Chapter 5
Health Status and Health Problems of Thai People

1. Overall Health Status Indicators

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

1.1 Life Expectancy at Birth

In 2004, the life expectancy at birth of Thai people was 70.3 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 1964-2006, Thais' life expectancy at birth substantially increased from 55.9 years to 69.9 years for males and 62.0 years to 77.6 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).

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 (in years) of Thai people in comparison with those for other countries

Group of countries	Life expectancy at birth					Health life expectancy[6]		
	1998[1]	2001[2]	2002[3]	2003[4]	2004[5]	Both sexes	Male	Female
WHO / SEAR								
Sri Lanka	73.3	72.3	72.5	74.0	74.3	61.6	59.2	64.0
Thailand	68.9	68.9	69.1	70.0	70.3	60.1	57.7	62.4
Indonesia	65.6	66.2	66.6	66.8	67.2	58.1	57.4	58.9
Maldives	65.0	66.8	67.2	66.6	67.0	57.8	59.0	56.6
India	62.9	63.3	63.7	63.3	63.6	53.5	53.3	53.6
Bhutan	61.2	62.5	63.0	62.9	63.4	52.9	52.9	52.9
Myanmar	60.6	57.0	57.2	60.2	60.5	51.7	49.9	53.5
Bangladesh	58.6	60.5	61.1	62.8	63.3	54.3	55.3	53.3
Nepal	57.8	59.1	59.6	61.6	62.1	51.8	52.5	51.1
ASEAN								
Singapore	77.3	77.8	78.0	78.7	78.9	70.1	68.8	71.3
Brunei	75.7	76.1	76.2	76.4	76.6	65.3	65.1	65.5
Malaysia	72.2	72.8	73.0	73.2		63.2	61.6	64.8
Thailand	68.9	68.9	69.1	70.0	70.3	60.1	57.7	62.4
Philippines	68.6	69.5	69.8	70.4	70.7	59.3	57.1	61.5
Vietnam	67.8	68.6	69.0	70.5	70.8	61.3	59.8	62.9
Indonesia	65.6	66.2	66.6	66.8	67.2	58.1	57.4	58.9
Myanmar	60.6	57.0	57.2	60.2	60.5	51.7	49.9	53.5
Laos	53.7	53.9	54.3	54.7	55.1	47.0	47.1	47.0
Cambodia	53.5	57.4	57.4	56.2	56.5	47.5	45.6	49.5
High human development								
Japan	80.0	81.3	81.5	82.0	82.2	75.0	72.3	77.7
Canada	79.1	79.2	79.3	80.0	80.2	72.0	70.1	74.0
Ireland	79.1	79.6	79.9	80.7	80.9	72.8	72.1	73.6
Sweden	78.7	79.9	80.0	80.2	80.3	73.3	71.9	74.8
Switzerland	78.7	79.0	79.1	80.5	80.7	73.2	71.1	75.3
World	66.9	66.7	66.9	67.1	67.3	-	-	-
High human development	77.0	77.1	77.4	78.0	78.0	-	-	-
Medium human development	66.9	67.0	67.2	67.2	67.3	-	-	-

Source :
[1] UNDP, Human Development Report 2000.
[2] UNDP, Human Development Report 2003.
[3] UNDP, Human Development Report 2004.
[4] UNDP, Human Development Report 2005.
[5] UNDP, Human Development Report 2006.
[6] WHO, World Health Report 2003.

Table 5.2 Life expectancy at birth (in years) of Thai people

Year	Males	Females	Females-Males 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
1989[1]	65.6	70.9	5.3
1991[1]	67.7	72.4	4.7
1995-1996[1]	69.9	74.9	5.0
2005-2006[1]	69.9	77.6	7.7
2005-2010[2]	69.6	76.2	6.6
2010-2015[2]	71.3	77.5	6.3
2015-2020[2]	73.1	78.9	5.8
2020-2025[2]	74.8	80.3	5.5

Sources: [1] Reports on Population Change Surveys, 1964-1965, 1974-1976, 1985-1986, 1989, 1991, 1995, 1996 and 2005-2006. National Statistical Office.

[2] 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 9.8 per 100,000 live births in 2006 (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 at 16.3 and the 2003 study of Yongjuea Laosirithavorn[3] reported a MMR of 52.2 for the same period.

