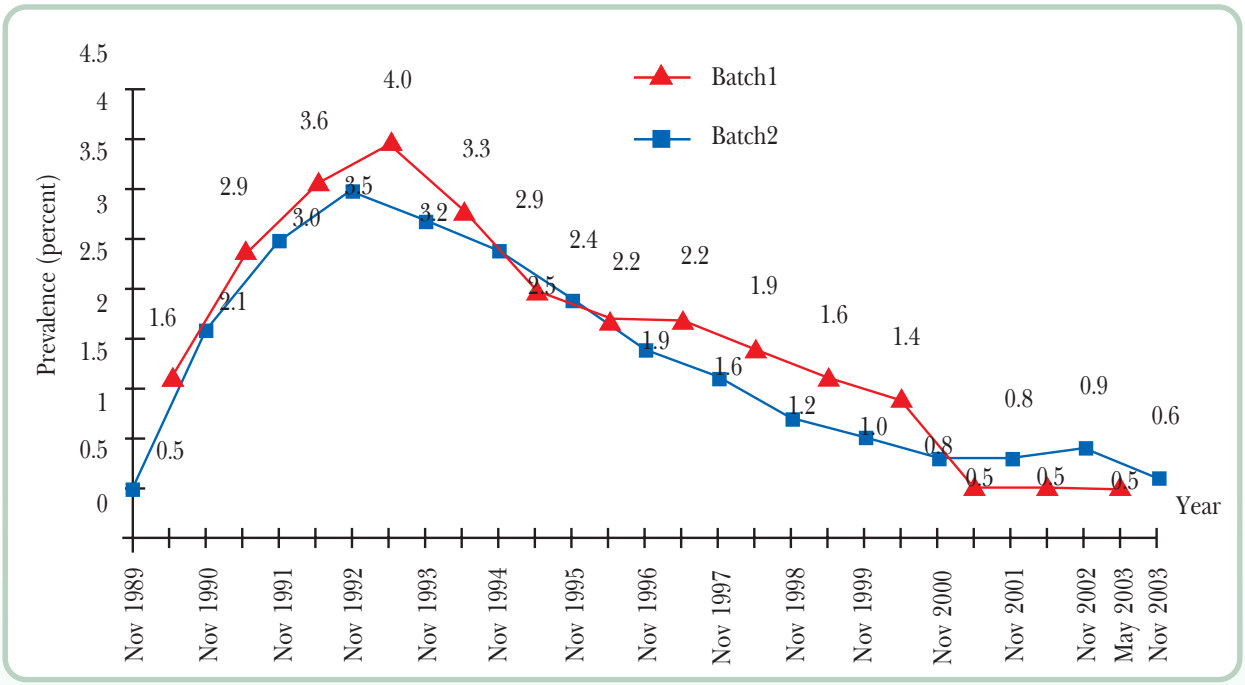


Group	June 1989	June 1990	June 1991	June 1992	June 1993	June 1994	June 1995	June 1996	June 1997	June 1998	June 1999	June 2000	June 2001	June 2002	June 2003
Direct female CSWs	3.47	9.30	15.24	22.97	28.25	27.64	33.15[1]	27.78	26.14	21.13	16.00	18.46	16.56	12.34	10.63
Indirect female CSWs	0.00	2.00	4.34	5.02	7.58	8.00	9.48[1]	10.14	8.22	6.74	6.56	5.51	5.03	4.07	3.88
Male clients at STI clinics	0.00	2.50	5.05	5.71	8.00	8.50	8.16	8.00	7.07	9.30	8.71	5.96	5.08	4.76	4.00
Injecting drug users	40.09	34.51	34.04	37.50	35.21	34.27	37.00	43.26	40.00	46.88	50.77	47.17	50.00	44.91	33.33
Pregnant women at ANC clinics	0.00	0.00	0.68	1.00	1.39	1.80	2.29	1.81	1.71	1.53	1.74	1.46	1.37	1.39	1.23
Blood donors	0.28	0.43	0.45	0.81	0.74	0.68	0.63	0.56	0.56	0.39	0.44	0.31	0.30	0.24	0.27

Source: Bureau of Epidemiology, Department of Disease Control.

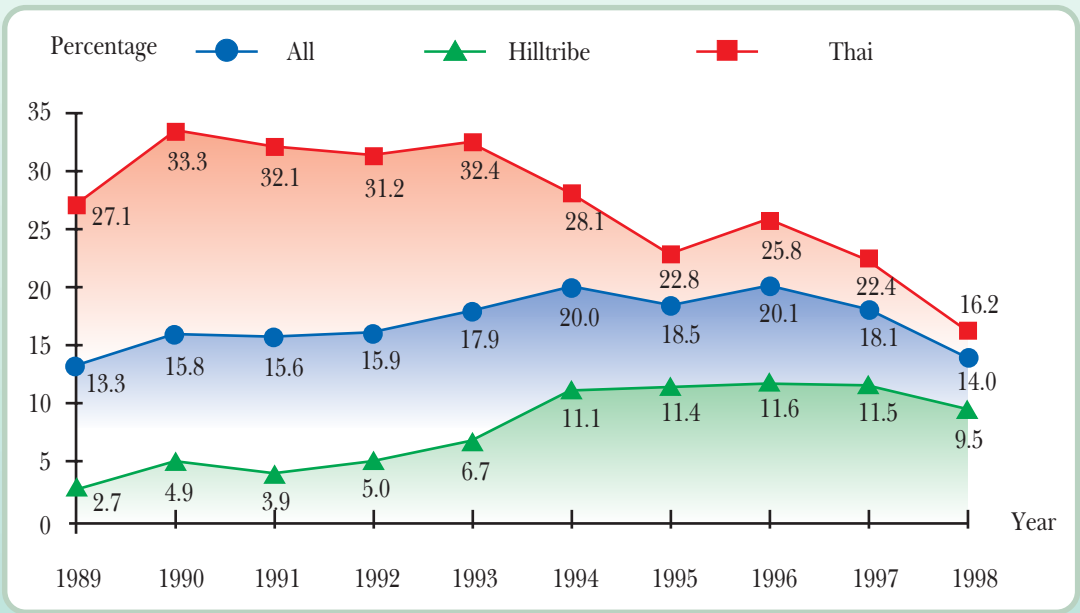
Note: [1]Data for December 1994.

Figure 5.27 Prevalence of HIV Infections in Thai Male Military Recruits, November 1989-May 2003



Sources: Armed Forces Research Institute of Medical Sciences, Royal Thai Army.
Institute of Pathology, Phra Mongkutklao Medical Centre, Royal Thai Army.

Figure 5.28 Prevalence of HIV Infections in Thai and Hilltribe Drug Addicts Undergoing Treatment at the Northern Regional Centre of Drug Dependence Treatment, 1989-1998



Source: Northern Regional Centre of Drug Dependence Treatment, Department of Medical Services.

(2) Prevalence of AIDS Cases

According to the report on the number of AIDS patients during 1984-2003 by geographic region, the highest prevalence rate (per 100,000 population) was reported in the North, while the lowest rate was reported in the Northeast (Figure 5.29).

Nonetheless, the number of reported cases still remains lower than actuality; as a matter of fact only 30-60% [10] of all the cases are actually reported, about 3 months after the case is detected.

(3) Projection of the Numbers of HIV-Infected Persons and AIDS Cases

The Ministry of Public Health and the Office of the National Economic and Social Development Board (NESDB), using the Asian Epidemic Model (AEM) technique, have estimated that in 2020 cumulatively there will be 1,250,000 HIV-infected individuals in Thailand (1,180,000 adults and 70,000 children), and of them all 1,100,000 will have died and only 157,000 will remain alive. From now on, each year there will be an additional 8,000 new HIV infections (including 500 children) and 16,500 new AIDS cases (1,500 children) and 18,000 deaths (Figure 5.30).

For 2003, cumulatively there were an estimated 1,055,000 HIV-infected persons, of whom 450,000 had died, 604,000 were still alive; and during the year there were 21,000 new HIV infections (including 3,500 children), 50,500 new AIDS cases and 52,000 deaths (Table 5.12).

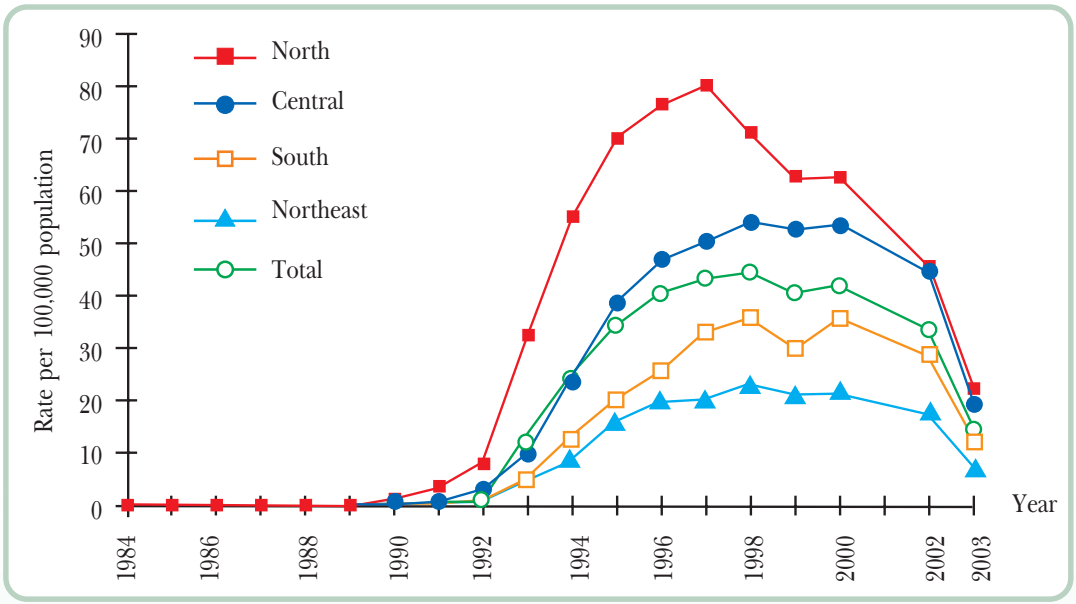
Table 5.12 Projection of the Numbers of HIV-Infected Persons, AIDS Cases and Deaths, 2000-2020

Category	Number,2003	Number,2020
HIV-infected persons, cumulative	1,055,000	1,250,000
Deaths due to HIV/AIDS, cumulative	450,000	1,100,000
Persons living with HIV/AIDS	604,000	157,000
New HIV infections	21,000	8,000
New AIDS cases	50,500	16,500
Deaths due to HIV/AIDS	52,000	18,000

Source: Department of Disease Control, Ministry of Public Heath.

[10]Division of Epidemiology, MoPH. Assessment of the Completeness of AIDS Patients Reporting, 2000.

Figure 5.29 Rates of Reported AIDS Cases by Region, Thailand, 1984-2003

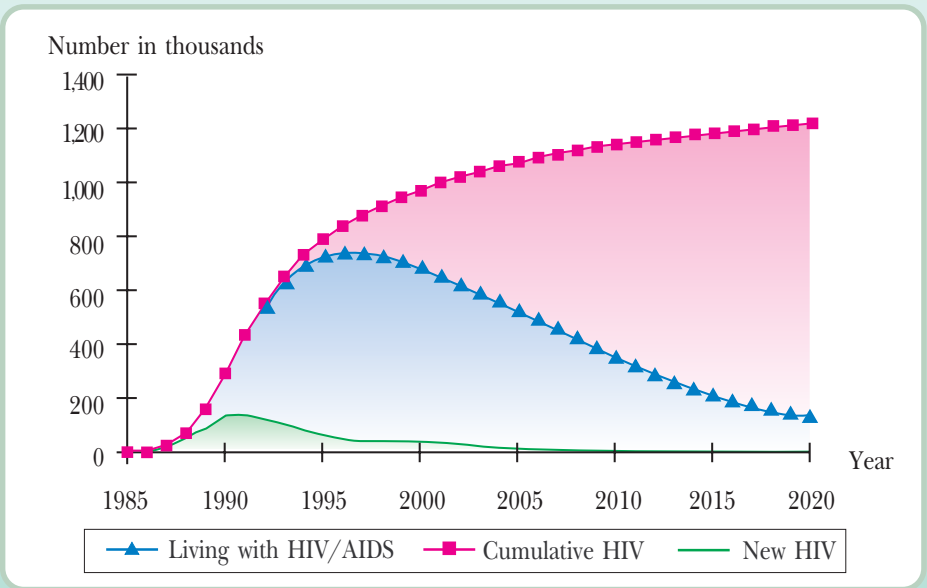


Region	1984	1986	1988	1990	1992	1994	1996	1998	2000	2002	2003
North	-	-	0.04	0.61	7.76	55.08	76.66	71.17	62.86	45.73	22.20
Central	0.01	0.01	0.03	0.40	2.85	23.97	47.15	54.22	53.65	44.83	19.60
South	-	-	0.01	0.07	1.35	12.46	25.81	36.06	35.98	29.15	12.12
Northeast	-	-	0.01	0.11	1.14	8.82	20.15	23.27	21.74	18.16	6.96
Total	**-**	**-**	**0.02**	**0.30**	**3.06**	**23.49**	**40.89**	**44.66**	**42.06**	**33.71**	**14.75**

Source: Bureau of Epidemiology, Department of Disease Control.

Note: The number of reported cases is about 30-60% of actuality.

Figure 5.30 Projections of the Number of Persons Living with HIV/AIDS Each Year, Cumulative Number of HIV-Infected Persons, and Number of New Infections, Thailand, 1985-2020



Source: Department of Disease Control, Ministry of Public Health

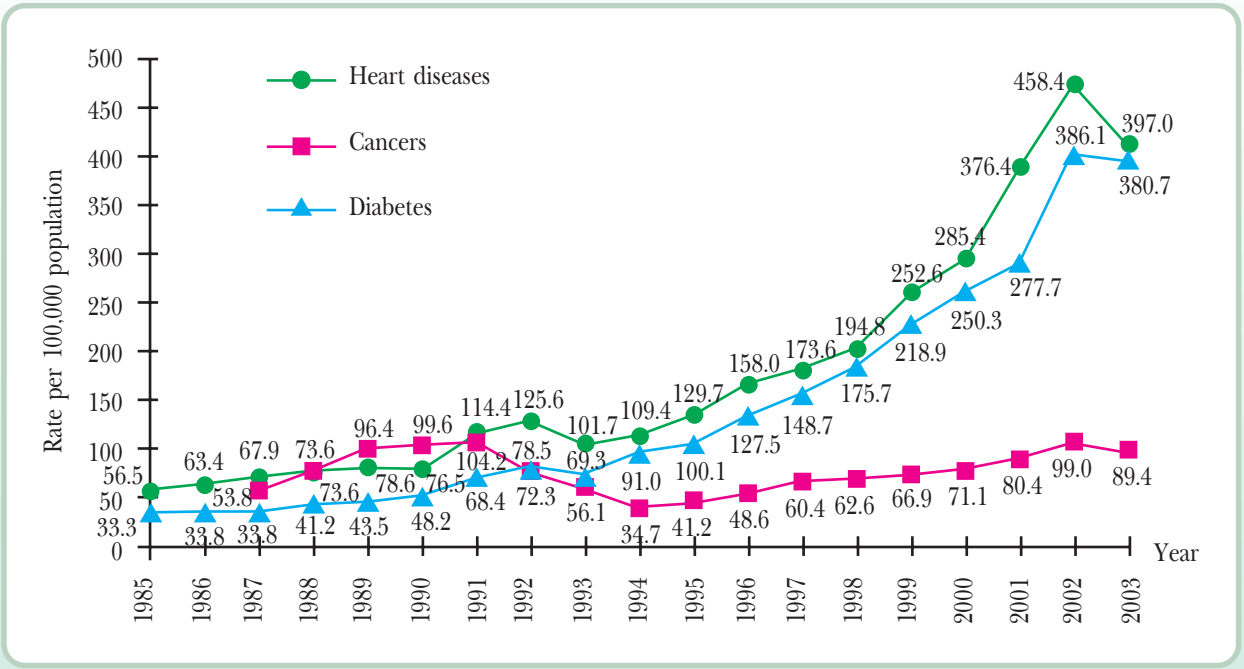
3.4.2 Chronic Diseases: Heart Diseases and Diabetes

Currently, non-communicable diseases, such as heart diseases and cancer, have become the leading causes of morbidity and mortality among the Thai people. Such an increasing trend results from unhealthy consumption behaviours and physical inactivity, as evidently demonstrated by the following hospital admission rates.

- Heart Diseases. The admission rate per 100,000 population has risen from 56.5 in 1985 to 109.4 in 1994 and to 397.0 in 2003.
- Cancer. The admission rate per 100,000 population has risen from 34.7 in 1994 to 89.4 in 2003.

Besides, diabetes also has a rising trend, i.e. from 33.3 per 100,000 population in 1985 to 91.0 in 1994 and 380.7 in 2003 (Figure 5.31).