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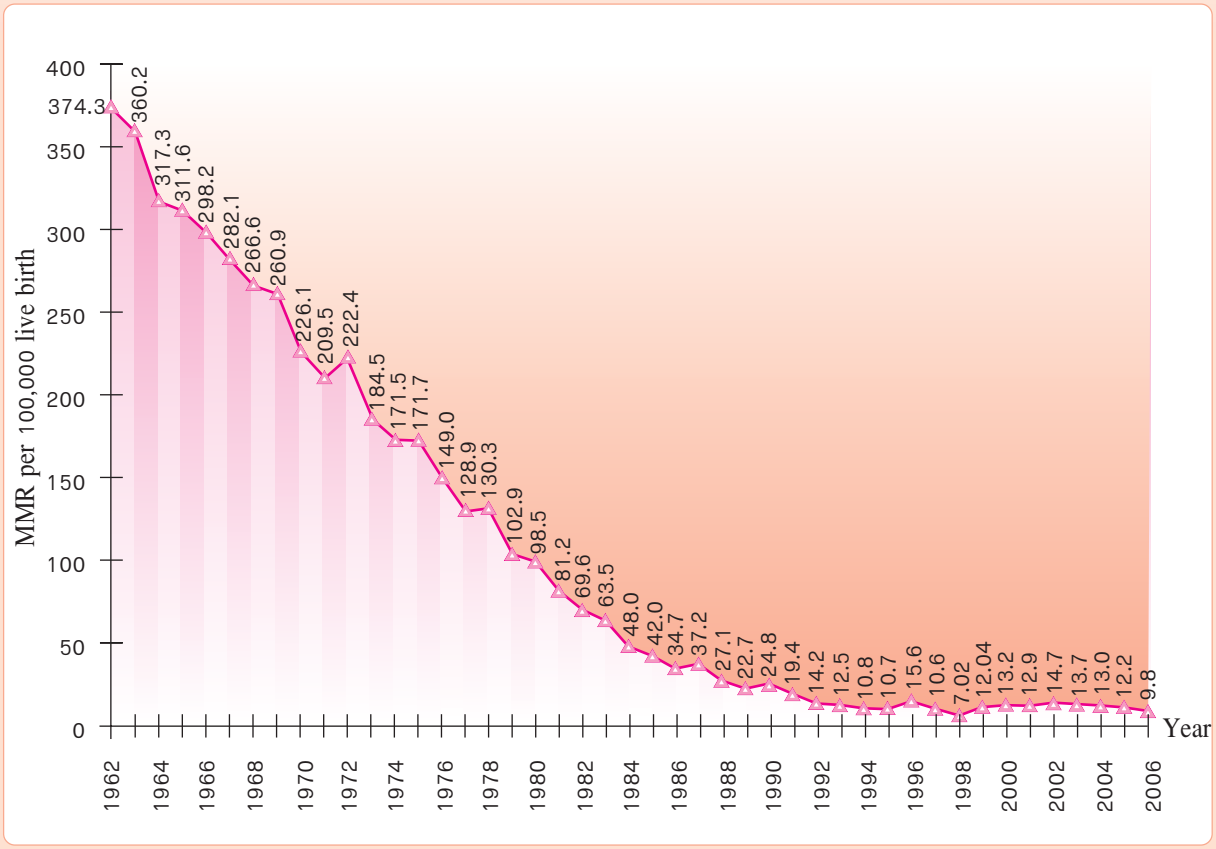
1 Survey on Mortality among Women of Reproductive Age Using the Reproductive Age Mortality Survey Method. Bureau of Health Promotion, Department of Health.

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

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

Figure 5.1 Maternal mortality ratio, Thailand, 1962-2006



Source: Bureau of Policy and Strategy, Office of the Permanent Secretary, MoPH.

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 11.3 in 2005-2006 (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).

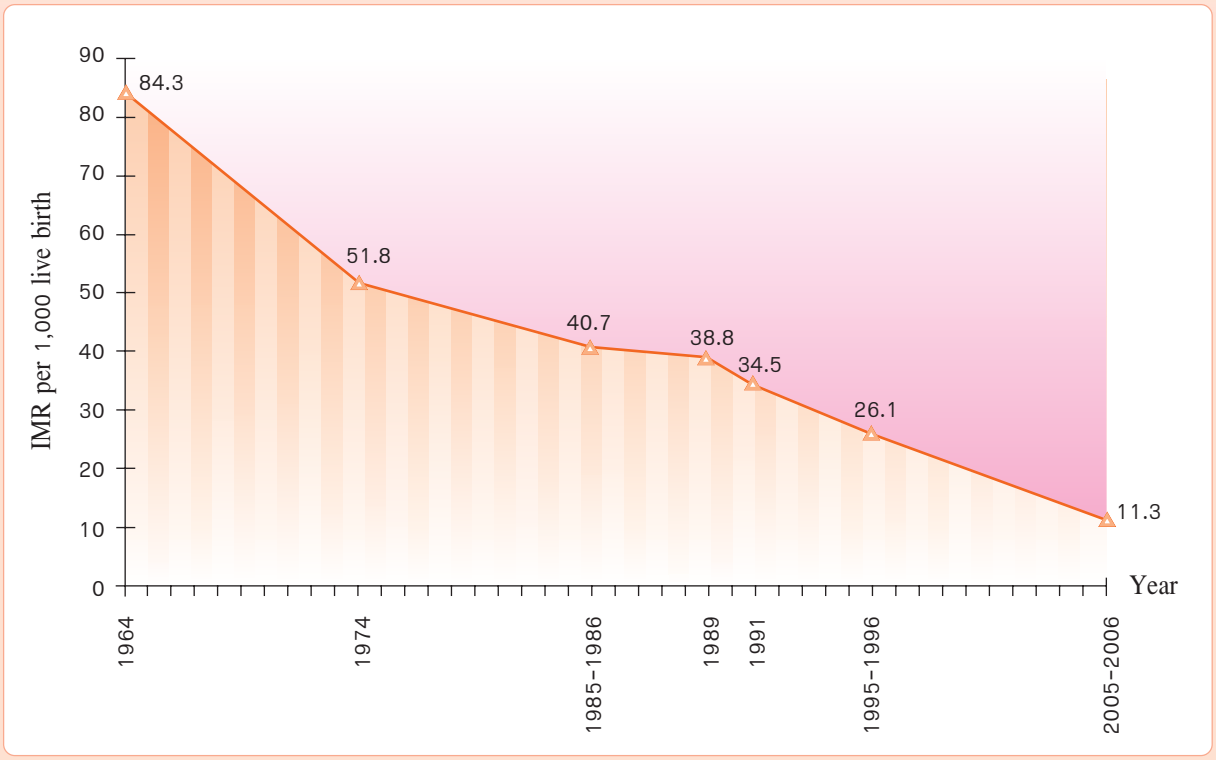
Table 5.3 Infant mortality rate and child mortality rate for Thailand in comparison with those for other countries, 1980, 2001, 2002, 2003 and 2004