Figure 5.31 Rate of Hospitalizations of Patients with Heart Diseases, Cancers and Diabetes, 1985-2003

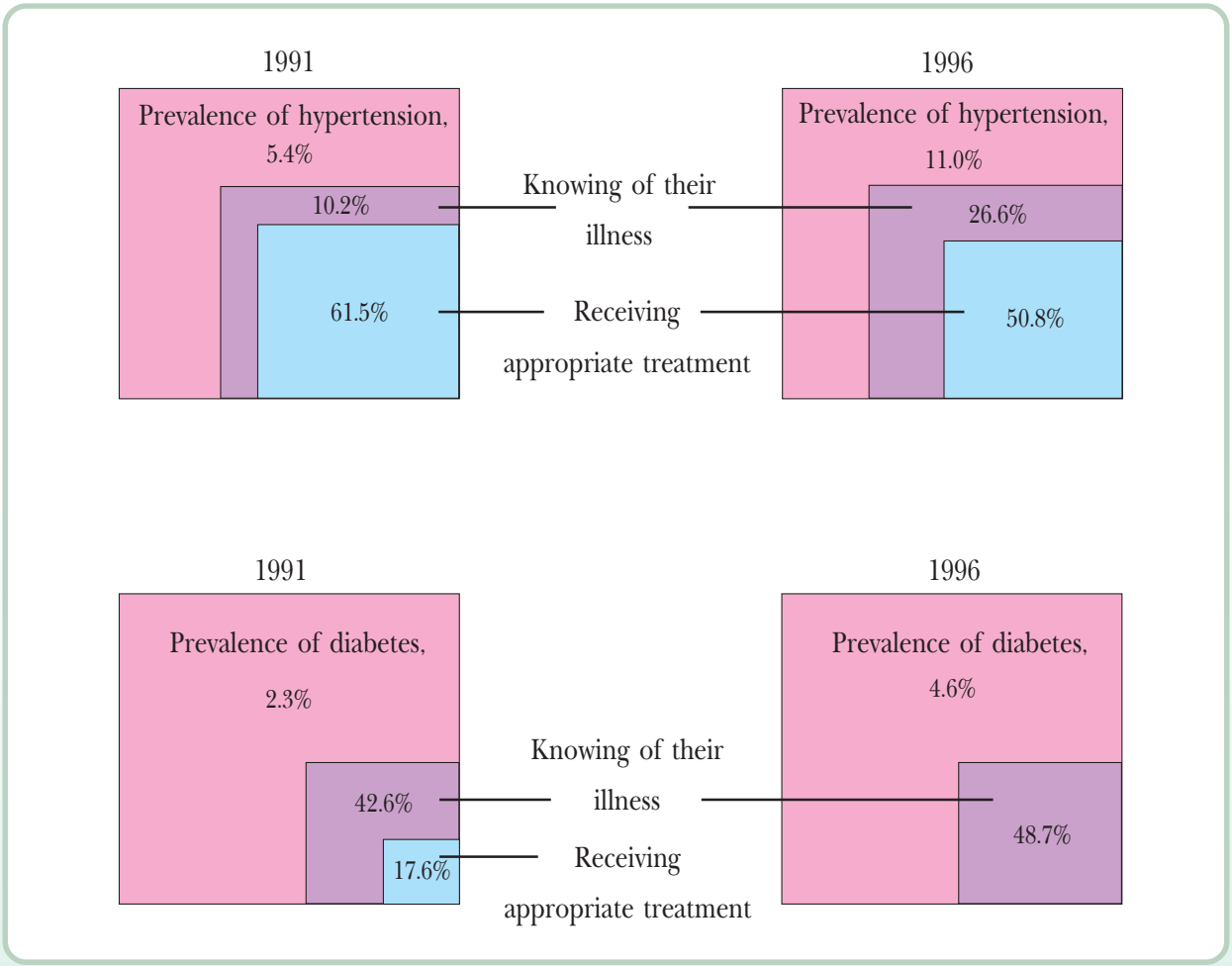


Source: Inpatients Report. Bureau of Policy and Strategy, Ministry of Public Health.

Note: The rate for cancers, since 1994, covers only liver, lung, cervical, and breast cancers.

The 1996 health examination survey revealed that, out of 2 million cases of diabetes nationwide, only half knew that they had diabetes and less than half had received appropriate treatment. And of 4 million hypertension patients, only a quarter had known of their hypertension status, and only half had received suitable suitable treatment (Figure 5.32).

Figure 5.32 Prevalence of Diabetes and Hypertension as Well as Appropriate Treatment among Thai Population, 1991-1996



Source: National Health Foundation, 1998.

3.4.3 Cervical and Breast Cancers

Cervical and breast cancers are fatal diseases that affect Thai women resulting in their premature death; and the trend is rising each year (Table 5.13) especially in Bangkok Metropolis (Figure 5.33). According to the cancer registry in 5 member provinces, the highest rete of cervical cancer was recorded in Chiang Mai Province, while the highest rate of breast cancer was recorded in Bangkok (Table 5.14). Classified by age, females aged 35 and older have a greater incidence rate of cervical and breast cancers than those aged under 35 (Table 5.15). In comparison with those in the U.S., most American females (77%) had breast cancer when they were over 50 years of age, while it is only 40-45% among Thai females in the same age group (Tables 5.16 and 5.17). Besides, it was found that 80% of Thai female breast cancer patients were in the invasive stage.[11]

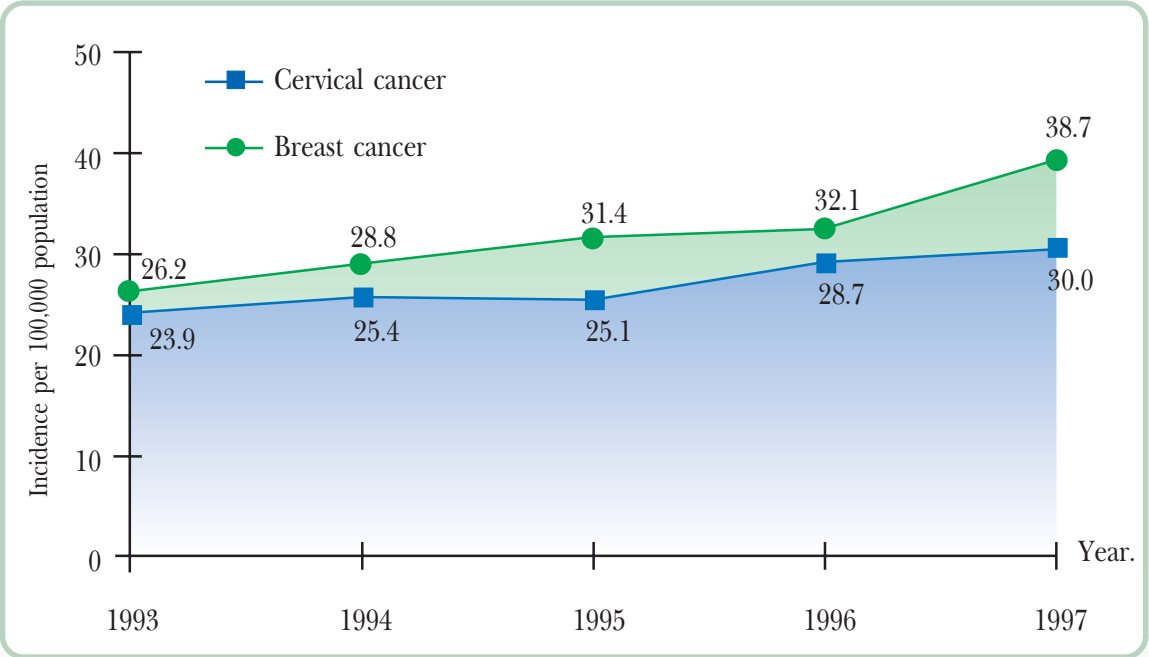
Table 5.13 Incidence of Cancers Commonly Found among Thai Females, 1990, 1993, 1996 and 1999

Number	Type of cancer	Incidence rate per 100,000 population			
		1990	1993	1996	1999
1	Cervical cancer	23.4	20.9	19.5	19.8
2	Breast cancer	13.5	16.3	17.2	19.9
3	Liver cancer	16.3	15.5	16.0	14.3
4	Lung cancer	12.1	11.1	10.0	9.9
5	Ovarian cancer	4.5	4.7	5.2	6.2

Source: National Cancer Institute, Ministry of Public Health.

[11] Thammanit Angsusingh. Screening Mammography. Breast Cancer Treatment Centre, Siriraj Hospital.

Figure 5.33 Incidence of Cervical and Breast Cancers among Females in Bangkok, 1993-1997



Source: National Cancer Institute, Ministry of Public Heath

Table 5.14 Percentage of Cancers of the Reproductive Organs Recorded at Provincial Cancer Registries, 1993, and 1995-1997

Province	Cervical cancer		Breast cancer		Ovarian cancer	
	1993	1995-1997	1993	1995-1997	1993	1995-1997
Chiang Mai	25.7	25.6	15.2	17.6	6.0	4.7
Lampang	23.1	23.6	15.0	16.4	4.4	3.7
Khon Kaen	18.0	15.0	8.6	11.6	4.5	5.6
Bangkok	18.5	20.7	20.6	25.4	4.2	5.9
Songkhla	15.8	16.1	11.5	12.1	3.1	4.6

Source: National Cancer Institute, Ministry of Public Health.

Table 5.15 Incidence of Cancers of the Reproductive Organs among Females Aged 15-59 Years by Organ and Age, 1996 and 1999

Organ	Incidence per 100,000 population in various age groups (years)												
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+
Breasts													
1996	0.1	0.5	3.1	10.5	23.1	39.9	54.2	48.8	49.8	48.4	44.9	41.2	36.5
1999	0.1	0.7	3.9	15.2	25.5	43.0	57.6	57.0	57.1	62.8	53.1	46.1	46.5
Cervix													
1996	0.4	1.0	3.6	11.4	24.4	40.5	51.0	56.6	63.0	64.8	56.1	53.8	39.1
1999	0.0	1.1	4.2	11.9	26.2	41.1	48.2	56.8	65.0	68.0	51.3	56.5	45.2
Uterine neck													
1996	0.0	0.1	0.2	0.7	1.5	3.8	7.2	11.7	11.6	11.4	10.5	10.7	2.4
1999	0.0	0.1	0.4	0.9	2.0	4.9	6.9	11.0	15.6	13.9	14.4	9.3	3.9
Ovaries													
1996	1.3	2.0	2.5	4.6	5.5	7.6	12.6	14.6	17.6	15.7	13.2	13.8	6.0
1999	1.9	2.0	2.2	4.8	7.7	8.9	15.5	14.6	20.4	22.0	15.5	12.8	11.3
Other reproductive organs													
1996	0.0	0.0	0.2	0.2	0.6	0.5	1.4	1.2	2.2	3.3	5.6	4.2	6.4
1999	0.0	0.0	0.3	0.4	0.7	0.3	1.5	2.2	2.0	3.3	4.4	2.5	7.6

Source: Cancer in Thailand, 1999-2000.

Table 5.16 Estimates of the Number of Breast Cancer Patients in American Females by Age, 1997

Age (years)	Estimated number	Percent
< 30	600	0.3
30-39	8,600	4.8
40-49	32,600	18.1
50-59	33,000	18.3
60-69	36,600	20.3
70-79	43,500	24.2
80+	25,300	14.0
Total	**180,200**	**100.0**

Source: American Cancer Society. Surveillance Research. 1997.

Table 5.17 Ages of Thai Female Breast Cancer Patients, 1983-2004

Age (years)	Surgery Department, Siriraj Hospital 1,353 cases (1983-1994)		Breast Cancer Treatment Centre 5,994 cases (1995-2004)	
	Number of cases	Percent	Number of cases	Percent
< 40	311	23.0	996	16.6
40-49	437	32.3	2,487	41.5
50-59	353	26.1	1,721	28.7
60-69	162	12.0	597	10.0
70 and over	90	6.6	193	3.2
Total	**1,353**	**100**	**5,994**	**100**

Source: Thammanit Angsusingh. Screening Mammography. Breast Cancer Treatment Centre, Siriraj Hospital.

3.4.4 Occupational Diseases

According to the epidemiological surveillance of occupational diseases, significant situations can be summarized as follows:

(1) Pesticide Poisoning

Based on the Department of Health's cholinesterase level examinations in famers during 1992-2002, 13-29% of farmers had abnormal enzyme levels resulting from pesticide exposure. The trend is unlikely to decline and the rate of pesticide poisonings is between 4 and 6 per 100,000 population (Table 5.18).

An assessment of health risks of farmers from chemical pesticide use, conducted by the Food and Drug Administration in five provinces in 2004, revealed that as high as 42.2% of farmers had pesticide poisoning with abnormal enzyme levels.

Table 5.18 Cholinesterase Testings Results and Morbidity/Mortality Due to Pesticide Poisoning in Farmers, 1992-2002

Year	Cholinesterase testing [1]			Pesticde poisoning [2]		
	Number tested (persons)	Tested abnormal (cases)	Percent	Illness (cases)	Deaths (cases)	Morbidity rate per 100,000 pop.
1992	42,471	8,669	20.41	3,599	31	6.23
1993	242,820	48,500	19.97	3,299	44	5.65
1994	411,998	72,590	17.62	3,143	41	5.32
1995	460,521	78,481	17.04	3,398	21	5.71
1996	156,315	40,520	25.92	3,196	31	5.32
1997	563,354	89,926	15.96	3,297	27	5.42
1998	369,573	77,789	21.05	4,398	15	7.16
1999	360,411	48,217	13.38	4,169	31	6.78
2000	278,612	52,604	18.88	3,109	21	5.03
2001	89,945	21,753	24.19	2,652	15	4.27
2002	115,105	33,858	29.4	2,571	14	4.11

Sources: [1] Department of Health, Ministry of Public Health
[2] Bureau of Epidemiology, Department of Disease Control.

(2) Occupational Diseases in the Industrial Sector

In the industrial sector, an increasing number of workers encounter occupational diseaes as evidenced by the rising percentage of disbursement rate under the Workers' Compensation Fund of the Social Security Office, i.e. from 1.2% in 1974 to 4.5% in 1996. The rate, however, has dropped to 3.0% in 2003 (Table 4.10). This is because of industrial expansion in manufacture and services with inappropriate use of new technologies and ineffective law enforcement measures.

Besides, there have been studies showing the importance of some specific occupational diseases as follows:

(2.1) Silicosis. According to a report from the United States, prior to 1970, more than 1,000 people died from silicosis each year, and after 1996. the number had dropped to lower than 250. In Thailand, at present an estimated 211,796 workers in 7,845 worksites are risk for silicosis.

Based on the silicosis surveillance in the relevant population groups according to their industrial categories, conducted by of the Department of Industrial Works and the Department of Mineral Resources during 1995-1998, the prevalence of silicosis per 1,000 population at risk increased from 16.9 in 1995 to 20.7 in 1998; and it was estimated that there were 4,393 cases of silicosis in 1998. To cope with the problem, in 2000 the Ministry of Public Health signed an agreement with the Department of Mineral Resources, Ministry of Industry, and the Department of Labour Protection and Welfare, Ministry of Labour

and Social Welfare, to implement a 10-year Silicosis Prevention and Control Project (2001-2010). In 2002, Physical check-ups were undertaken in 3,263 workers in industries across the country. It was found that, based on X-ray examinations, 30 workers had **silicosis-an incidence of 9.19 per 1,000 at-risk population.**

(2.2) Byssinosis (Cotton dust disease). The Division of Occupational Health, in collaboration with Dr. Praparn Yongchaiyudh and colleagues, in 1987, conducted a study on 229 thread-spinning workers in a textile industry in Samut Prakan Province. The study found a 19.7% byssinosis prevalence. A higher prevalence rate was found in workers with longer employment periods. Another study conducted by the Division of Occupational Health in 2002 in 43 textile industries revealed that four industries had a dust content in the air higher than the maxinum permissible level. Besides, health examinations performed in 5,282 workers revealed that 86 of them had irregular symptoms. And it was found that only 21.6% (1,140) of all the workers wore a protective mask at all times while working. Another study on exposure to cotton dust in six textile industries of Malee pongsophon and colleagues in 2002, by collecting air samples at the mixing, washing, spinning, reeling and weaving sections, revealed that all sections had cotton dust levels above the permissible level, especially in 28 (or 32.18%) out of 87 air samples.

(2.3) Lead poisoning. According to the 1993 study of Department of Industrial Works, there were 558,839 workers in 14,440 workplaces nationwide that used lead in their production processes. The lead poisoning surveillance conducted in 16 industrial categories in 16 provincial areas, totally 56 workplaces, during 1990-1993 by the Division of Occupational Health demonstrated that the workplaces with a high risk of lead poisoning included those involved with battery manufacturing, ore smelting, lead mining, and lead foundries. Over 80% of the workers were found to have an elevated blood-lead level of over 40 micrograms per decilitre (mcg/dl); and over 20% of them had the lead level higher than 60 mcg/dl. Other industries with a lower risk of lead poisoning were printing press, vehicle-repairing garages, shipbuilding plants, and ornament-producing operations. Approximately 20-30% of the workers in such industrial categories had a blood-lead content of over 40 mcg/dl, and less than 5% had over 60 mcg/dl.

However, in 2002 the MoPH Division of Occupational Health conducted an occupational lead poisoning surveillance by testing for blood lead contents in 3,876 workers. It was found that 257 workers (6.6%) had a lead content higher than 40 mcg/dl and 73 workers (1.9%) had higher than 60 mcg/dl.

(2.4) Risks from Organic Solvents. According to a study of risks for chemical hazards by Dr. Nalinee Sripuang [12] in 1999 on workers in petrochemical, auto-making and electronics industries, the workers were at high risk for exposure to solvents in the aromatic hydrocarbon group. And it was found that female workers had a urine metabolite concentration higher than male workers.

Another study on contacts with solvents (benzene, toluene, and xylene) in workers in three industries in the Map Taphut Industrial Estate, conducted by the Division of Occupational Health, MoPH, revealed unsafe conditions and risks of solvent poisoning among some groups of workers

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[12] Nalinee Sripuang. Risk Assessment of Chemical Hazards in Occupation Health Surveillance : A Case Study of Organic Solvents, 1999.

(of all the samples, 0.5% had a phenol content and 1.4% had a hippuric acid content higher than the maximum allowable levels).

(2.5) Hearing Loss. The Division of Occupational Health, MoPH, conducted a study in 1998 [13] on hearing capacity of workers who encountered loud noise in industries. The study demonstrated that 69.3% of the workers had hearing impairment.

3.4.5 Accidental Injuries

(1) Road Traffic Accidents

The situation of road traffic accidents in Thailand can be categorized by the time period as follows:

The First Period, before 1986 : Economic Recession. The number of accidents was not so high during this period. Each year, there were about 18,000 - 25,000 accidents with about 2,000-4,000 deaths or a mortality rate of 3.9-5.7 per 100,000 population. And there were approximately 8,000-9,000 injury cases each year, or an injury rate of 17.2 per 100,000 population.

The Second Period, 1987-1992 : Economic Recovery. During this period there were annually about 40,000-60,000 accidents, nearly two times higher than during the previous period, with about 8,000-9,000 deaths or a mortality rate of 7.4-16.0 per 100,000 population. It was noteworthy that casualties had increased almost threefold. The number of injuries had increased to 20,000-25,000 each year or an injury rate of 24.0-43.9 per 100,000 population, a nearly twofold rise.

The Third Period, 1993-1996 : Bubble Economy. Each year there were 80,000-100,000 accidents, a twofold increase, with about 14,000-16,000 deaths or a mortality rate of 16.3-28.2 per 100,000 population, a nearly twofold increase. And there were about 40,000-50,000 injuries each year or an injury rate of 43.4-85.6 per 100,000 population, a twofold increase.

The Fourth Period, 1997-2001 : Economic Crisis. Each year there were 70,000-80,000 accidents with 12,000 deaths or a mortality rate of 20.0-22.7 per 100,000 population. And each year there were 48,000-52,000 injuries or an injury rate of 77.5-86.9 per 100,000 population. This was a declining trend compared with the previous period.

The Fifth Period, 2002 onward : Economic Recovery. Each year there were approximately 90,000 accidents with 13,000 deaths or a mortality rate of 21 per 100,000 population. And there were approximately 70,000 injuries a year or an injury rate of 110.8 per 100,000 population (Figure 5.34).

It was found that those who died from accidents were mostly in the working-age group, (15-34 years old); the number for males being four or five times greater than for females (Table 5.20 and Figure 5.35).

It is noteworthy that the numbers of accidents, injuries, and deaths from accident are higher compared to those in the previous year probably as a resulf of economic expansion,

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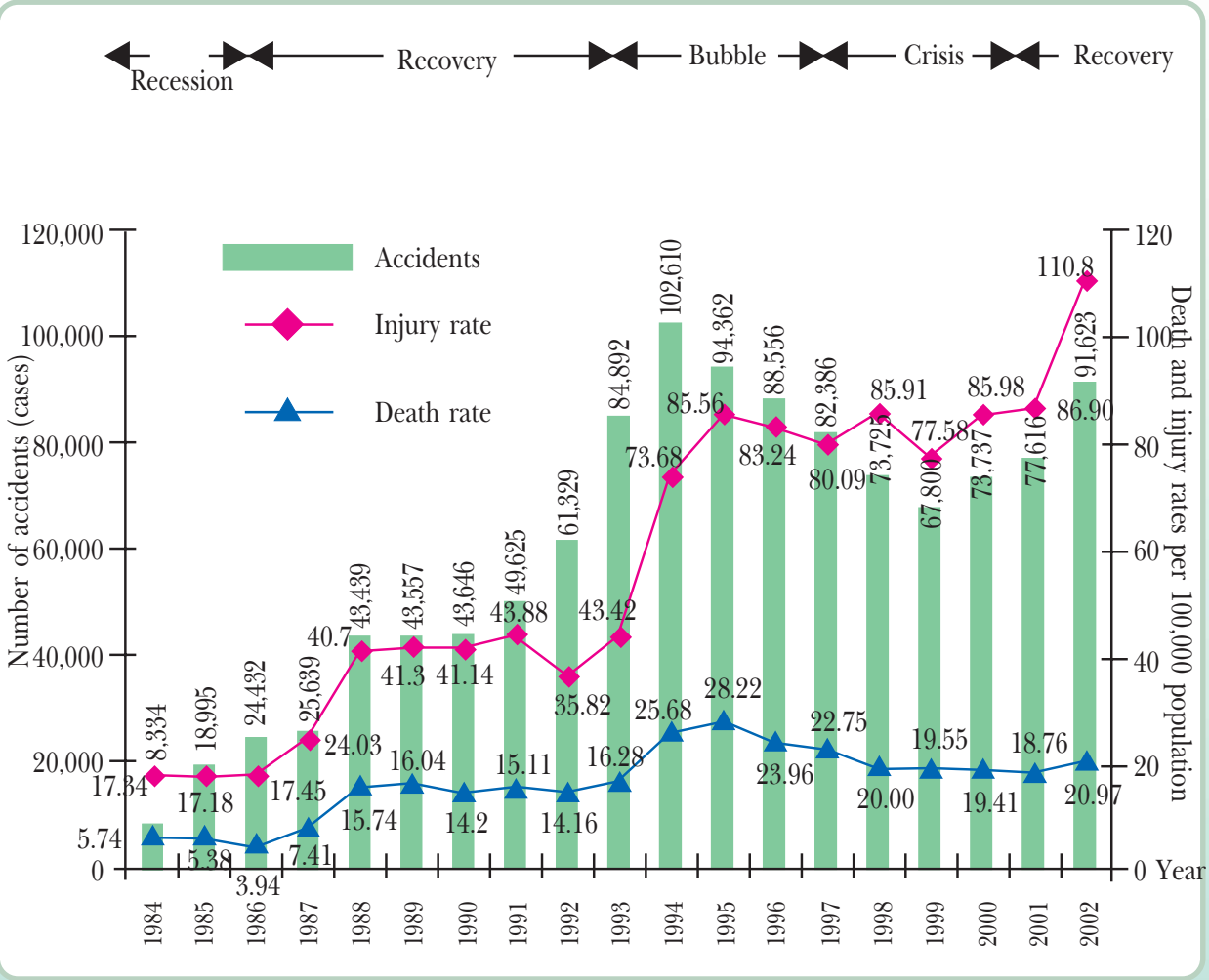
[13] Vikrom Sengkisiri. Comparison of Effectiveness of Hearing Measurements between 16-hr Noise Exposure Cessation and 4-hr Ear Protective Device Usage in Industrial Plants in 1998,1999.

grassroots-level economic stimulus measures with a low-interest monetary policy and tax measures enhancing the people's purchasing powers. With such higher purchasing powers, the volumes of auto sales have been rising after the economic crisis ended. Motor vehicles have become the fifth element of livelihood. But the increase in the number of automobiles has resulted in more road traffic accidents as evidenced by a study on the relationship between the number of accidents and the auto sales records. It has been found that the increase or decrease in auto sales is positively associated with the number of road accidents (r = 0.63; Table 5.21).

This kind of situation caused a direct loss of prooperty worth 1,494.9 million baht in 2002 (Table 5.19). But actually there are other incalculable losses including life losses, medical expenses, disabilities, etc. According to the 2000 study on economic losses from road traffic accidents, conducted by the Thailand Development Research Institute (TDRI), the economic loss is as high as 115,337 million baht or 2.3% of the gross domestic products[14] (4,923,263 million baht; Table 5.22).

Figure 5.34 Death and Injury Rates from Road Traffic Accidents, Thailand, 1984-2002



Source: Police Information System Centre, Royal Thai Police.

[14] Centre of Traffic and Transport Research and Development, King Mongkut's University of Technology at Thonburi. A Project on the Analysis of Causes of Road Trafic Accidents, 2002.

Table 5.19 Numbers and Rates of Accidental Deaths and Injuries and Estimated Damages, 1984-2002

Year	Population	No. of accidents (cases)	Deaths		Injuries		Property damages (baht)
			No. (persons)	Rate per 100,000 pop.	No. (persons)	Rate per 100,000 pop.	
1984	50,583,105	18,334	2,904	5.74	8,770	17.34	56,265,453
1985	51,795,651	18,955	2,788	5.38	8,901	17.18	60,645,504
1986	52,696,204	24,432	2,086	3.94	9,242	17.45	55,061,650
1987	53,873,172	25,639	3,991	7.41	12,947	24.03	129,539,616
1988	54,960,917	43,439	8,651	15.74	22,370	40.70	329,527,667
1989	55,888,393	43,557	8,967	16.04	23,083	41.30	439,028,000
1990	56,303,273	43,646	7,997	14.20	23,161	41.14	477,603,000
1991	56,961,030	49,625	8,608	15.11	24,995	43.88	639,616,000
1992	57,788,965	61,329	8,184	14.16	20,702	35.82	607,793,000
1993	58,336,072	84,892	9,496	16.28	25,330	43.42	1,021,464,000
1994	59,095,419	102,610	15,176	25.68	43,541	73.68	1,408,216,000
1995	59,277,900	94,362	16,727	28.22	50,718	85.56	1,631,117,000
1996	60,116,182	88,556	14,405	23.96	50,044	83.24	1,561,708,187
1997	60,816,227	82,386	13,836	22.75	48,711	80.09	1,571,786,469
1998	61,155,888	73,725	12,234	20.00	52,538	85.91	1,378,673,826
1999	61,577,827	67,800	12,040	19.55	47,770	77.58	1,345,985,811
2000	61,770,259	73,737	11,988	19.41	53,111	85.98	1,242,205,524
2001	62,093,855	77,616	11,652	18.76	53,960	86.90	1,240,801,187
2002	62,554,482	91,623	13,116	20.97	69,313	110.80	1,494,936,815

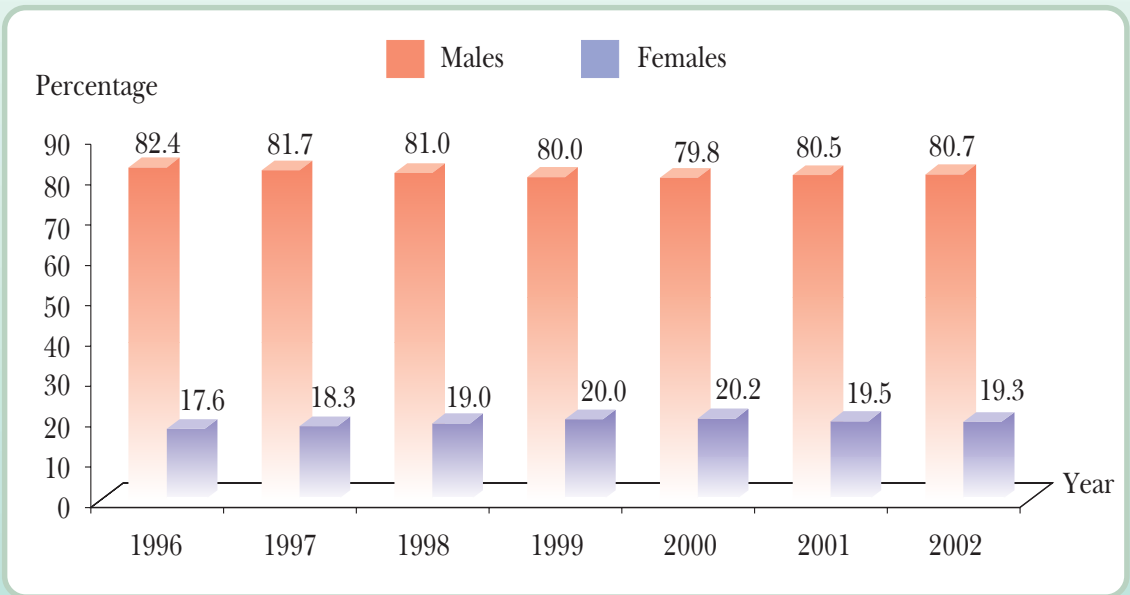
Source: Police Information System Centre, Royal Thai Police.

Table 5.20 Number and Percentage of Deaths from Transportation Accidents by Age Group, 1996-2002

Age group (years)	1996		1997		1998		1999		2000		2001		2002	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
0-4	29	1.7	175	1.3	210	2.6	254	2.2	287	2.2	243	1.9	205	1.5
5-9	389	2.3	227	1.8	146	1.8	261	2.2	287	2.2	256	2.0	214	1.6
10-14	599	3.6	392	3.0	237	3.0	300	2.6	387	2.9	356	2.7	428	3.2
15-19	2,786	16.6	2,052	15.8	1,075	13.5	1,501	13.0	1,647	12.5	1,623	12.5	1,869	13.9
20-24	2,995	17.8	2,236	17.3	1,184	14.8	1,702	14.6	1,861	14.1	1,810	14.0	2,003	14.9
25-29	2,262	13.5	1,743	13.5	1,051	13.2	1,470	12.6	1,641	12.4	1,575	12.2	1,686	12.6
30-34	1,733	10.3	1,343	10.4	830	10.4	1,286	11.1	1,452	11.0	1,437	11.1	1,415	10.5
35-39	1,410	8.4	1,177	9.1	742	9.3	1,113	9.6	1,221	9.3	1,306	10.1	1,225	9.1
40-44	1,017	6.1	904	7.0	665	8.3	914	7.9	1,092	8.3	1,063	8.2	1,086	8.1
45-49	870	5.2	750	5.8	488	6.1	785	6.8	884	6.7	912	7.0	903	6.7
50-54	594	3.6	484	3.7	329	4.1	561	4.8	638	4.8	650	5.0	697	5.2
55-59	546	3.3	468	3.6	320	4.0	444	3.8	507	3.8	463	3.6	488	3.6
60-64	421	2.5	371	2.9	287	3.6	392	3.4	448	3.4	450	3.5	408	3.0
65-69	304	1.8	209	1.6	205	2.6	283	2.4	352	2.7	341	2.6	355	2.7
70-74	162	1.0	157	1.2	115	1.5	168	1.4	241	1.8	204	1.6	222	1.7
75-79	112	0.6	67	0.5	66	0.8	83	0.7	135	1.0	124	1.0	139	1.0
80-84	39	0.2	37	0.3	22	0.3	56	0.5	59	0.5	65	0.5	56	0.4
85 and over	26	0.1	21	0.1	10	0.1	26	0.2	46	0.3	60	0.5	39	0.3

Source: Bureau of Registration Administration, Department of Local Administration, Ministry of Interior.

Figure 5.35 Proportion of Deaths from Transportation Accidents by Sex, 1996-2002



Source: Bureau of Registration Administration, Department of Local Administration, Ministry of Interior.

Table 5.21 Correlation between the Number of Accidents and Overall Automobile Sales, 1990-2002

Year	Number of accidents[1] (cases)	Number of automobiles sold[2] (units)	Increase from previous year
1990	43,646	304,062	+46%
1991	48,625	268,560	-11.7%
1992	61,329	362,987	+35.2%
1993	84,892	456,461	+25.8%
1994	102,610	485,105	+6.4%
1995	94,362	571,580	+17.7%
1996	88,556	589,126	+3.1%
1997	82,386	363,156	-38.4%
1998	73,725	144,065	-60.3%
1999	67,800	218,330	+51.5%
2000	73,737	262,189	+20.1%
2001	77,616	289,000	+10.2%
2002	91,623	410,000	+41.9%

Note: Correlation coefficient = 0.630

Source: (1) Royal Thai Police.

(2) Krungthep Turakij (Bangkok Business Newspaper). Information compiled by Toyota Motors (Thailand) Co., Ltd.

Table 5.22 Estimates of Economic Losses Due to Road Traffic Accidents Undertaken by the Thailand Development Research Institute (TDRI), 1998-2000

Year	Loss to the deceased (million baht)	Loss to the injured (million baht)	Loss to property (million baht)	Total loss (million baht)
1998	79,766	38,409	1,380	119,555
1999	78,501	36,580	1,346	116,427
2000	78,162	35,933	1,242	115,337

Source: Analysis of Causes of Road Traffic Accidents Project. Office of Transport and Traffic Policy and Planning, Ministry of Transport.

A study on road traffic accidents nationwide has revealed that motorcycles, pickups/vans, personal passenger cars and bicycles/tricycles are the leading causes of injuries and deaths, compared with other types of vehicles. In regard to accident severity, the major vehicle categories that caused fatal accidents in 2001-2002 were personal passenger cars, pickups/vans and motorcycles (Table 5.23).