Group of countries	IMP per 1,000 live births					CMR per 1,000 live births				
	1980	2001	2002	2003	2004	1980	2001	2002	2003	2004
WHO / SEAR										
North Korea	32	42	42	42	42	43	55	65	55	55
Sri Lanka	34	17	16	13	12	48	19	19	15	14
Thailand	49	24	24	23	18	58	28	28	26	21
Indonesia	90	33	32	31	30	125	45	43	41	38
Myanmar	109	77	77	76	76	134	109	108	107	106
India	115	67	65	63	62	173	93	90	87	85
Nepal	132	66	62	61	59	195	91	83	82	76
Bangladesh	132	51	48	46	56	205	77	73	69	77
ASEAN										
Singapore	12	3	3	3	3	13	4	4	5	3
Malaysia	30	8	8	7	10	42	8	8	7	12
Thailand	49	24	24	23	18	58	28	28	26	21
Philippines	52	29	28	27	26	81	38	37	36	34
Vietnam	57	30	20	19	17	70	38	26	23	23
Indonesia	90	33	32	31	30	125	45	43	41	38
Myanmar	109	77	77	76	76	134	109	108	107	106
Laos	127	87	87	82	65	200	100	100	91	83
High income										
Sweden	7	3	3	3	3	8	3	3	4	4
Japan	8	3	3	3	3	10	5	5	5	4
Switzerland	9	5	5	4	5	11	6	6	6	5
Canada	10	5	5	5	5	13	7	7	7	6
Ireland	11	6	6	5	5	14	6	6	7	6
Word	80	56	55	57	54	121	81	81	86	79
High income	13	5	5	5	6	15	7	7	7	7
Middle income	57	31	30	30	30	80	38	37	37	37
Low income	116	80	79	80	79	171	121	121	123	122

Source: World Bank, World Development Indicators, 1999, 2000/2001, 2002, 2003, 2004, 2005, 2006

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

Figure 5.2 Infant mortality rate for Thailand, 1964-2006

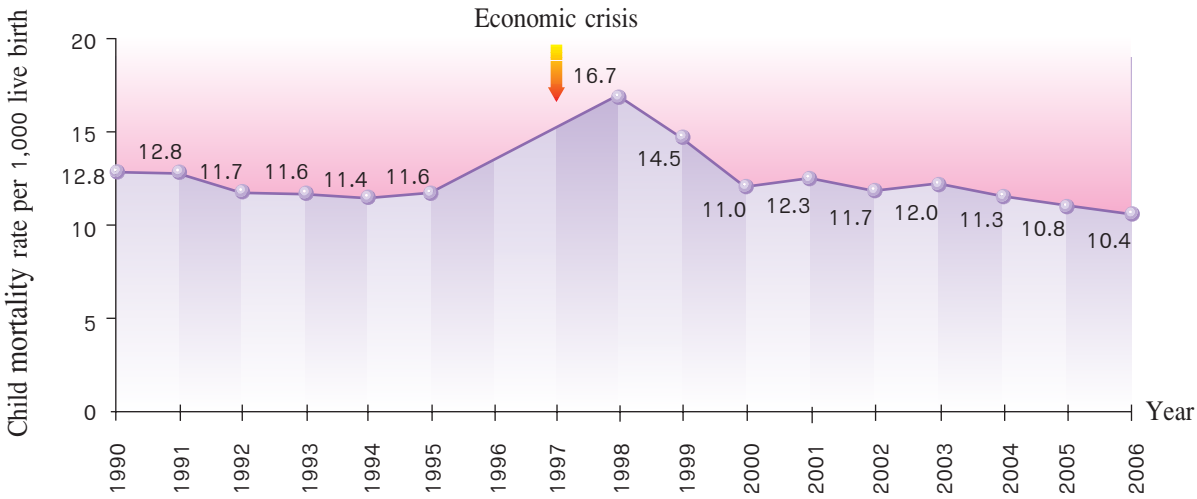


Source: Estimates were derived from the data from the Population Changes Survey. National Statistical Office.

1.4 Children Mortality Rate

The child mortality rate (among children aged under 5 years per 1,000 live births) has insignificantly changed from 12.8 in 1990 to 10.4 in 2006. 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 5.3). However, even though the Thai CMR is lower than the global average, it is still higher than that for other countries in this region such as Singapore and Malaysia (Table 5.3). It is also noted that the rate reported by the civil registration office tends to be lower than reality, whereas the rate of 15.7 was derived from the 2006 population change survey.

Figure 5.3 Child mortality rate in Thailand, 1990-2006



Source: Bureau of Policy and Strategy, Office of the Permanent Secretary, MoPH.

Note: In 1996-1997, there was some adjustment in the data processing system of the civil registration office and, as a result, there were no child death data processing for those years, possibly resulting in the higher CMR for 1998.

1.5 Causes of Death

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 number one 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 diseases of the circulatory system, followed by 16.5% for cancer/tumors in females, and 18.2% for infectious diseases, followed by 16.6% for diseases of the 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 (years)	Major causes of death	
	Males	Females
0 - 4	Low birth weight, perinatal asphyxia	Low birth weight, congenital heart defect
5 - 14	Road traffic accidents, accidental drowning	Accidental drowning, HIV/AIDS
15 - 29	Road traffic accidents, HIV/AIDS	HIV/AIDS, road traffic accidents
30 - 44	HIV/AIDS, road traffic accidents	HIV/AIDS, road traffic accidents
45 - 59	Liver/bile-duct cancer, HIV/AIDS	Cerebrovascular diseases, liver cancer
60 - 69	Liver cancer, cerebrovascular diseases	Cerebrovascular diseases, diabetes
70 - 79	Cerebrovascular diseases, chronic obstructive pulmonary disease	Cerebrovascular diseases, diabetes
80 and over	Cerebrovascular diseases, chronic obstructive pulmonary disease	Cerebrovascular diseases, ischemic heart disease

1.6 Causes of Illness

Surveys on people's illnesses conducted by the National Statistical Office between 1991 and 2006 revealed that the most prevalent illness was diseases of the respiratory tract, followed by musculoskeletal diseases and gastrointestional diseases. However, when considering the trends in illness, it was found that the prevalence of cardiovascular diseases, endocrine system diseases, allergies and neuropsychiatric diseases were on the rise (Table 5.4).