Table 5.23 Numbers and Rates of Injuries and Deaths from Road Traffic Accidents by Type of Vehicles, 1997-2002

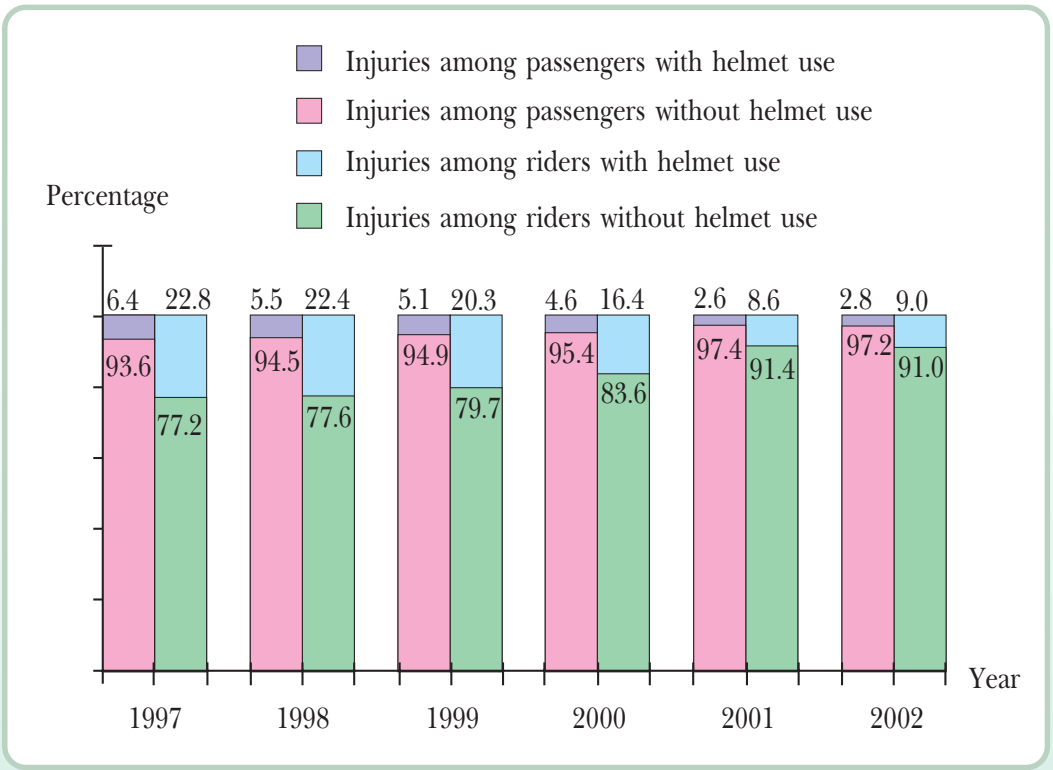
Type of vehicles	1997			1998			1999			2000			2001			2002		
	Injuries	Deaths	Death rate (%)	Injuries	Deaths	Death rate (%)	Injuries	Deaths	Death rate (%)	Injuries	Deaths	Death rate (%)	Injuries	Deaths	Death rate (%)	Injuries	Deaths	Death rate (%)
Bicycles and tricycles	1,817	45	2.5	1,888	43	2.3	2,183	45	2.1	14,450	118	0.8	2,037	124	6.1	2,296	127	5.5
Motorcycles	48,440	1,707	3.5	43,274	1,469	3.4	41,947	1,274	3.0	84,378	3,129	3.7	41,817	3,045	7.3	48,740	3,525	7.7
Three-wheeled motor vehicles	393	24	6.1	401	22	5.5	407	10	2.5	1,160	42	3.6	429	36	8.4	488	36	7.4
Personal passenger cars	1,075	65	6.0	1,169	84	7.2	1,064	58	5.5	2,700	102	3.8	891	91	10.2	1,020	107	10.5
Pickups/vans	6,628	348	5.2	5,373	251	4.7	5,172	221	4.3	8,584	402	4.7	4,008	335	8.4	4,668	403	8.6
Trucks (6 wheels or more)	856	43	5.0	647	36	5.6	677	28	4.1	1,512	76	5.0	923	63	6.8	971	58	6.0
Trailers	140	2	1.4	137	3	2.2	172	5	2.9	215	9	4.2	70	6	8.6	83	5	6.0
Transport pickups	437	20	4.6	317	8	2.5	411	13	3.2	738	19	2.6	186	9	4.8	270	20	7.4
Buses	627	9	1.4	377	11	2.9	385	10	2.6	966	25	2.6	232	19	8.2	406	15	3.7
Agricultural trucks	147	13	8.8	139	3	2.2	173	10	5.8	413	22	5.3	367	19	5.2	428	20	4.7
Thai farm trucks (E-taen)	206	14	6.8	223	14	6.3	201	3	1.5	269	12	4.5	193	8	4.1	195	14	7.2
Total	**60,766**	**2,290**	**3.8**	**53,945**	**1,944**	**3.6**	**52,792**	**1,677**	**3.2**	**115,385**	**3,956**	**3.4**	**51,153**	**3,755**	**7.3**	**59,565**	**4,330**	**7.3**

Source: Report on Injury Surveillance in Thailand. Bureau of Epidemiology, Department of Diseae Control.

Note: Data for 2001-2002 include only severely injured cases (injuries/deaths before reaching hospital, deaths in emergency rooms, and injures cases admitted/ hospitalized for observation or treatment only).

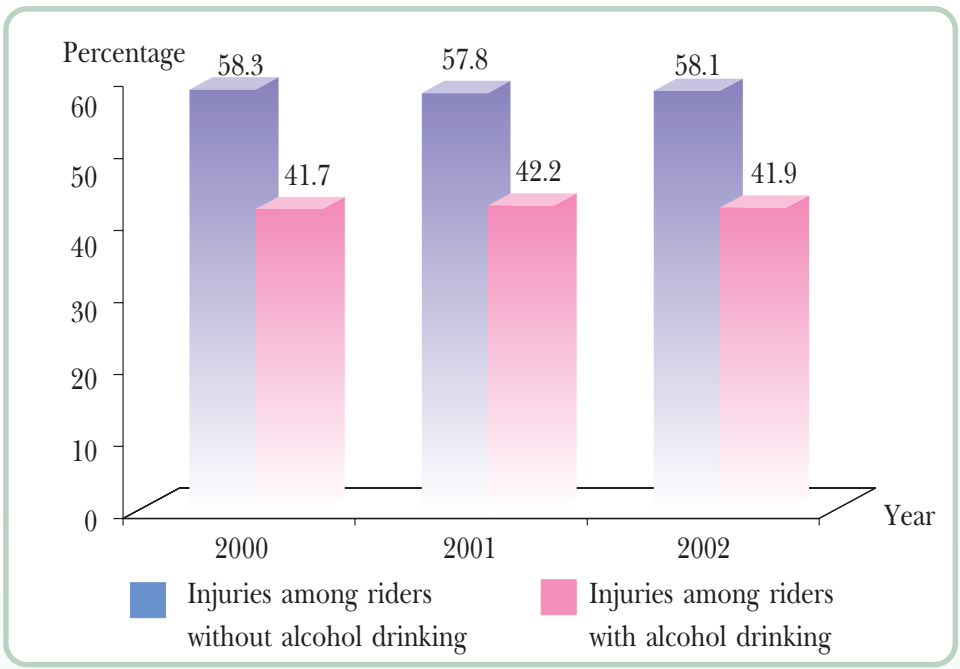
Even though the Royal Decree on Anti-crash Helmets has been in effect in all provinces throughout the country since 1 January 1996, the data from the injury surveillance system have shown that motorcycle riders/passengers who do not wear helmets are 90% more likely to have accident injuries than those who wear helmets (Figure 5.36); and nearly half of those accident victims have drunk alcohol before riding (Figure 5.37).

Figure 5.36 Proportion of Injuries among Motorcycle Riders and Passengers with and without Helmet Use, 1997-2002



Source: Report on Injury Surveillance in Thailand. Bureau of Epidemiology, Department of Disease Control.

Figure 5.37 Proportion of Severe Injuries among Motorcycle Riders with and without Alcohol Drinking, 2000-2002

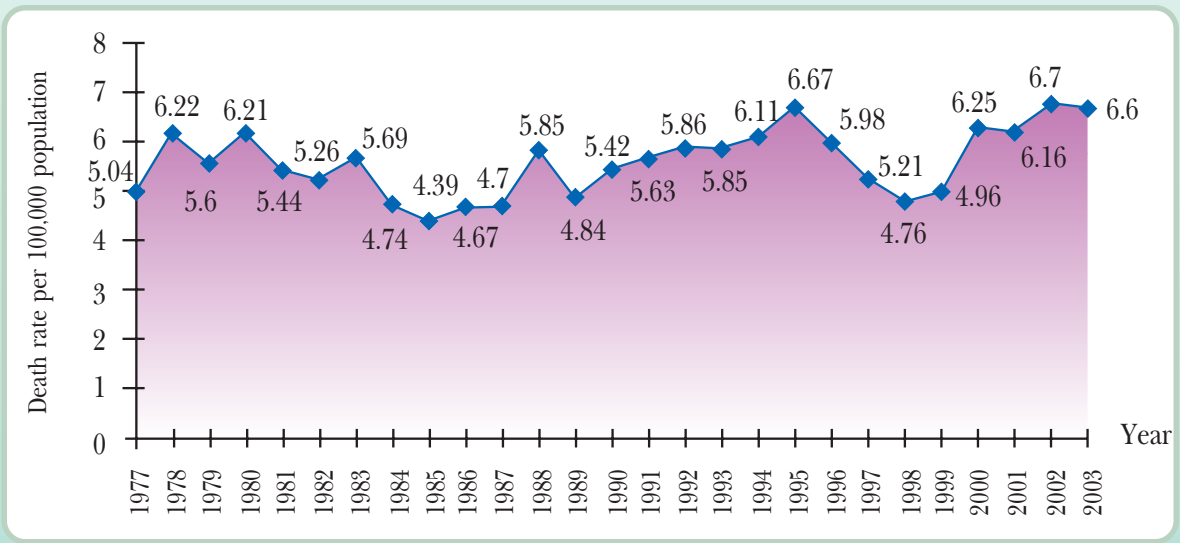


Source: Report on Injury Surveillance in Thailand. Bureau of Epidemiology, Department of Disease Control.

(2) Water-Related Accidents: Drowning and Falling into the Water

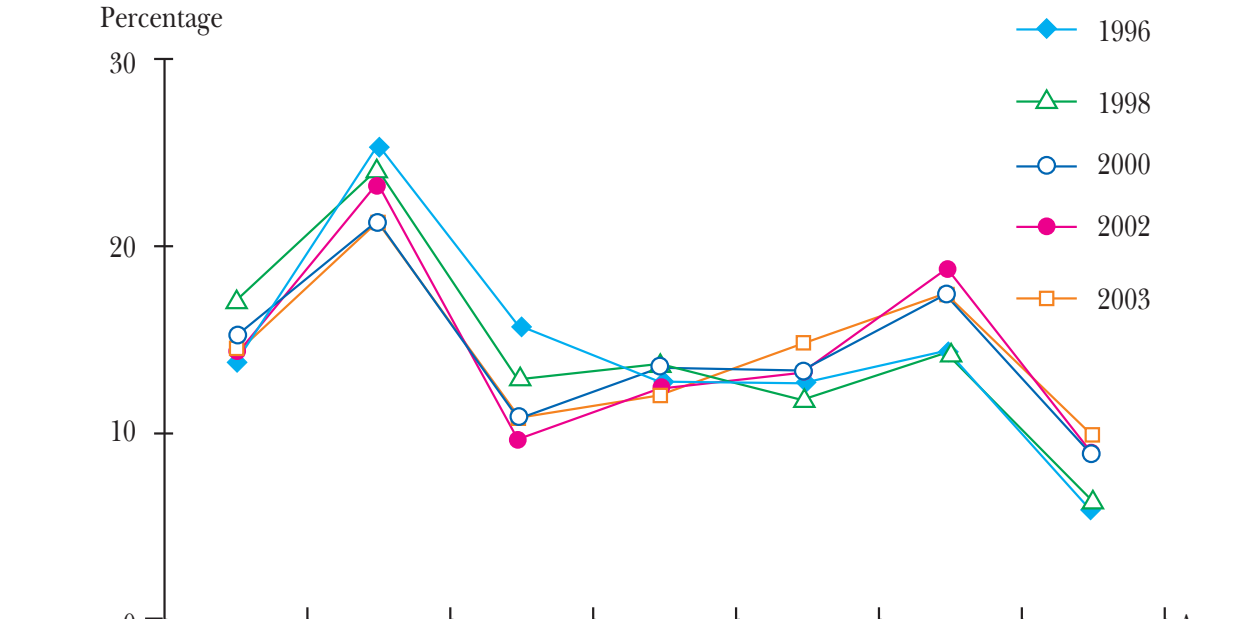
Water-related accidents are an important problem that has not received adequate attention as expected, compared to the problem of road traffic accidents. During 1977-2003, the rate of deaths from drowning and falling into the water was 4.4-6.7 cases per 100,000 population (Figure 5.38). An epidemiological analysis of water-related accidents in Thailand during the period 1996-2003 revealed that, among those who died from drowning, males were 3 times more likely than females to become the victims; the highest number being among school-age children (Figure 5.39). This might result from their lack of experience in playing safely in the water and thus being less capable of helping themselves.

Figure 5.38 Rate of Deaths from Accidental Drowning in Thailand, 1977-2003



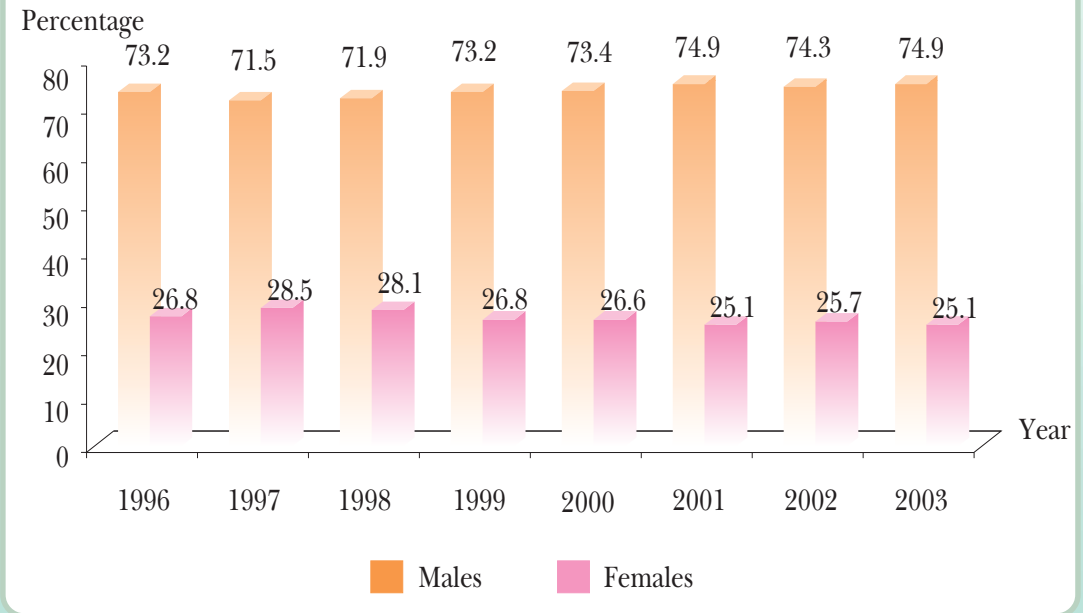
Source: Bureau of Policy and Strategy, Ministy of Public Health

Figure 5.39 Number and Percentage of Reported Deaths from Accidental Drowning by Age and Gender in Thailand, 1996-2003



	< 4	5-14	15-24	25-34	35-44	45-64	>64
1996	13.8	25.3	15.7	12.7	12.5	14.2	5.7
1998	17.2	24.2	12.9	13.6	11.7	14.1	6.3
2000	15.2	21.3	10.8	13.4	13.1	17.3	8.9
2002	14.3	23.4	9.6	12.2	13.1	18.6	8.8
2003	14.3	21.3	10.7	11.9	14.7	17.2	9.8

Age (years)



Source: Mortality Report. Bureau of Policy and Strategy, Ministry of Public Health.

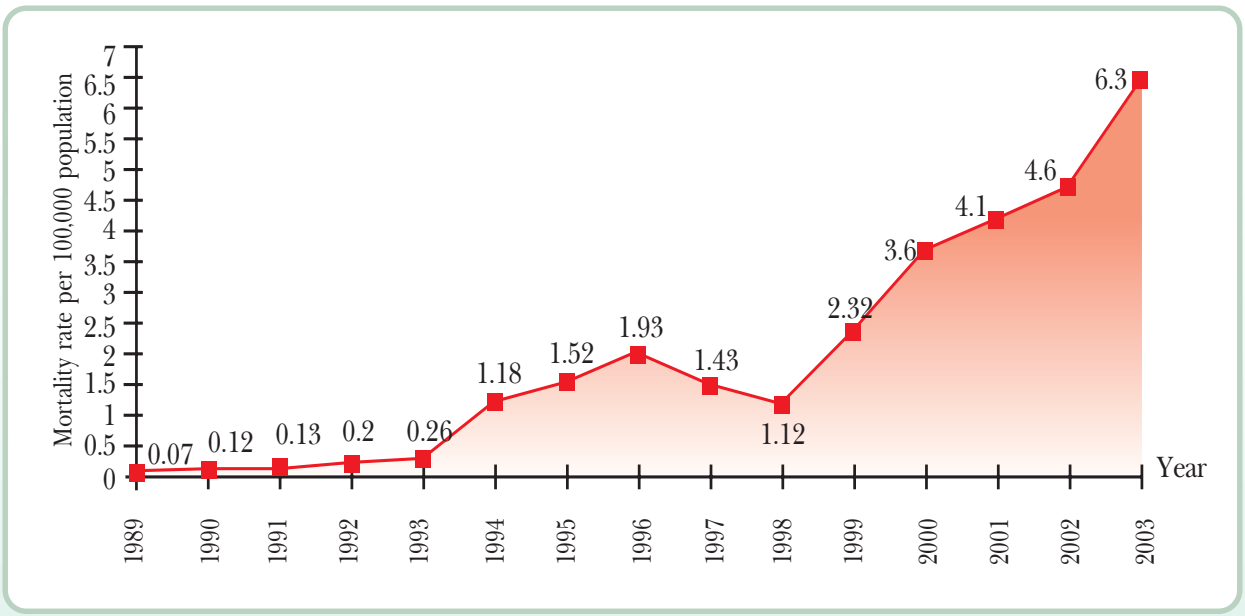
3.4.6 Diseases Associated with Behaviours and Lifestyles

(1) Tobacco Use

There has been a rising trend in the prevalence of diseases evidently caused by smoking, including emphysema, coronary atherosclerosis, chronic obstructive pulmonary disease, and lung cancer, as follows.

(1.1) Emphysema. The prevalence of emphysema has risen from 0.07% in 1989 to 6.3% in 2003 (Figure 5.40).

Figure 5.40 Rate of Mortality Due to Emphysema, 1989-2003



Source: Bureau of Policy and Strategy, Ministry of Public Health.

(1.2) Chronic obstructive pulmonary disease (COPD). A major cause of COPD is cigarette smoking for a long period of time. According to the 1991 Health Examination Survey, 1.5% of the people aged 15 had COPD, and that the more they smoked, the more they would come down with COPD (Figure 5.41). By 2010, it has been estimated that the prevalence of COPD would be 7,035 per 100,000 population[15] (Figure 5.42).

A projection of the number of COPD patients showed that 1.5% of the population aged over 15 were COPD identified. In brief, the longer the time of tobacco exposure, the greater the likelihood of COPD to develop (Figure 5.44). There is a great deal of evidence reporting such an association. In 2010, tobacco consumption is projected to result in a COPD prevalence of 7,035 per 100,000 population in Thailand[15] (Figure 5.45).

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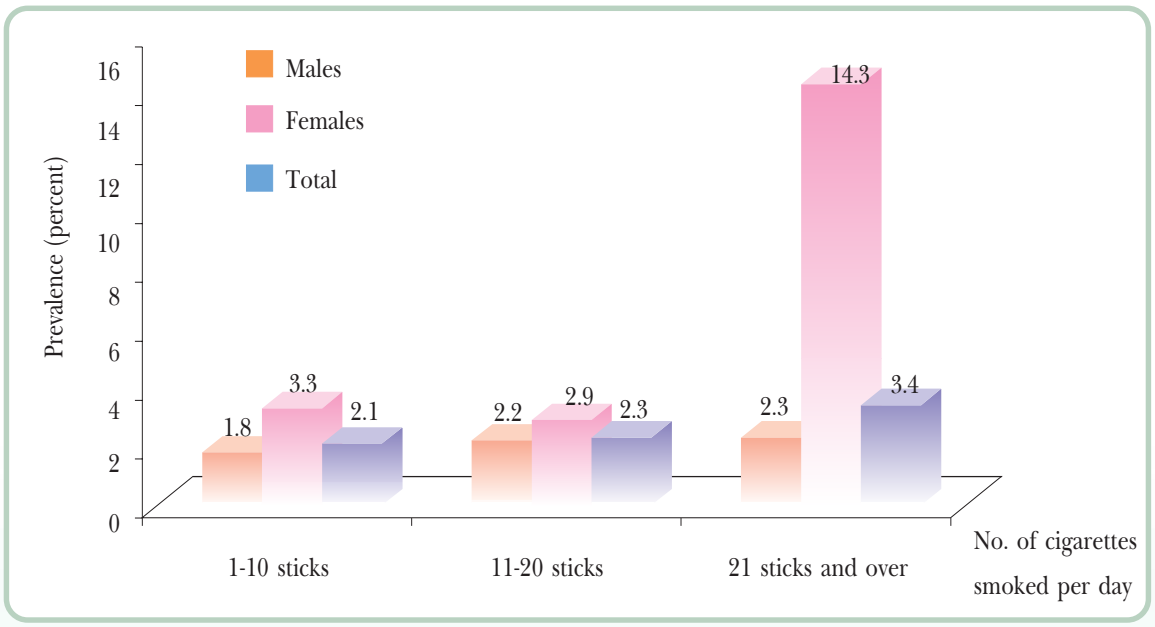
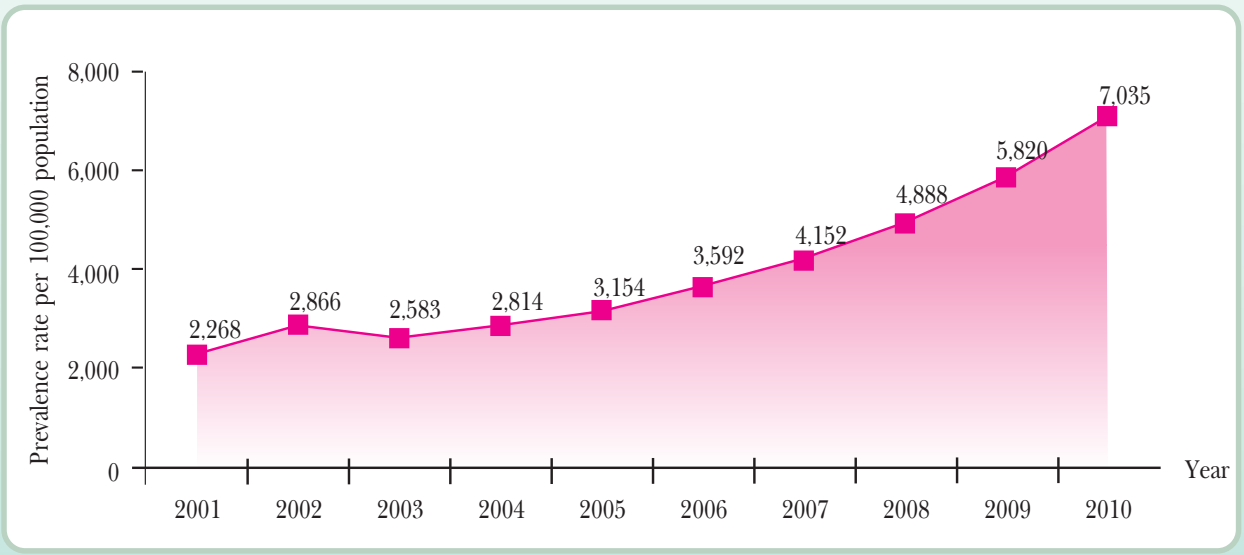
[15] The projection was based on the assumption that in the next 10 years the smoking rate will decrease each year by 0.42% among males and 0.16% among females.

Figure 5.41 Prevalence Rate of Chronic Obstructive Pulmonary Disease among Thai People Aged 15 and Over by the Number of Cigarettes Smoked and Sex



Source: Thai Health Research Institute and Health Systems Research Institute. Health Examination Surveys, 1st round in 1991 and 2nd round in 1996.

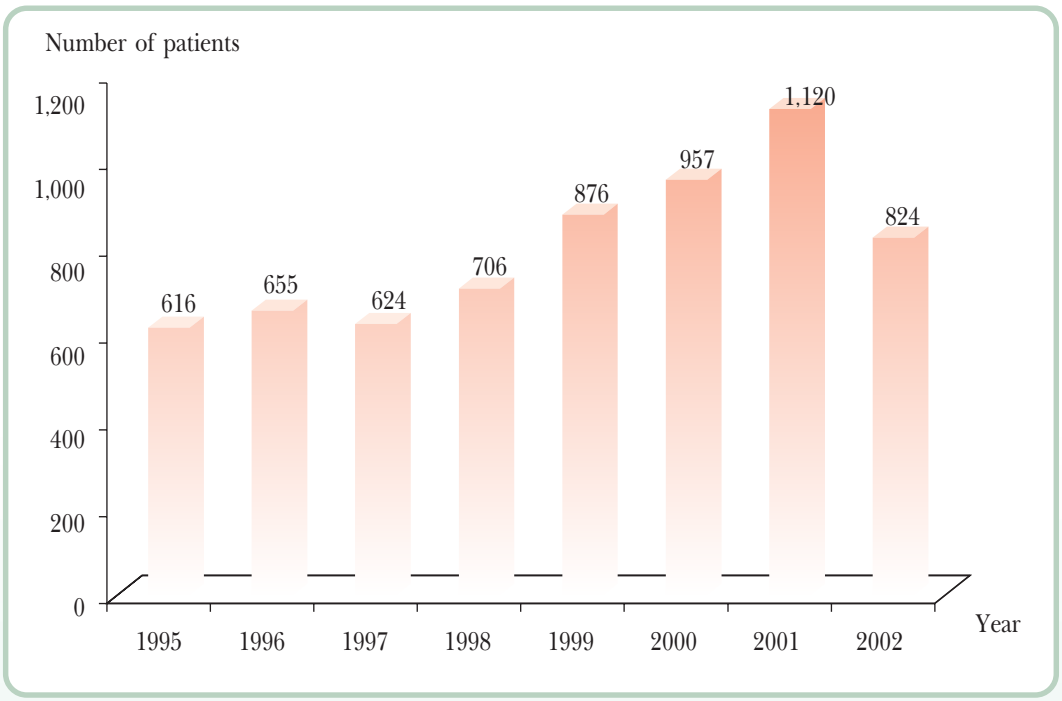
Figure 5.42 Projection of Chronic Obstructive Pulmonary Disease Prevalence, Thailand, 2001- 2010



Source: Sawang Saenghiranwattana. Chronic Obstructive Pulmonary Disease: Current Situation and Trends, 1999.

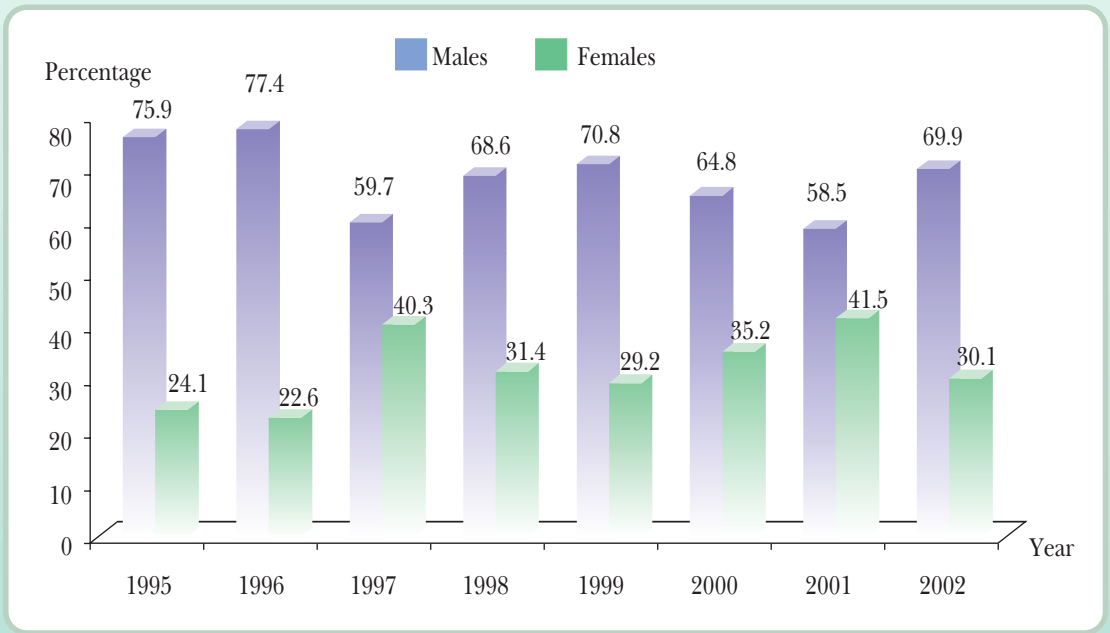
(1.3) Coronary atherosclerosis. This disease has a rising trend, trend, especially among females (Figures 5.43 and 5.44). In addition to tobacco use, such a disease results from physical inactivity, hyperlipidaemia and overweight.

Figure 5.43 Number of Patients with Coronary Atherosclerosis Treated at the Cardiology Institute, 1995-2002



Source: Institute of Cardiology, Ministry of Public Health.

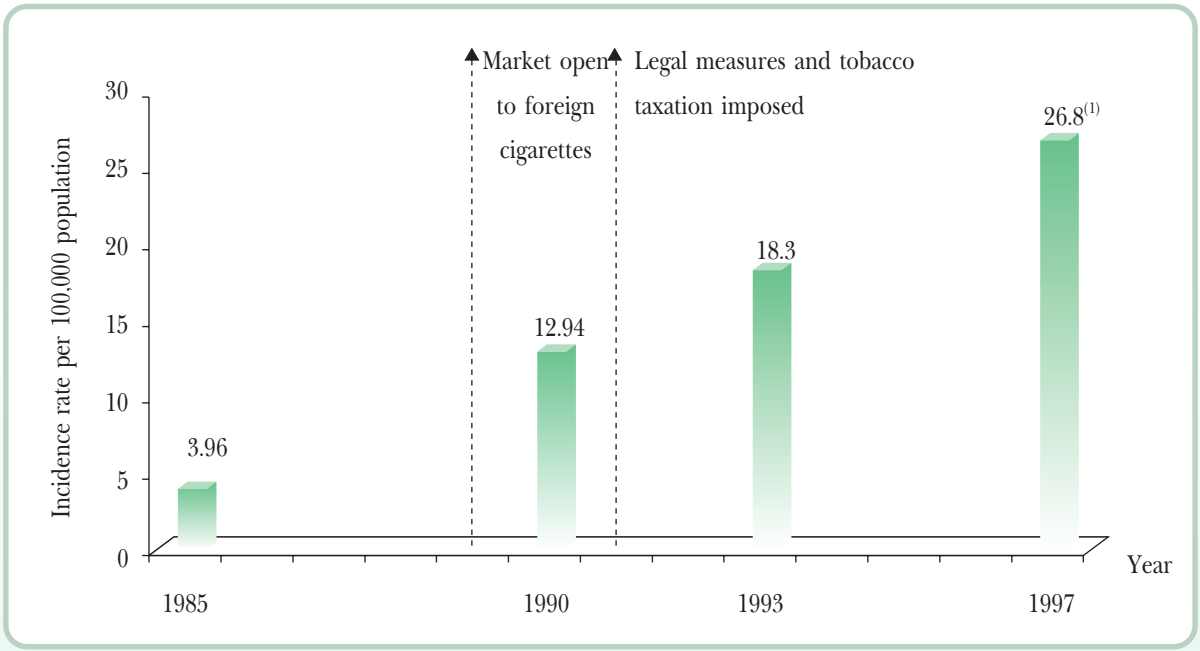
Figure 5.44 Proportion of Patients with Coronary Atherosclerosis Undergoing Surgery at the Cardiology Institute by Sex, 1995-2002



Source: Institute of Cardiology, Ministry of Public Health.

(1.4) Lung cancer. Between 1985 and 1997 the prevalence of lung cancer increased sevenfold, i.e. from 3.96 to 26.8 per 100,000 population. The rise is expected to be associated with tobacco consumption and air pollution (Figure 5.45).

Figure 5.45 Incidence Rate of Lung Cancer, Thailand, 1985-1997

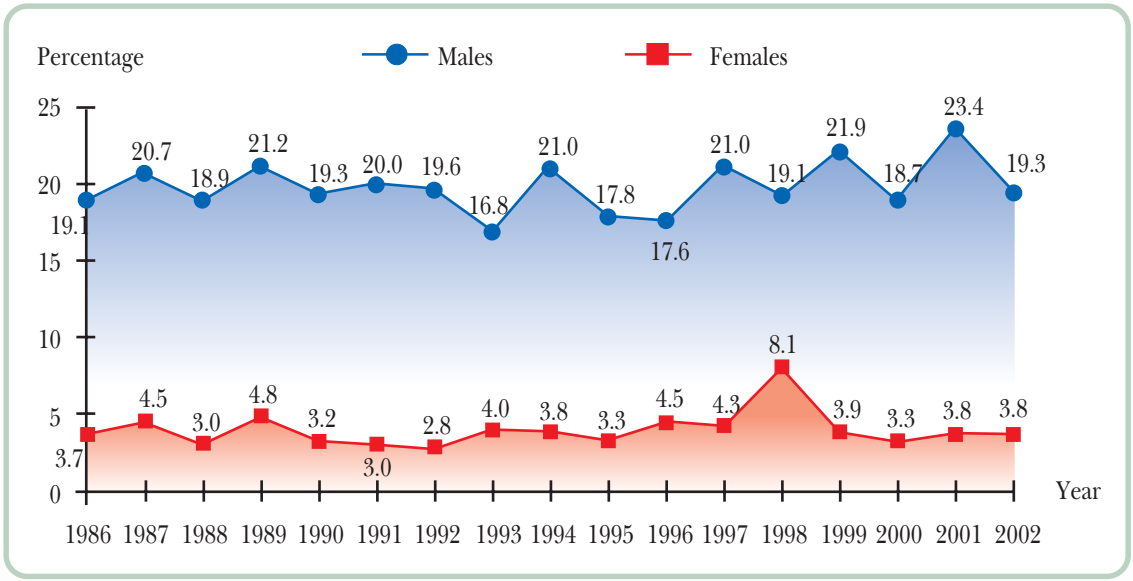


Source: National Cancer Institute, Ministry of Public Health.

Note: (1) Lung cancer in males.

A report on lung cancer patients treated at the National Cancer Institute during 1986-2002 revealed that 16-23% were males, 3-8 times higher than in females (Figure 5.46).

Figure 5.46 Percentage of Lung Cancer Patients Treated at the National Cancer Institute, 1986-2002



Source: National Cancer Institute, Ministry of Public Health.

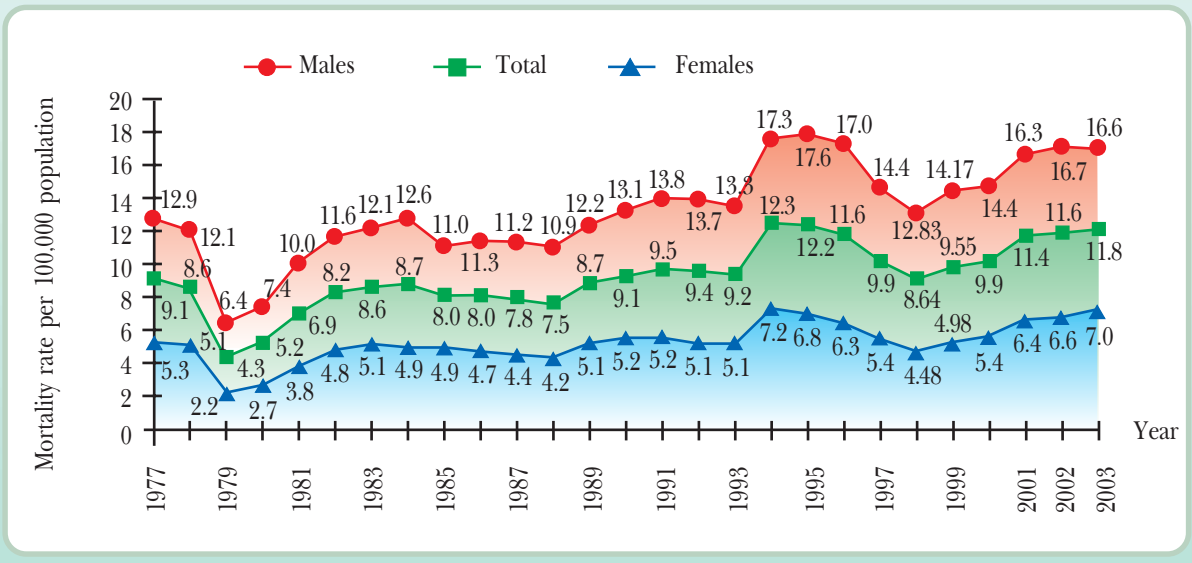
Note: As percentage of all cancer patients.