Table 5.4 Percentage of people with illnesses by major group of diseases, 1991-2006

Group of diseases	1991	1996	2001	2003	2004	2005	2006
Respiratory tract diseases	38.1	45.7	39.6	40.2	44.8	45.0	44.3
Musculoskeletal diseases	15.7	13.2	14.0	14.9	11.8	12.2	11.4
Gastrointestinal diseases	15.4	11.3	10.0	10.3	9.1	9.3	9.4
Cardiovascular diseases	3.0	6.6	6.6	6.3	5.2	5.9	6.3
Endocrine system diseases	1.4	3.3	4.7	4.4	3.1	4.4	4.1
Oral/dental, eye, ear, nose and throat diseases	4.7	3.2	3.6	2.6	3.3	3.2	2.7
Infectious diseases	2.2	2.1	1.8	1.3	2.1	1.7	0.9
Urinary tract diseases	1.4	1.8	1.3	1.3	1.1	0.9	1.0
Allergies	0.7	1.5	1.8	2.1	1.8	1.9	2.3
Neuropsychiatric diseases	0.8	1.3	1.5	1.7	1.6	1.9	2.1
Skin diseases	3.2	1.2	1.5	1.1	1.0	1.2	1.4
Female genital diseases	1.4	0.8	0.9	0.9	0.8	0.8	0.7

Source: Reports on Health and Welfare Surveys, 1991, 1996, 2001, 2003, 2004, 2005 and 2006. National Statistical Office.

1.7 Disabilities

A survey conducted by the National Statistical Office revealed that the proportion of people with disability was rising from 0.5% in 1974 to 1.7% in 2002 (Table 5.5). 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[4] (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.

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 epidemiologic transition.[5] 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 5.4).

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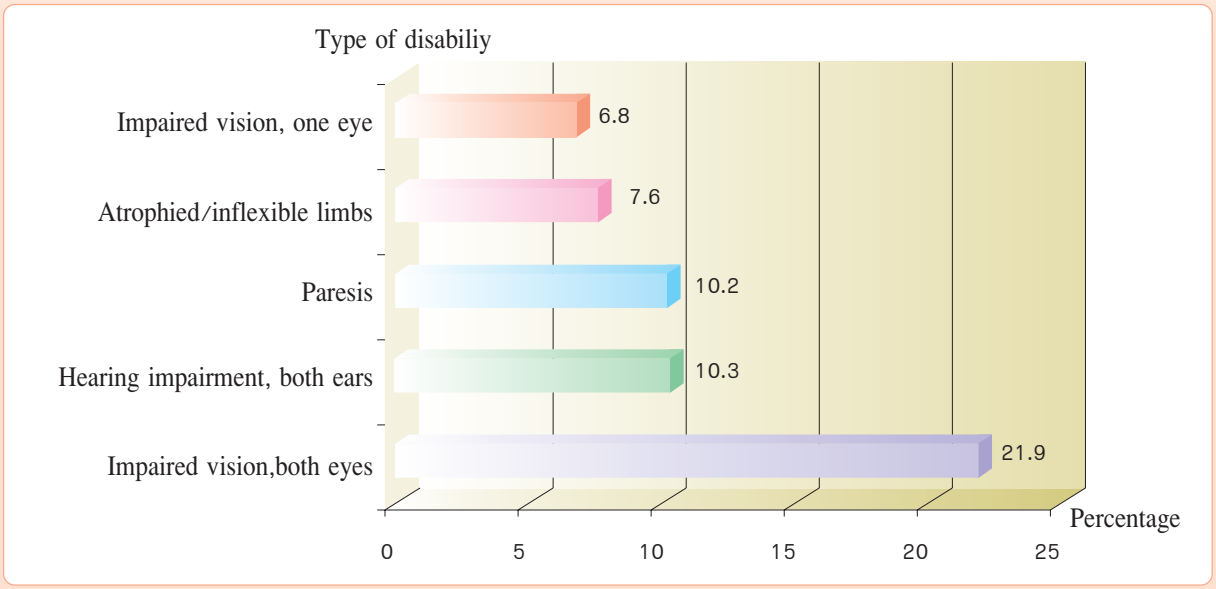
[4] Chanpen Choprapawon (editor). Report on the First Nationwide Health Examination Survey on Thai People, 1991-1992. Thai Health Research Institute and Health Systems Research Institute, 1992.

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

Figure 5.4 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 cardiovascular disease was most common (22.2%), followed by musculoskeletal diseases (19.4%), respiratory system diseases (14.8%), and neuropsychiatric disorders (11.8%). It is noteworthy that cardiovascular and neuropsychiatric diseases were more common in males, whereas musculoskeletal diseases were more common in females (Table 5.6).

Table 5.5 Number and percentage of Thai people with disabilities, 1974-2002

Year of survey	Population (thousands)	People with disabilities (thousands)	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.