(2) Alcohol Consumption

Major health hazards caused by or associated with alcohol drinking (alcohol use disorders) are cirrhosis and accidents.

Consumption of alcohol for a long time negatively affects the liver as it has been found that, between 1977 and 2003, the mortality rates of liver disease and chronic cirrhosis were reported at 4.3-12.3 per 100,000 population, the rates being 6-18 in males and 2-7 in females, i.e. 2-3 times higher in males than in females (Figure 5.47). However, the trend in cirrhosis resulting from hepatitis B virus is declining (Figure 5.15).

Figure 5.47 Mortality Rate of Liver Disease and Cirrhosis, Thailand, 1977-2003



Source: Bureau of Policy and Strategy, Ministry of Public Health.

(3) Food and Drug Consumption

People's food consumption patterns have changed to eating out or eating readily-cooked food bought from restaurants or food stalls where the food might have been contaminated with pathogens or toxic substances due to unhygienic practices of the food handlers. Consumers, then, are likely to be vulnerable to food-borne diseases, particularly diarrhoea whose incidence tends to be rising (Figure 5.21). Eating of improperly heated food, especially fresh-water fish, might cause opisthorchiasis or liver fluke disease (Figure 5.10) which is a major cause of liver cancer (Table 5.24). It has been noted that Thailand has the highest incidence of liver cancer in the world.[16]

Table 5.24 Incidence of Liver Cancer Thailand, 1993, 1996 and 1999

Year	Incidence per 100,000 population	
	Males	Females
1993	37.4	15.5
1996	40.5	16.0
1999	38.6	14.3

Source: Cancer in Thailand, 1995-2000.

Regarding drug consumption, irrational use, over-use or use without sufficient knowledge seems to be rising, resulting in adverse toxic or allergic reactions directly or indirectly. This is evidenced from the number of reported adverse events from drug use which has risen from 176 in 1983 to 4,684 in 1997 and 20,287 in 2003 (Figure 5.48). Besides, it has been found that each year 18-30 % of all patients have to be hospitalized due to problems related to drug use which tends to be rising.[17]

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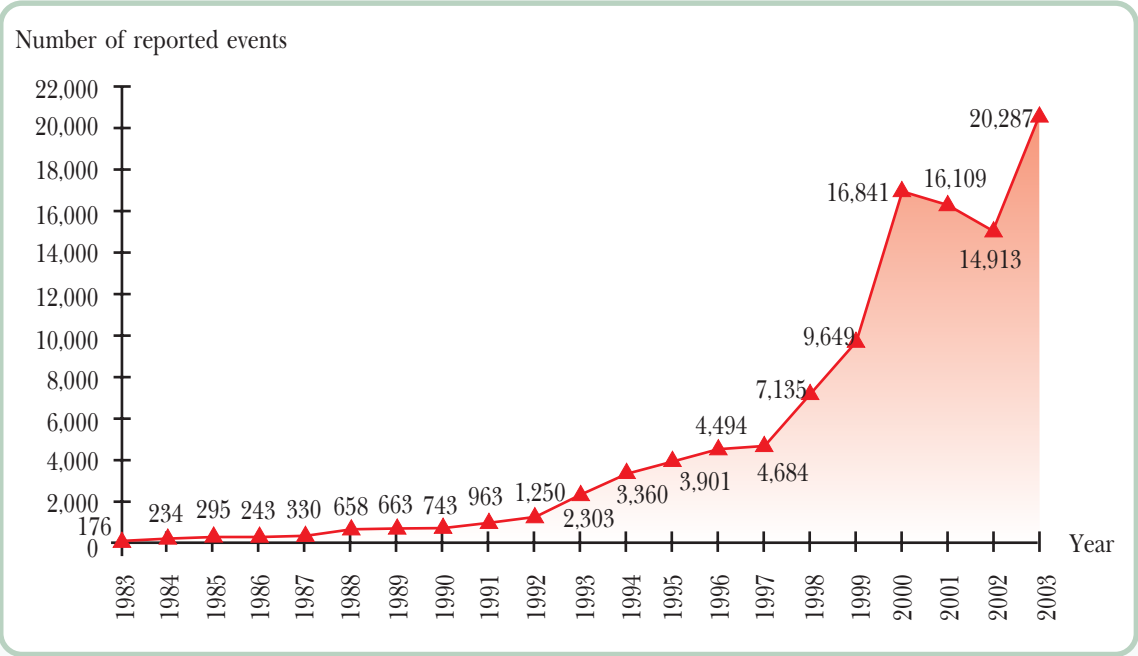
[16] Vatanasapt, V., and Sriamporn, S. (1999). Cancer in Thailand 1992-1994. (IARC Technical Report No. 34), Lyon, IARC.

[17] Suwit Wibulpolprasert, Vichai Chokevivat and Sripen Tantives (editors). Drug System in Thailand, 2002.

Figure 5.48 Number of Reported Adverse Events from Drug Use, 1983-2003



Source: Division of Planning and Technical Administration, Food and Drug Administration.

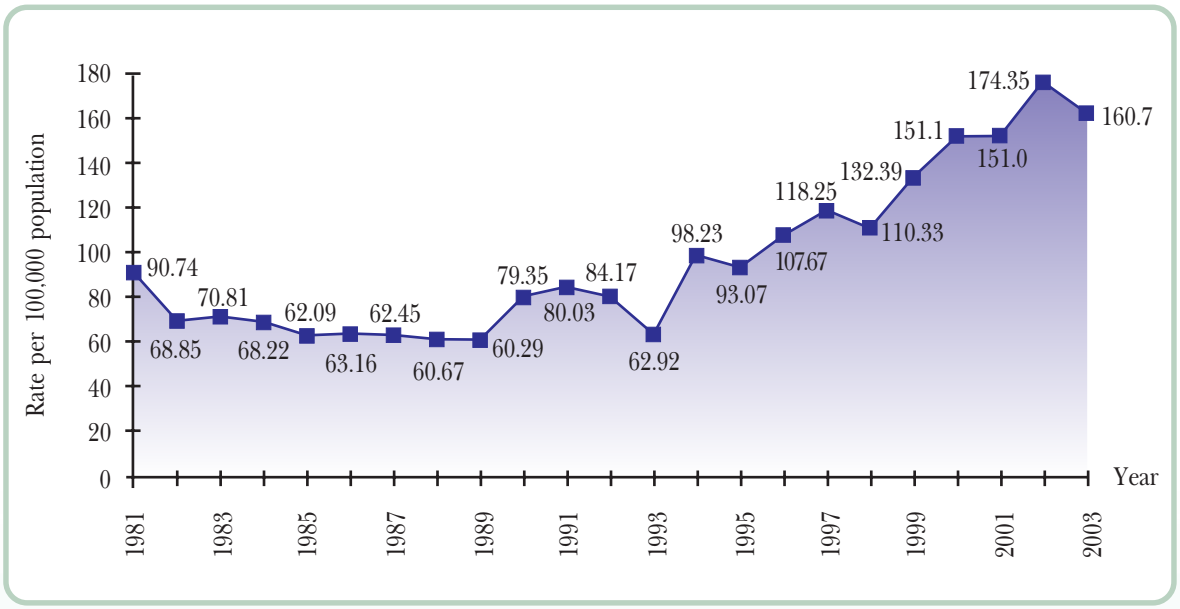
(4) Diseases Associated with Unsafe Sex Bahaviours

As a result of systematic and intensive efforts for the prevention and control of STIs and HIV/AIDS, people's sexual behaviours have changed considerably. Sexual promiscuity has declined and condom use has risen, resulting in a significant drop in the STI incidence (Figure 5.20).

3.4.7 Mental Health Disorders

Rapid changes in economic, social and cultural situations have led to a rising incidence of psychoneurosis, particularly a rise in the number of institutionalized cases of mental/behavioural disorders during the period 1996-2003 (Figure 5.49). This might result from the struggling with the economic crisis; a lot of people suffering from insufficient income and unemployment (Figure 5.49).

Figure 5.49 Admission Rate with Phychosis and Mental Disorders, Thailand, 1981-2003



Source Inpatients Report. Bureau of Policy and Strategy, Ministry of Public Health.

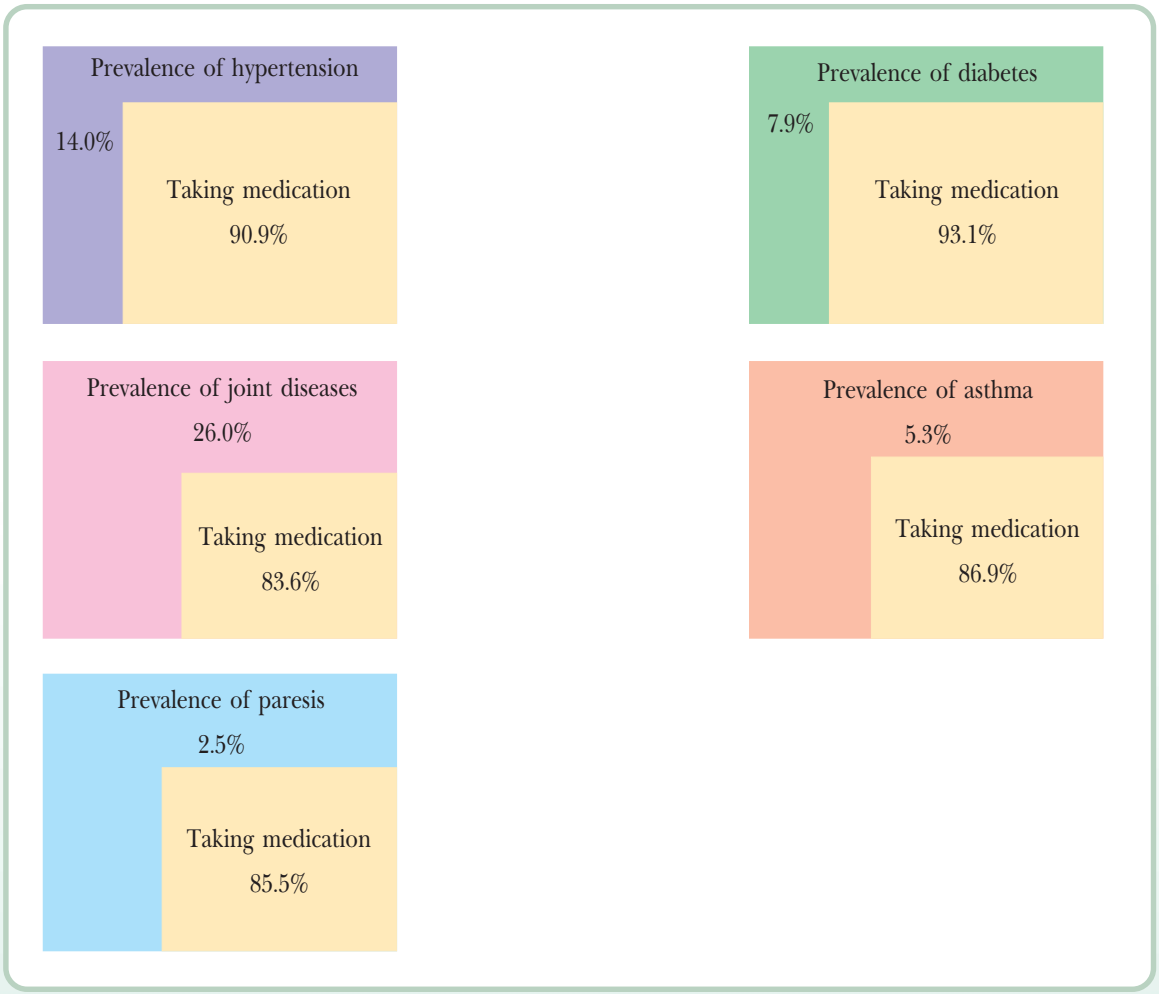
3.4.8 Health Problems of the Elderly

(1) Diseases and Disabilities in the Elderly

According to the 2001 survey on quality of life of Thai people aged 60 years and over, the most common illnesses among the elderly are hypertension, diabetes, joint diseases, asthma, and paresis (Figure 5.50).

Another survey conducted by the National Statistical Office in 2002 revealed that the first 5 illnesses that elderly people had are body ache (including backache and joint pain), insomnia, vertigo, eye diseases, dementia and hypertension. These illnesses are more prevalent with age (Table 5.25), and the prevalence is higher in females than in males (Table 5.26).

Figure 5.50 Prevalence of Illnesses among Thai Elderly People, 2001



Source: Institute of Geriatric Medicine. A Survey on Quality of Life of Thai Elderly People, 2001.

Table 5.25 Proportion (Percentage) of Thai Elders with Most Common Diseases/Symptoms by Age Group, 1994 and 2002

Disease/Symptom	1994					2002				
	Total	60-64 Yrs	65-69 Yrs	70-74 Yrs	75 yrs and over	Total	60-64 Yrs	65-69 Yrs	70-74 Yrs	75 yrs and over
- Body ache, backache	-	-	-	-	-	75.1	72.7	74.7	77.8	77.3
- Joint pain (degeneration)	72.4	68.5	73.7	73.8	76.9	47.5	42.8	46.7	49.8	54.9
- Insomnia	44.7	40.2	44.8	46.6	52.0	38.7	34.1	38.1	42.0	44.9
- Vertigo	49.2	46.8	45.7	51.6	56.9	36.8	34.4	35.6	38.7	41.2
- Eye diseases	43.0	35.6	40.6	48.5	56.0	33.2	27.5	31.1	37.3	42.8
- Dementia	27.2	21.7	22.9	32.1	40.2	29.8	22.3	26.5	33.2	45.2
- Hyper/hypotension	25.0	22.3	25.7	27.4	26.8	20.0	17.7	20.3	21.9	21.6

Source: Surveys on Elderly People in Thailand, 1994 and 2002, National Statistical Office.

Table 5.26 Proportion (Percentage) of Thai Elders with Most Common Diseases/Symptoms by Sex, 1994 and 2002

Disease/Symptom	1994			2002		
	Total	Male	Female	Total	Male	Female
- Body ache, backache	-	-	-	75.1	73.0	76.8
- Joint pain (degeneration)	72.4	67.3	76.5	47.5	43.5	50.8
- Insomnia	44.7	36.5	51.4	38.7	33.7	42.9
- Vertigo	49.2	38.9	57.6	36.8	27.8	44.4
- Eye diseases	43.0	39.1	46.1	33.2	30.6	35.3
- Dementia	27.2	23.8	30.0	29.8	26.6	32.5
- Hyper/hypotension	25.0	22.1	27.3	20.0	17.6	22.0

Source: Surveys on Elderly People in Thailand, 1994 and 2002, National Statistical Office.

(2) Rising Trends in Health Problems of the Elderly

The diseases that are health problems with rising trends are the following:

(2.1) Hypertension is a major health problem of the elderly that has a rising trend (Table 5.27) and is correlated with the economic and social development of society. Urban residents are more likely to have hypertension than rural residents. Besides, according to the World Health Report, it was estimated that in 2000 hypertension was the cause of 7.1 million deaths or approximately 13% of all deaths worldwide and it was also the cause of losses in non-fatal health status.

Table 5.27 Trends and Prevalence of Hypertension among Thai Elders in Urban and Rural Areas, 1985-1998

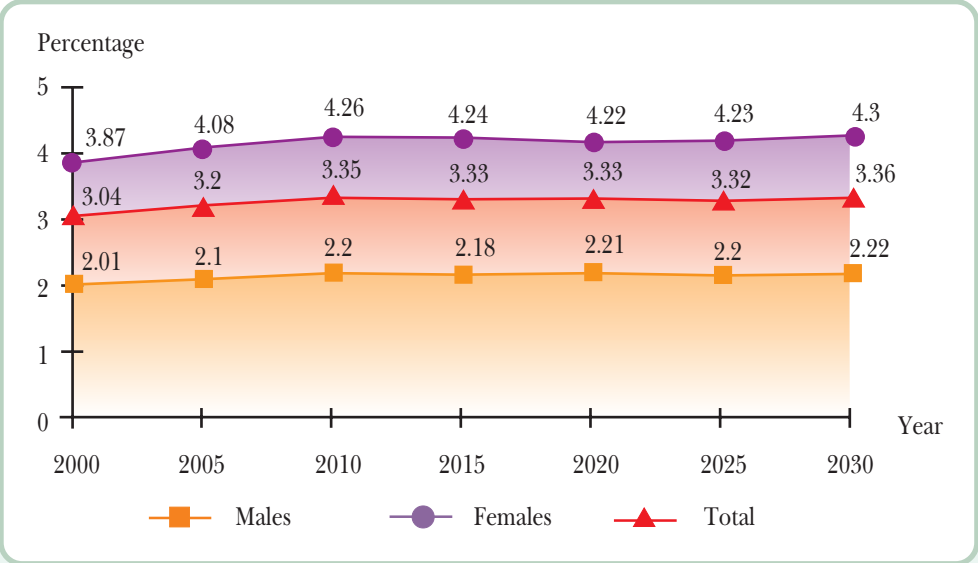
Residence	Prevalence, percent								
	1985	1986	1988	1989	1991	1992	1995	1996	1998
Urban	28		26		15.8+#		26**#	44.4#	36.5
Rural		23.3		18*	11.1+#	8.8*	15.3**#	23.6#	

Source: Sutthichai Jitapunkul. The Spread of Chronic Diseases and Disabilities in Thailand: A Hypothesis Based on the Data from Studies on the Elderly, 2000.

Notes: * Criteria used only for hypertension + Age 65+ yrs.
** Criteria used only for history taking # Nationwide survey

(2.2) Dementia is increasingly an important problem affecting the quality of life of the patients, caregivers, and society. A study on the prevalence of dementia among Thai elders reveals that at present the prevalence is 3.04% and is projected to be 3.4 percent in 2030. (the female to male ratio being 2:1) (Figure 5.51). Besides, the prevalence of dementia is rising with age. However, the prevalence of this disease in Thai elders is lower than that in American elders, but when considering the prevalence in each age group, their increase rates are comparable (Table 5.28).

Figure 5.51 Projection of Dementia Prevalence in the Elderly, 2000-2030



Source: Thai Health Research Institute, National Health Foundation, and Bureau of Health Policy and Planning, MoPH. Report an a Study of Health Problems among the Thai Elderly, 1998.

Table 5.28 Comparison of Dementia Prevalence among Thai and American Elders

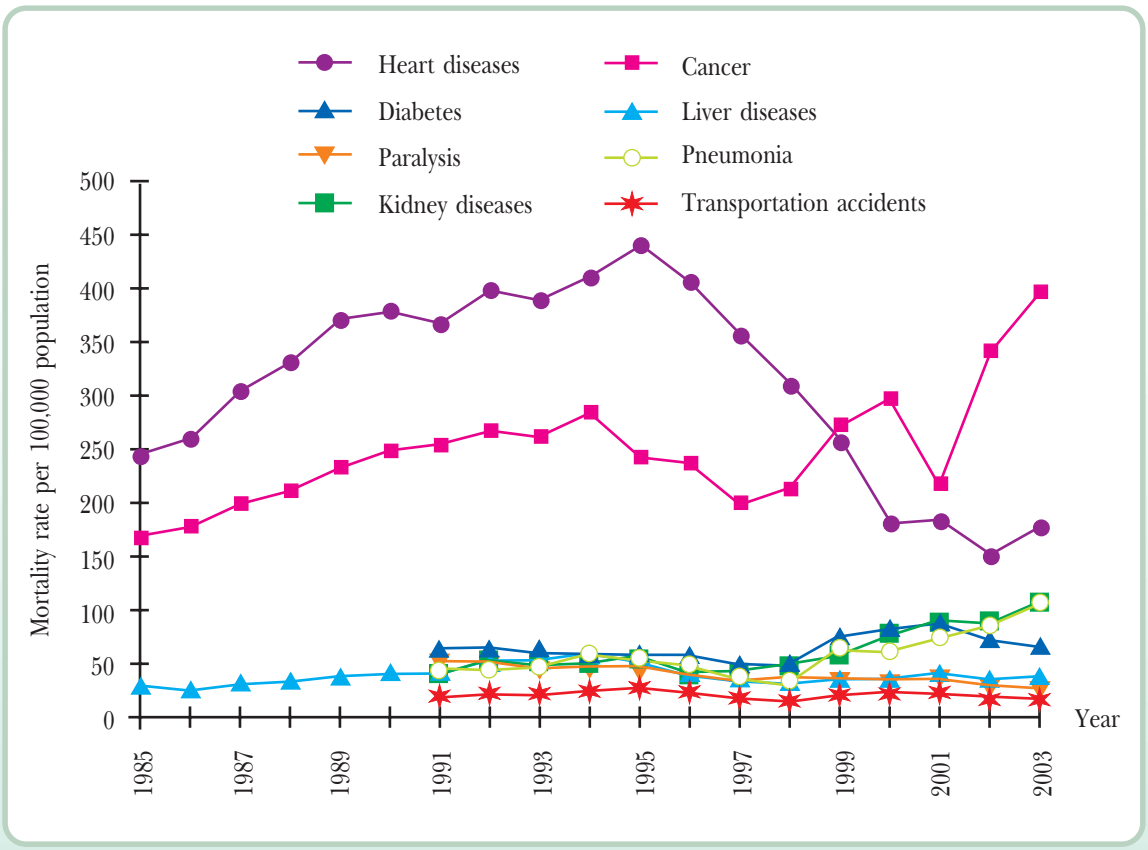
Age (years)	Prevalence	
	Thai elders	American elders
60 - 64	1.0%	-
65 - 69	2.0%	2.5%
70 - 74	3.0%	5.0%
75 - 79	5.0%	10.0%
80 - 84	7.5%	15.0%
85 - 89	12.5%	30.0%
90+	30.0%	-

Source: Sutthichai Jitapunkul, Napaporn Chayovan and Jiraporn Kespichaywattana. "National Policies on Ageing and Long-term Care Provision for Older Persons in Thailand" in David R. Phillips and Alfred C.M. Chan (eds). Ageing and Long-term Care: National Policies in the Asia-Pacific. Bestprint Printing Co., Singapore, 2002.

(3) Major Causes of Death in the Elderly

Among the elderly, the most common causes of death are, in order of magnitude, heart diseases, cancer, diabetes, liver diseases, kidney diseases, paralysis, pneumonia, and transportation accidents. The mortality rate per 100,000 population from cancer has risen from 169.1 in 1985 to 399.5 in 2003. The rates of mortality have also risen for diabetes from 28.8 to 66.7 for the same period and for kidney diseases from 38.3 in 1991 to 108.0 in 2003 (Figure 5.52 and Table 5.29).

Figure 5.52 Mortality Rates from Major Causes of Death in the Elderly, 1985-2003



Source: Bureau of Policy and Strategy, Ministry of Public Health.

Table 5.29 Mortality Rates of Diabetes, Heart Diseases, Cancer, Paralysis, Liver Diseases, Kidney Diseases, Pneumonia, and Transportation Accidents/among the Elderly, 1985-2003

Year	Mortality rate per 100,000 population among the elderly							
	Diabetes	Heart diseases	Cancer	Liver diseases	Kidney diseases	Paralysis	Pneumonia	Transportation accidents
1985	28.8	245.0	169.1	n.a.	n.a.	n.a.	n.a.	n.a.
1986	24.9	259.3	177.6	n.a.	n.a.	n.a.	n.a.	n.a.
1987	30.3	304.3	199.1	n.a.	n.a.	n.a.	n.a.	n.a.
1988	32.4	331.1	209.6	n.a.	n.a.	n.a.	n.a.	n.a.
1989	37.2	372.3	231.9	n.a.	n.a.	n.a.	n.a.	n.a.
1990	39.4	379.2	248.8	n.a.	n.a.	n.a.	n.a.	n.a.
1991	39.9	386.7	253.9	62.6	38.3	49.5	42.0	16.9
1992	49.5	400.3	266.8	63.4	48.0	51.5	42.3	20.1
1993	50.8	389.7	262.9	57.1	45.9	42.4	45.3	19.5
1994	57.2	412.2	283.9	56.3	47.5	44.9	56.0	24.1
1995	56.2	440.7	242.1	52.2	55.3	45.5	51.0	26.3
1996	57.4	407.5	236.2	41.4	38.2	37.4	46.8	22.4
1997	48.5	356.1	199.4	33.1	40.5	32.0	33.7	17.1
1998	47.7	310.0	213.0	34.4	46.7	31.3	28.9	13.3
1999	74.8	257.7	273.7	34.0	56.1	32.3	61.1	18.5
2000	82.1	179.9	297.6	34.0	75.5	33.9	59.9	22.6
2001	88.4	182.2	218.2	40.6	89.6	34.8	73.0	21.5
2002	72.1	149.4	342.6	35.5	87.2	29.2	85.5	18.9
2003	66.7	177.1	399.5	38.3	108.0	26.8	107.4	16.7

Source: Bureau of Policy and Strategy, Ministry of Public Health.

Note: n.a. = Data not available

3.4.9 Problems of the Disabled

A survey conducted by the National Statistical Office (NSO) revealed that the proportion of people with disability was rising from 0.5% in 1974 to 1.7% in 2002 (Table 5.30). However, other surveys have reported higher prevalence, compared with that reported by NSO. For example, the 1991-1992 health examination survey on the Thai population revealed a 6.3% disability prevalence[18] (excluding mental/intellectual disabilities); and if all kinds of disabilities are taken into account, the overall prevalence of disabilities will be 8.1% of the total population.

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[18] Chanpen Choprapawon (editor). Report on the First Nationwide Health Examination Survey on Thai People, 1991-1992. Thai Health Research Institute and Health Systems Research Institute, 1992.

Besides, Suwit Wibulpolprasert and colleagues (1997) projected that the prevalence of people with disabilities had increased at a rate higher than that of the population growth. The physical and movement disabilities were most commonly found, which is associated with the socio-economic changes and the country's epidemiological transition.[19] Regarding the characteristics of disability, the 2002 report on disabilities and crippling conditions revealed that most of the disabled persons had impaired vision in both eyes, hearing impairment, paresis, atrophied/inflexible limbs, and blurred vision in one eye (Figure 5.53).

Table 5.30 Number and Percentage of Thai People with Disabilities, 1974-2002

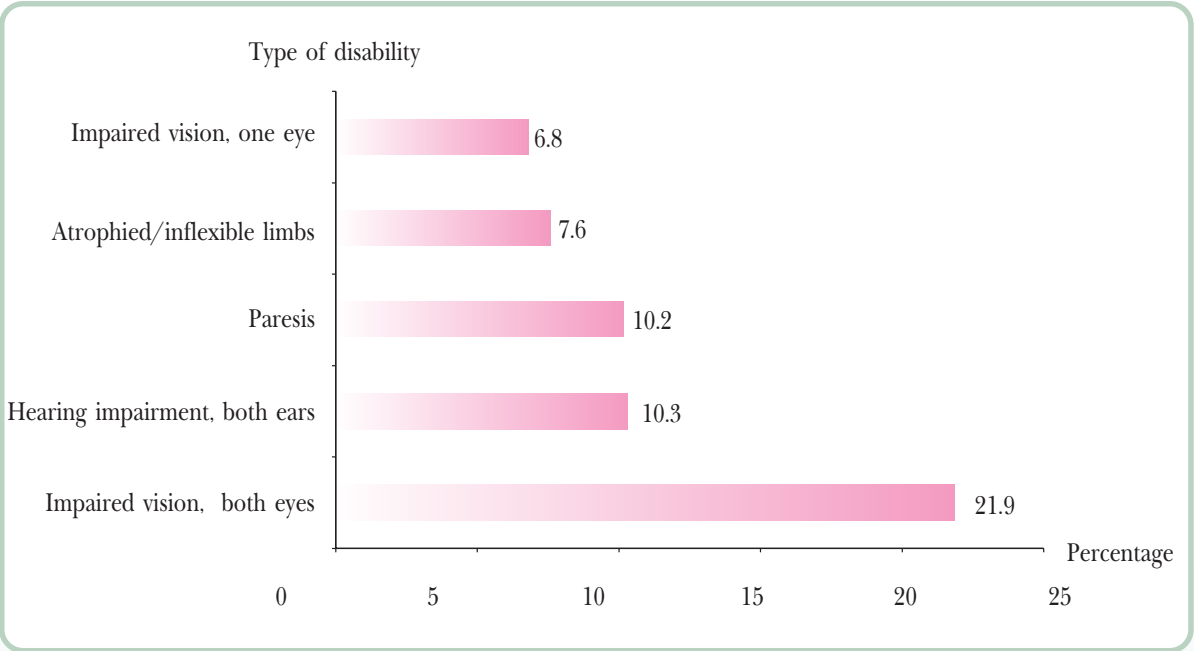
Unit: Thousands

Year of survey	Population	People with disabilities	Percentage of total population
1974	39,796.9	209.0	0.5
1976	42,066.9	245.0	0.6
1977	44,211.5	296.2	0.7
1978	45,344.2	324.6	0.7
1981	47,621.4	367.5	0.8
1986	51,960.0	385.9	0.7
1991	57,046.5	1,057.0	1.8
1996	59,902.8	1,024.1	1.7
2001	62,871.0	1,100.8	1.8
2002	63,303.0	1,098.0	1.7

Source: Health and Welfare Survey Projects, 1974-2002. National Statistical Office.

[19] Suwit Wibulpolprasert et al. Medical Rehabilitation Service System for the Disabled, 1997.

Figure 5.53 Proportion of People with Disabilities (First Five Major Types), 2001



Source: Report on Disabilities and Crippling Conditions Survey, 2002. National Statistical Office.

In addition, the 2001 survey on illnesses among the disabled revealed that coronary-artery disease was most common (22.2%), followed by diseases of the musculo-skeletal system (19.4%), diseases of the respiratory system (14.8%), and neuro-psychiatric disorders (11.8%). It is noteworthy that coronaryartery and neuro-psychiatric disorders were more common in males, whereas the diseases of the musculo-skeletal system were more common in females (Table 5.31).

Table 5.31 Proportion (Percentage) of Disabled Persons with Common Diseases or Symptoms by Sex, 2001

Disease/symptom	Total	Males	Females
- Coronary artery disease	22.2	25.6	18.3
- Diseases of musculo-skeletal system	19.4	17.6	21.6
- Diseases of respiratory system	14.8	14.6	14.9
- Neuro-psychiatric disorders	11.8	14.1	9.0

Source: Report on Disabilities Survey, 2001, National Statistical Office.

3.5 Re-emerging Health Problems

The re-emerging public health problems include tuberculosis whose incidence is rising with HIV/AIDS, filariasis coming in with migrant workers from Myanmar, and leptospirosis.

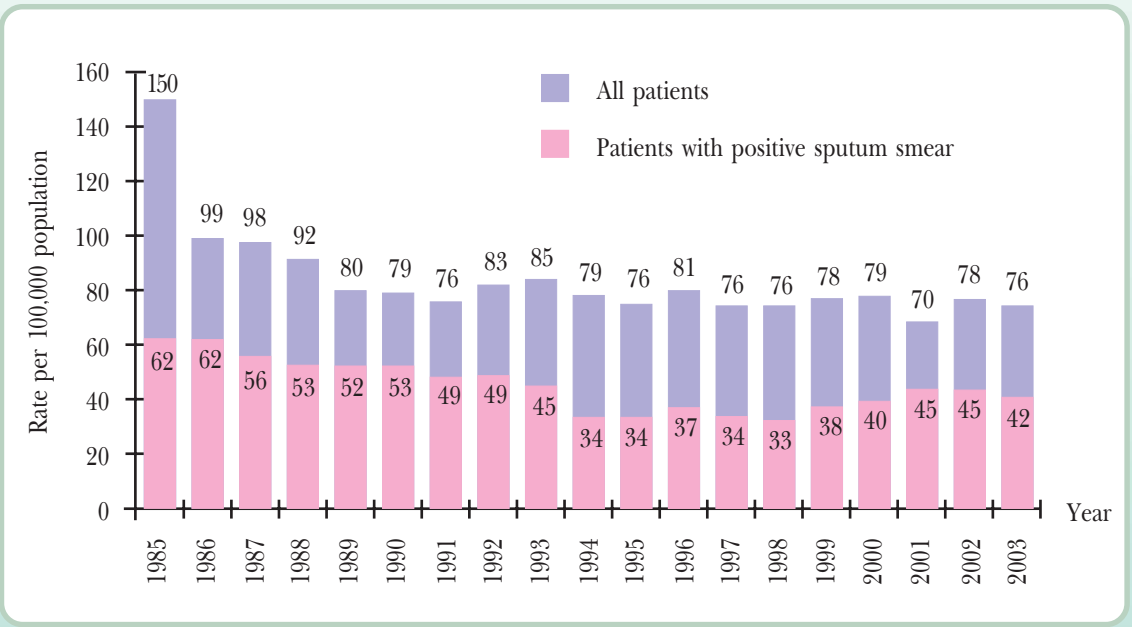
3.5.1 Tuberculosis

The tuberculosis prevalence (per 100,000 population) was actually declining between 1985 and 1989 from 150 to 80; but between 1990 and 2003 it did not decrease, rather it increased slightly (Figure 5.54).

Owing to the HIV/AIDS epidemic, tuberculosis is becoming a public health problem. In all upper northern provinces, the TB-HIV coinfection rate has risen from 3.0% in 1991 to 27.0% in 2003. Overall, for the entire country for over 10 years, the coinfection prevalence has increased from 16.4% in 1989 to 32.1% in 2003 (Figure 5.55).

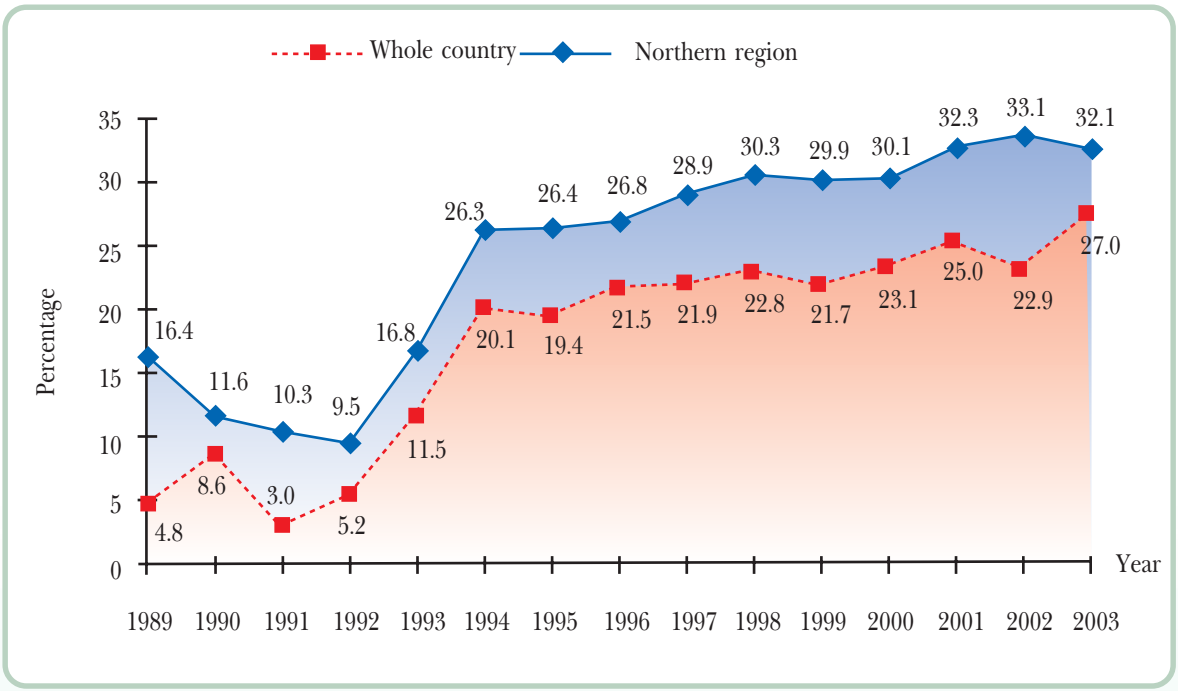
According to WHO's projections, HIV/AIDS has resulted in an annual increase of 4% of tuberculosis cases. In actuality, in Thailand the tuberculosis prevalence has risen by 3% each year during the past 5 years. And multidrug-resistant tuberculosis has dropped from 2.02% in 1997-1998 to 1.06% in 2002, which is rather low compared with those in other HIV/AIDS-affected countries whose rates are over 10% (Institute of Tuberculosis Research, Japan, quoted in the Division of Tuberculosis).