Table 5.6 Proportion (percentage) of disabled persons with commonly found diseases or symptoms by sex, 2001

Disease/symptom	Total	Males	Females
- Cardiovascular diseases	22.2	25.6	18.3
- Musculoskeletal diseases	19.4	17.6	21.6
- Respiratory tract diseases	14.8	14.6	14.9
- Neuropsychiatric disorders	11.8	14.1	9.0

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

1.8 Epidemiologic Transition

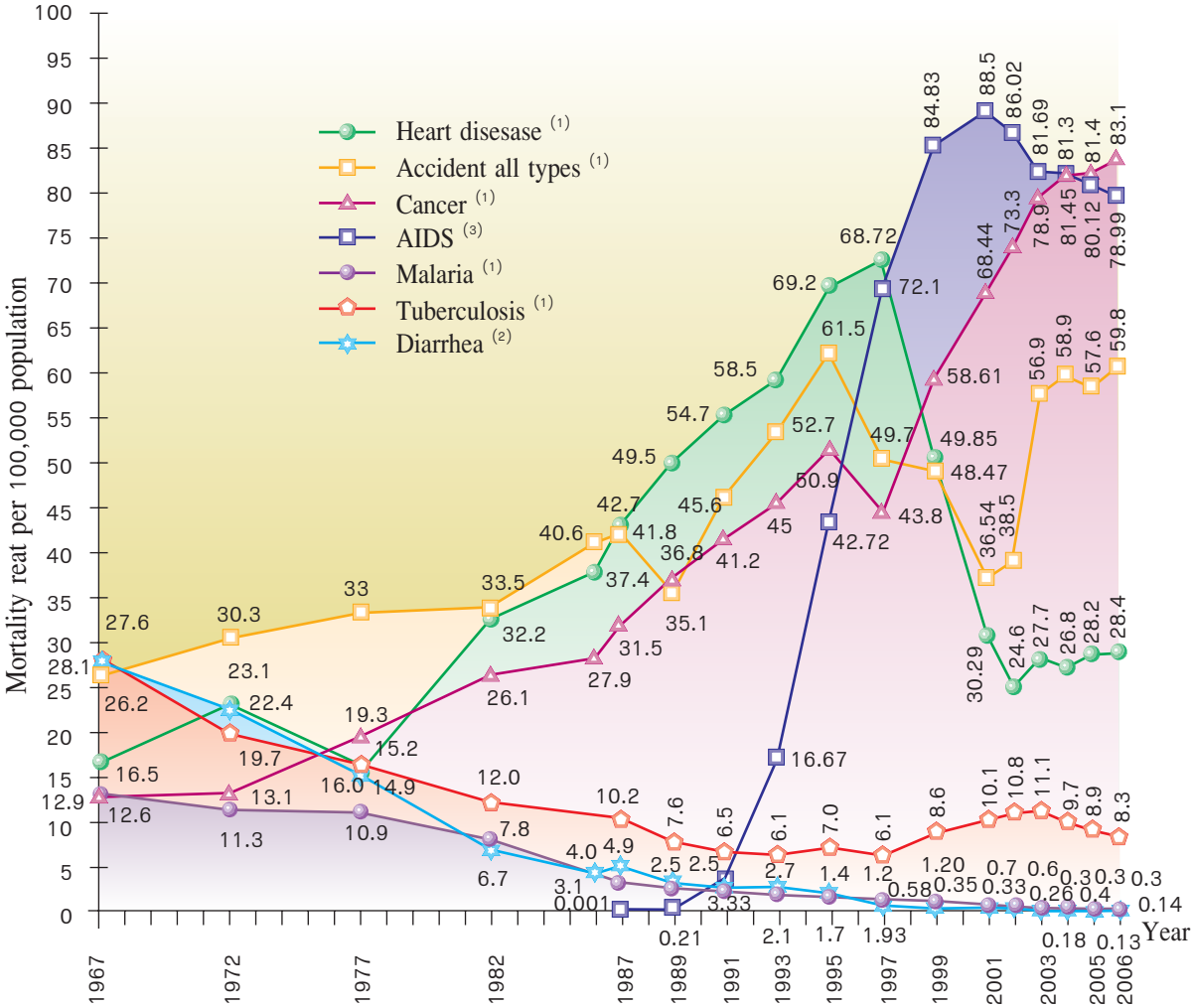
Overall, according to a death certificates analysis, the major and rising causes of death among Thai citizens are non-communicable diseases, accidents, and HIV/AIDS (which is currently a major health problem of the country). The prevalence rates of communicable diseases, which used to be significant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

Table 5.7 Percentage of causes of disability-adjusted life years (DALY) lost of Thai people by age group, 2004

Cause of DALY lost	Percentage of DALY lost by age group					
	0 - 4	5 - 14	15 - 44	45 - 59	60 and over	Total
- Communicable diseases	55.3	33.6	25.6	14.6	10.3	20.2
- Non-communicable diseases	32.9	34.7	50.7	73.7	85.8	65.1
- Accidents	11.7	31.6	23.7	11.7	3.9	14.8

Source: Working Group on Burden of Disease and Risk Factors, Thailand. International Health Policy Programme, 2006.

Figure 5.5 Mortality rates due to major causes of death, Thailand, 1967-2006



Sources: (1) Bureau of Policy and Strategy, Office of the Permanent Secretary, MoPH.

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

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

1.9 Disability-Adjusted Life Years of Thai People

In measuring the health status of Thai people using DALY[6] as the indicator, it was found that **the number one cause of DALY is HIV/AIDS for males, cerebrovascular diseases for females**, the second and third causes were road traffic injuries and alcohol abuse-related diseases respectively among males, and HIV/AIDS and diabetes respectively among females (Table 5.8).

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 perinatal asphyxia;
- Age group 15-29 years: major health problems are HIV/AIDS, road traffic injuries, drug abuse, schizophrenia, and alcohol abuse;
- Age group 30-59 years: major health problems are HIV/AIDS, road traffic injuries, diabetes, and liver cancer;
- Age group 60 years and over: major health problems are cerebrovascular diseases, emphysema, and diabetes.