Figure 5.54 Rate of Newly Registered Tuberculosis Patients in Thailand, 1985-2003



Source: Department of Disease Control, Ministry of Public Health.

Figure 5.55 Percentage of Tuberculosis Infection in HIV/AIDS Patients in Thailand, 1989-2003



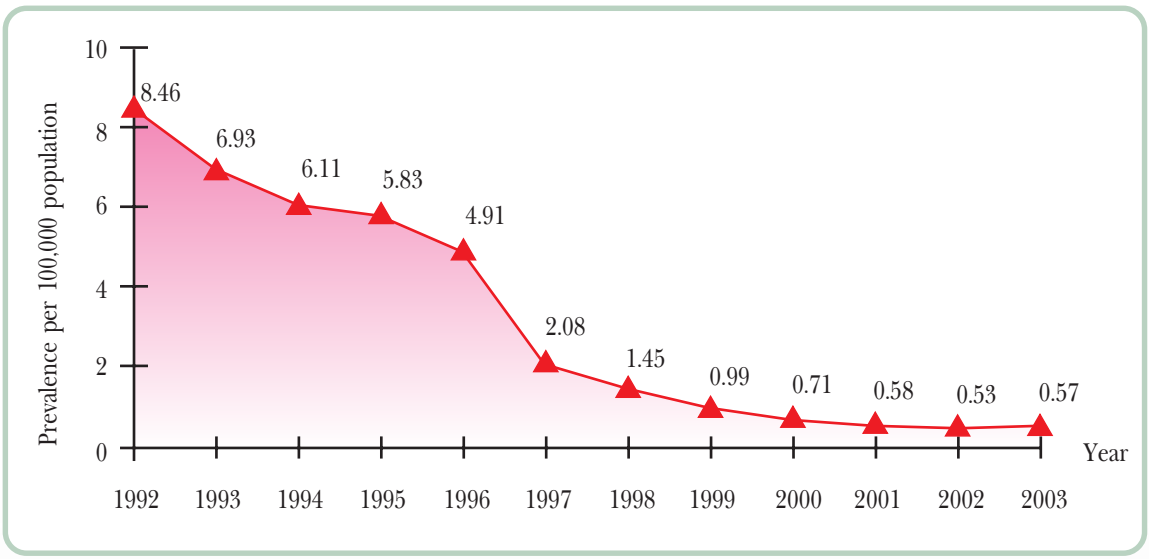
Source: Bureau of Epidemiology, Department of Disease Control.

Note: The Bureau of Epidemiology adjusted all the data for 1989-2003.

3.5.2 Filariasis

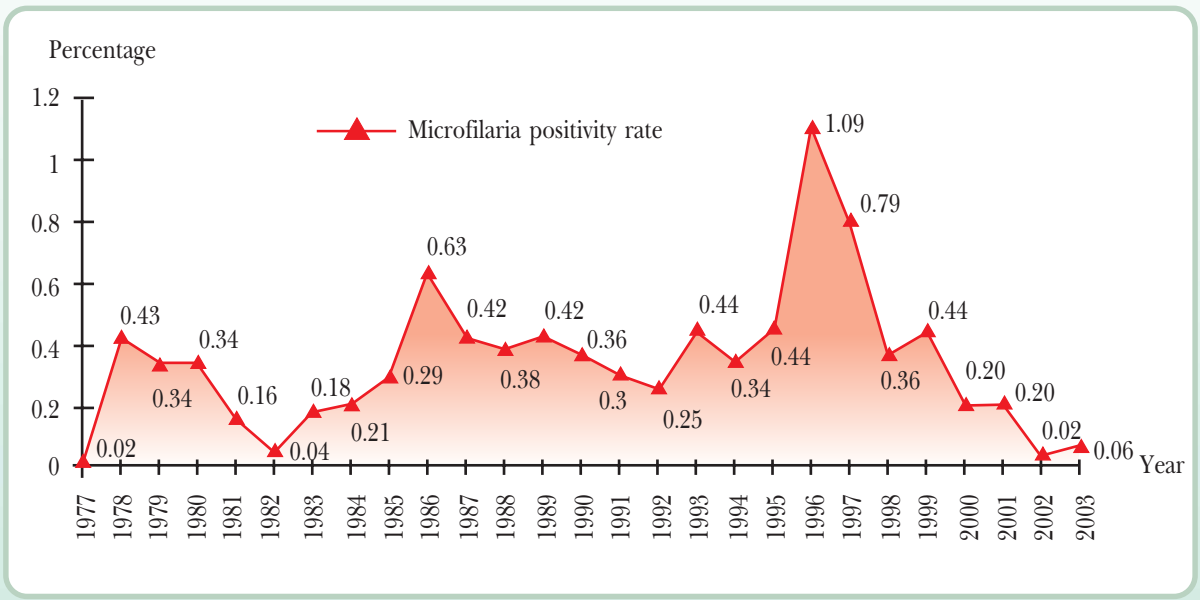
Overall, the filariasis control efforts have been able to reduce the prevalence rate (per 100,000 population) from 8.46 in 1992 to 0.57 in 2003 (Figure 5.56) and reduce the microfilaria positivity rate in alien workers to less than 1% over the past 20 years, except that in 1996 the rate was greater than 1% as a result of intensive health check-ups for foreign workers (Figure 5.57). However, filariasis is still a public health problem in some areas, particularly the provinces along the Thai-Myanmar and Thai-Malaysian borders. This is largely because of the environmental conditions favorable to mosquito breeding and the border areas being the places where workers from Myanmar cross over to find jobs.

Figure 5.56 Prevalence Rate of Filariasis, Thailand, 1992-2003



Source: Department of Disease Control, Ministry of Public Health.

Figure 5.57 Microfilaria Positivity Rate in Alien Workers, 1977-2003

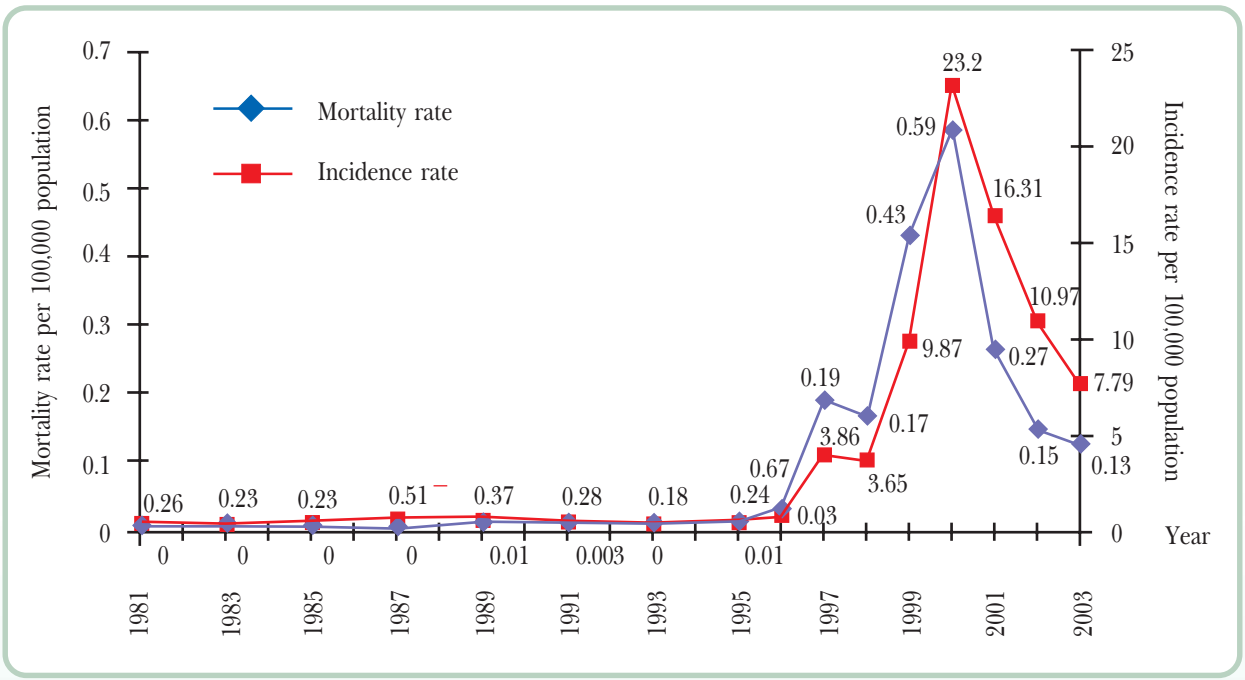


Source: Department of Disease Control, Ministry of Public Health.

3.5.3 Leptospirosis

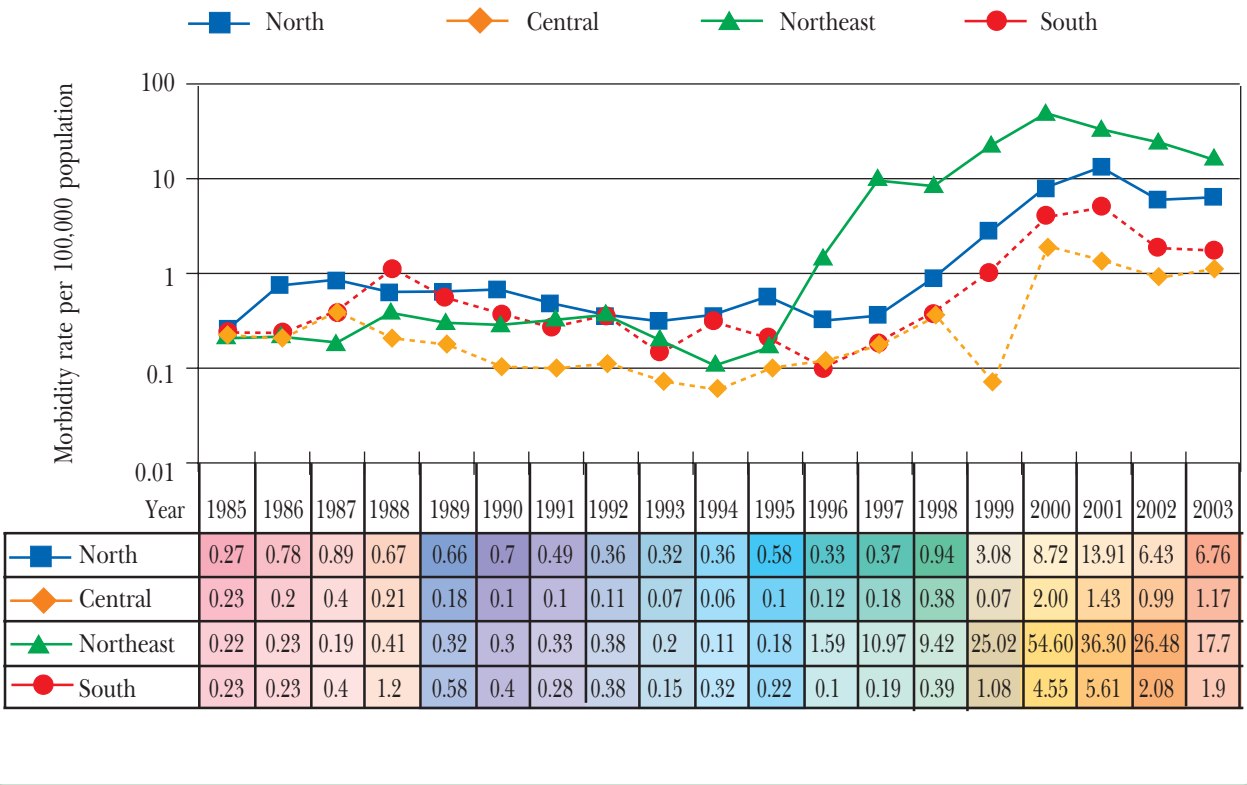
Leptospirosis is a re-emerging infectious disease having an incidence rate between 0.2 and 0.7 per 100,000 population during the period 1981-1996. But for the past four years, the incidence and mortality rates have been on the rise, i.e. the incidence per 100,000 population rising from 0.67 in 1996 to 23.2 in 2000 and the mortality rate per 100,000 population rising from 0.03 to 0.59 during the same period (Figure 5.58). Over 90% of the patients live in the Northeastern region of the country (Figure 5.59). However, for the period 2001-2003, both the incidence and mortality rates were declining.

Figure 5.58 Incidence and Mortality Rates of Leptospirosis in Thailand, 1981-2003



Source: Bureau of Epidemiology, Department of Disease Control.

Figure 5.59 Morbidity Rate of Leptospirosis by Region in Thailand, 1985-2003



Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
North	0.27	0.78	0.89	0.67	0.66	0.7	0.49	0.36	0.32	0.36	0.58	0.33	0.37	0.94	3.08	8.72	13.91	6.43	6.76
Central	0.23	0.2	0.4	0.21	0.18	0.1	0.1	0.11	0.07	0.06	0.1	0.12	0.18	0.38	0.07	2.00	1.43	0.99	1.17
Northeast	0.22	0.23	0.19	0.41	0.32	0.3	0.33	0.38	0.2	0.11	0.18	1.59	10.97	9.42	25.02	54.60	36.30	26.48	17.7
South	0.23	0.23	0.4	1.2	0.58	0.4	0.28	0.38	0.15	0.32	0.22	0.1	0.19	0.39	1.08	4.55	5.61	2.08	1.9

Source: Bureau of Epidemiology, Department of Disease Control.

3.6 Problems of Emerging Diseases

3.6.1 SARS

Severe acute respiratory syndrome (SARS) is an emerging disease. The SARS epidemic occurred in November 2002 in Quandong province in the southern region of the Peoples Republic of China. The outbreak could be controlled in June 2003 but had caused illness in 8,437 individuals and 813 deaths in 29 countries; a case-fatality rate of 9.64%. The areas with the widespread epidemic were China (Beijing and Quandong), Hong Kong, Taiwan, Singapore, Canada (Toronto) and Vietnam (Hanoi).

In Thailand, there were 9 probable cases (with pneumonia), 2 of whom had died, and 31 suspect cases (without pneumonia), and no deaths. All the patients contracted the disease from abroad. Thailand undertook strict measures for disease prevention and control and could successfully control the disease.

3.6.2 Hand-Foot-Mouth Disease

Hand-foot-mouth disease is an emerging disease. Its outbreak was reported in 1977 in Malaysia, with 2,140 cases and 31 deaths; a case-fatality rate of 1.4%.

For Thailand, the first case was reported in 2000. In 2001, there were 1,548 reported cases and 3 deaths (a morbidity rate of 2.49 per 100,000 population); and in 2002, there were 3,533 cases and 2 deaths (a morbidity rate of 5.65 per 100,000 population).

Laboratory testing for enterovirus 71 conducted by the National Institute of Health of the Department of Medical Sciences in 1998-2002 revealed that enterovirus 71 could be detected in the hands and mouth of the patients. The enterovirus 71 positivity rate rose from 8% in 1998 to 14.7% in 2002. No deaths were reported (Table 5.32).

Table 5.32 Results of Enterovirus 71 Testing, 1998-2002

Year	Enterovirus 71 testing		
	Number tested (cases)	Positive (cases)	Percent
1998	25	2	8.0
1999	36	3	8.3
2000	168	10	14.7
2001	397	81	20.4
2002	122	18	14.7

Source: National Institute of Health, Department of Medical Sciences, Ministry of Public Health.

3.6.3 Avian Influenza

Avian influenza has been reported in animals for over 100 years. Its outbreak occurred periodically; the last one in late 2003 though 2004 was reported in poultry in Hong Kong, South Korea, Japan, Vietnam, Cambodia, Indonesia and Thailand. The disease normally occurs in poultry, particularly chickens, and can be transmitted to humans, which can become ill and fatal. The first outbreak was reported in Hong Kong with 18 cases, 6 of whom died; then in 2003 the Netherlands reported another 83 cases and 1 death and in 2004 an outbreak was reported in Vietnam with 18 cases and 5 deaths. At present, there has been no report of human-to-human transmission of avian influenza.

In Thailand, there has never been any report on avian influenza in humans. However, it has been reported that large numbers of chickens have died in several provinces of the country. Between 21 December 2003 and 10 April 2004, cases of avian influenza were reported in several countries as shown in Table 5.33.

Table 5.33 Characteristics and Risk History of Confirmed, Suspect, Excluded, and Unidentified-Subtype Cases of Avian Influenza

Characteristic	Confirmed cases	Suspect cases	Excluded cases	Influenza A cases, subtype unidentified
No. of deaths	12/8	21/8	546/20	31/2
(case-fatality rate)	(67%)	(38%)	(4%)	(6%)
Age (median, years)	12 (2-58)	33 (1-67)	12 (0.5-84)	28 (0.5-92)
Sex: male (%)	8 (67%)	15 (71%)	321 (59%)	21 (67%)
History of direct contact with poultry suspected of or dying from avian influenza	7/12 (58%)	11/21 (52%)	205/423 (48%)	14/29 (48%)
Residing in the area with poultry dying of unusual causes over the past 14 days	21/21 (100%)	18/21 (86%)	274/404 (68%)	18/28 (64%)

Source: Bureau of Epidemiology, Department of Disease Control.