Table 5.8 Major diseases attributable to disability-adjusted life years (DALY) of Thai people by sex, 2004

No.	Male			Female		
	Disease	DALYs	Percent	Disease	DALYs	Percent
1	HIV/AIDS	645,426	12.1	Cerebrovascular disease	307,131	7.9
2	Road traffic injuries	600,004	11.3	HIV/AIDS	290,711	7.5
3	Alcohol abuse	329,068	6.2	Diabetes	267,549	6.9
4	Cerebrovascular diseases	305,105	5.7	Depression	191,490	4.9
5	Liver cancer	294,868	5.5	Liver cancer	140,480	3.6
6	Ischemic heart disease	178,011	3.3	Road traffic injuries	135,832	3.5
7	Chronic obstructive pulmonary disease	175,549	3.3	Ischemic heart disease	117,790	3.0
8	Diabetes	168,702	3.2	Knee osteoarthritis	117,042	3.0
9	Depression	136,895	2.6	Chronic obstructive pulmonary disease	112,663	2.9
10	Cirrhosis	133,046	2.5	Cataract	110,572	2.8

Source: Working Group on Burden of Disease and Risk Factors, Thailand. International Health Policy Programme, 2006.

[6] Disability-Adjusted Life Years (DALY): 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".

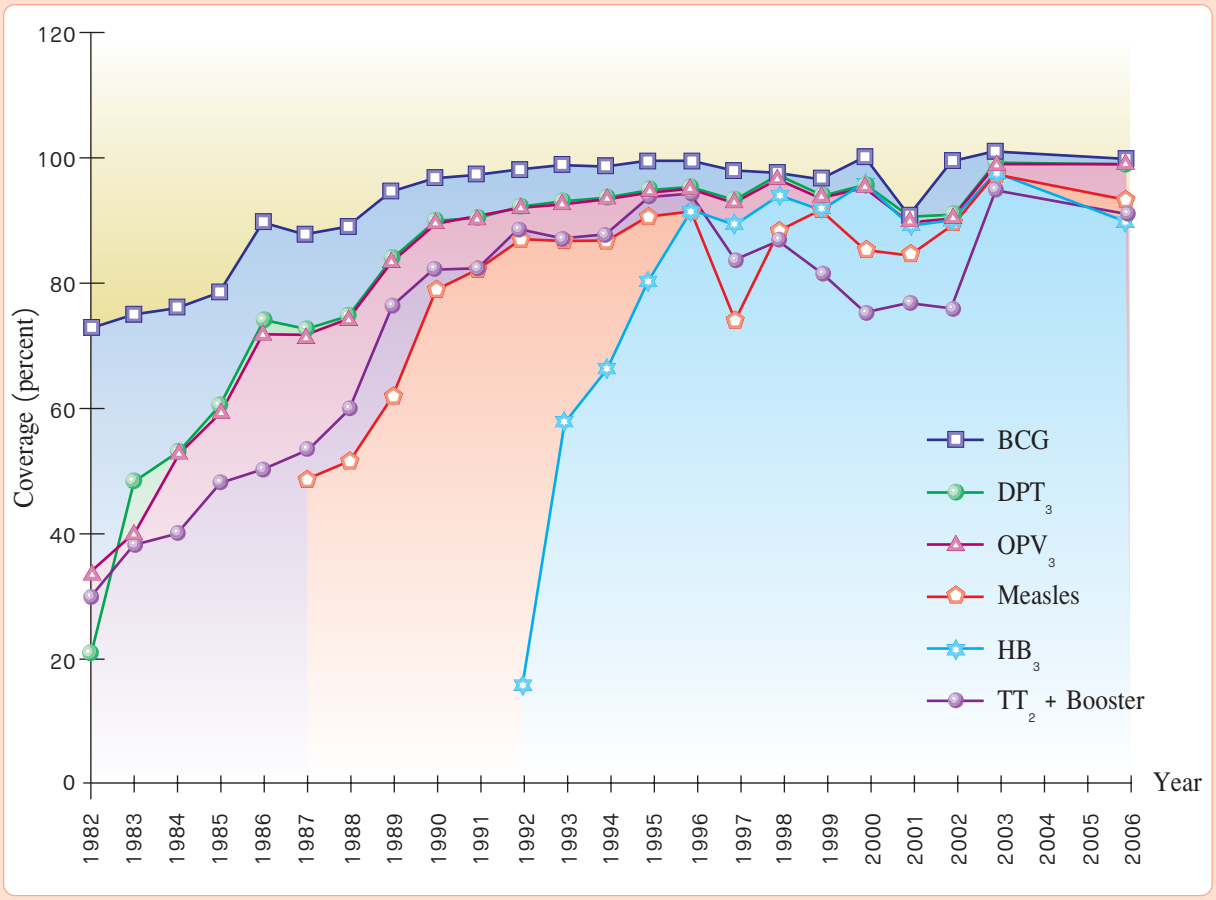
2. Major Health Problems

2.1 Communicable Diseases

2.1.1 Vaccine-preventable Diseases

Since the Ministry of Public Health launched the Expanded Programme on Immunization (EPI) in target population groups, the immunization coverage has remarkably improved (Table 5.9 and Figure 5.6).

Figure 5.6 Coverage of immunization: BCG, DPT_3, OPV_3, HB_3 measles among children and TT_2+ booster among pregnant women, 1982-2006



Sources: (1) Department of Disease Control, Ministry of Public Health.
(2) Bureau of Policy and Strategy, Office of the Permanent Secretary, MoPH.

Table 5.9 Coverage of immunization against vaccine-preventable diseases in different target groups, 1982-2006

Activity	Coverage (percent) in fiscal year																					
	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]	2003[3]	2006[4]
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	99.5	98.0
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	97.6	97.1
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	97.6	97.6
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	96.1	91.4
HB_3 (%)	-	-	-	-	-	-	-	-	-	-	15.4	57.1	65.5	79.3*	90.7	88.5	93.0	90.4	94.9	87.9	88.8	96.0	88.3
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	93.3	89.2

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, Office of the Permanent Secretary MoPH.

* Data from the 1st Provincial Health Survey (1995).

[3] Data for 2003 were derived from the survey on coverage of the basic immunization program and the polio immunization campaign, 2003. Department of Disease control, MoPH.

[4] Data for 2006 were derived from the child situation survey, Thailand, Dec 2005-Feb 2006. National Statistical Office.

As a result of such a high immunization coverage, the morbidity rates of vaccine-preventable diseases have a tendency to decline (Table 5.10 and Figure 5.8), However, it is noteworthy that in 2001-2002, the incidence of measles increased slightly partly due to an epidemic among the hilltribe people (Figure 5.7).

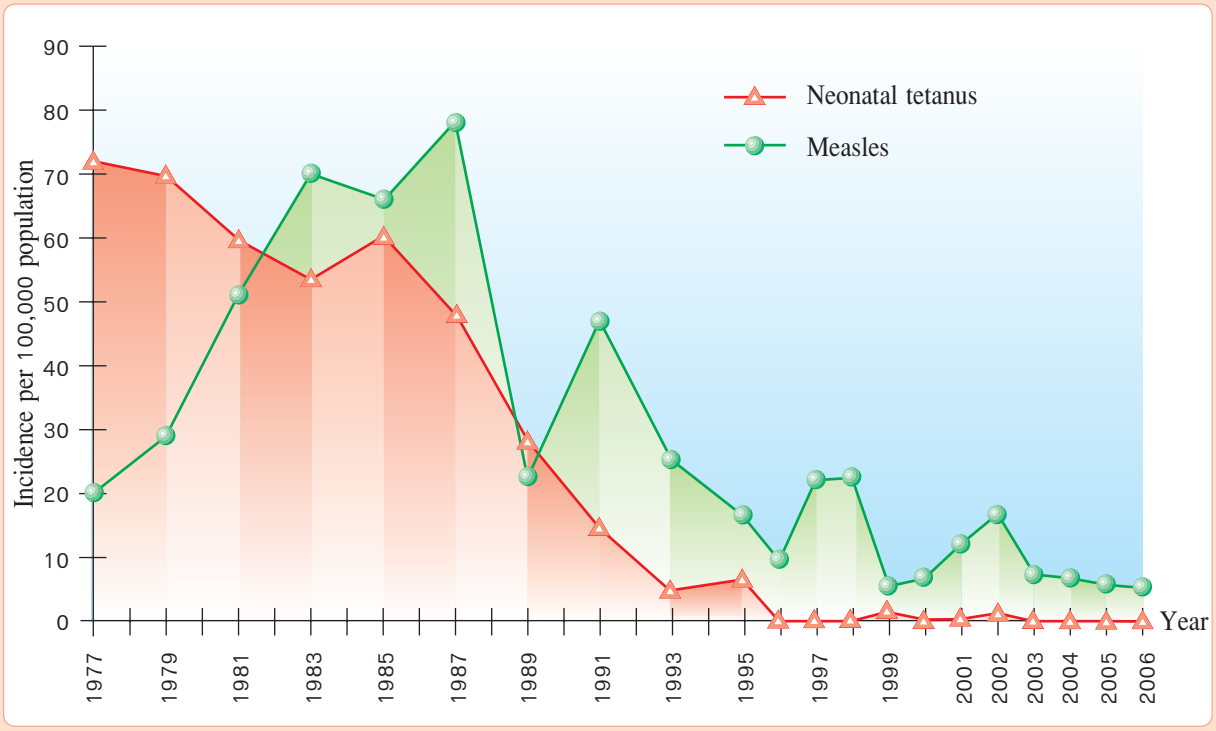
Besides, it was noted that hepatitis B infection had a rising incidence, probably resulting from a more extensive surveillance effort (Figure 5.9).

Table 5.10 Incidence rates of major vaccine-preventable diseases in Thailand, 1977-2006

Incidence of vaccine-preventable diseases per 100,000 population						
Year	**Measles**	**Neonatal tetanus**	**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
2004	6.66	0.02	0.02	0.03	0.00	4.54
2005	5.67	0.01	0.00	0.04	0.00	4.41
2006	5.31	0.00	0.00	0.11	0.00	5.48

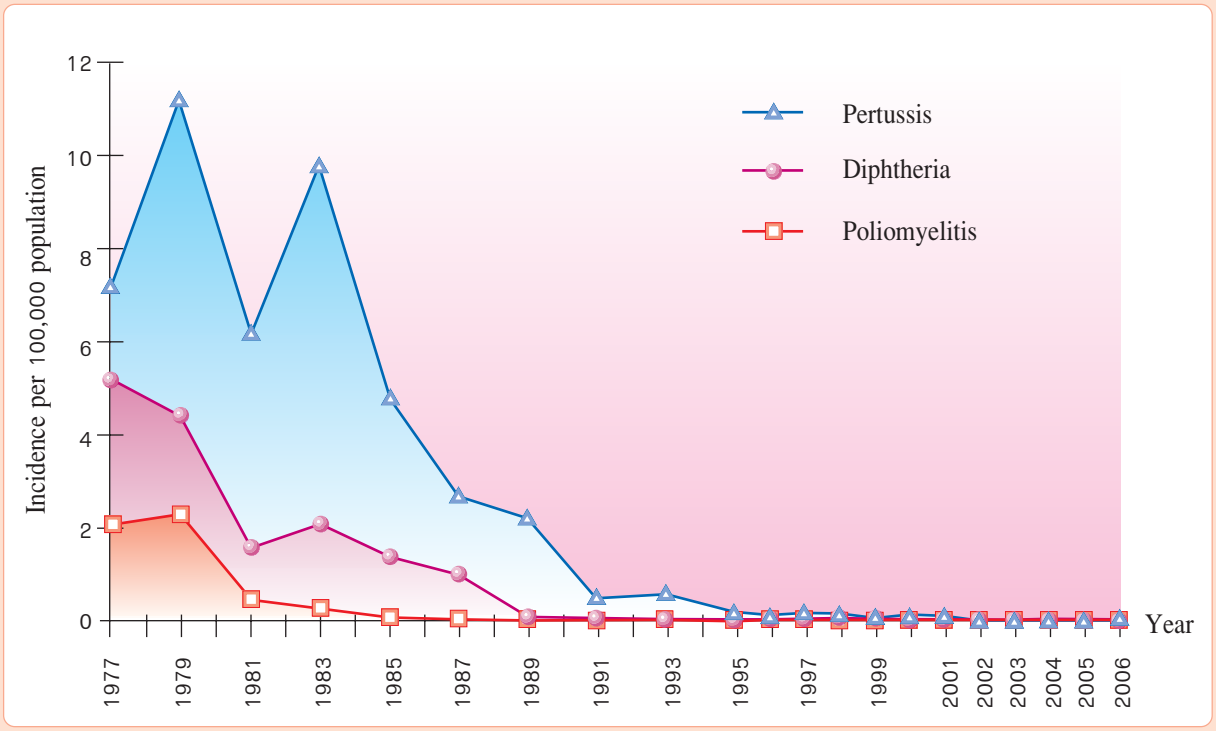
Source: Bureau of Epidemiology, Department of Disease Control, MoPH.

Figure 5.7 Incidence of neonatal tetanus and measles in Thailand, 1977-2006



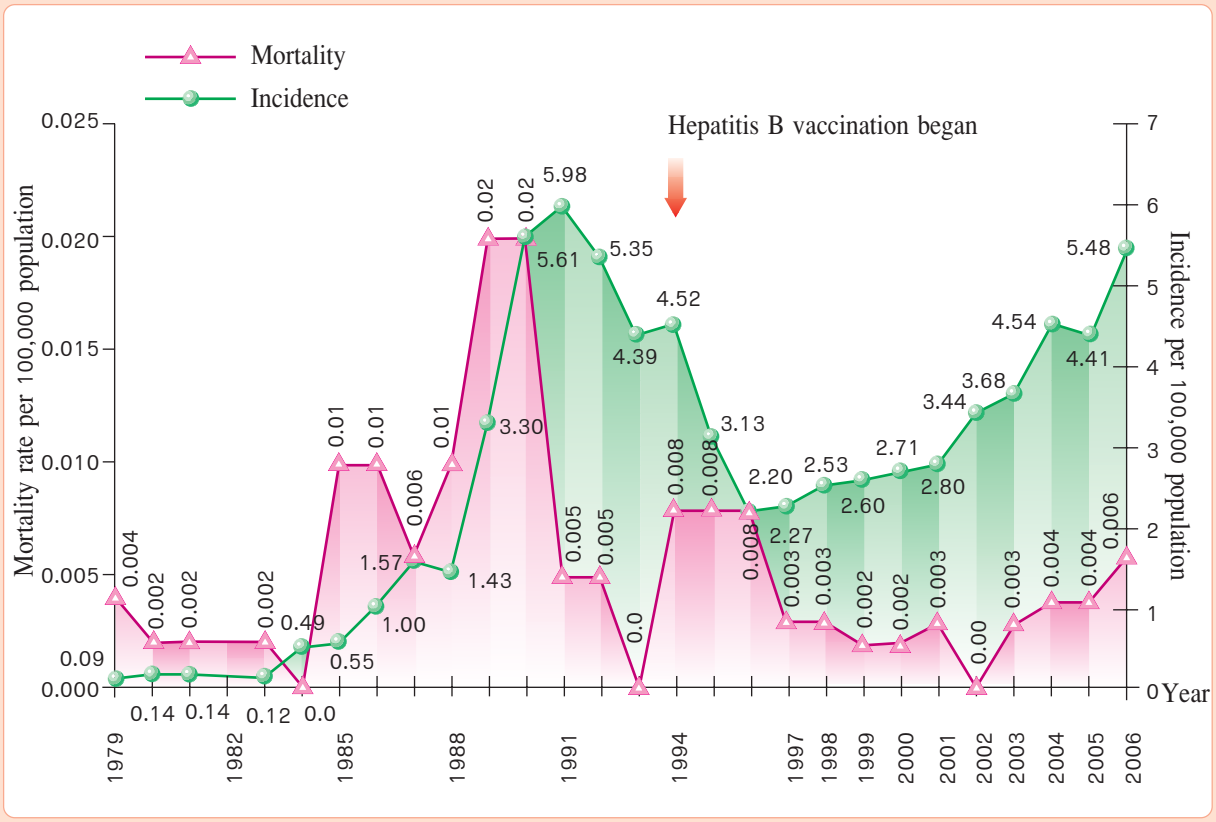
Source: Bureau of Epidemiology, Department of Disease Control.

Figure 5.8 Incidence of pertussis, diphtheria, and poliomyelitis in Thailand, 1977-2006



Source: Bureau of Epidemiology, Department of Disease Control.

Figure 5.9 Incidence and mortality rates of hepatitis B in Thailand, 1979-2006



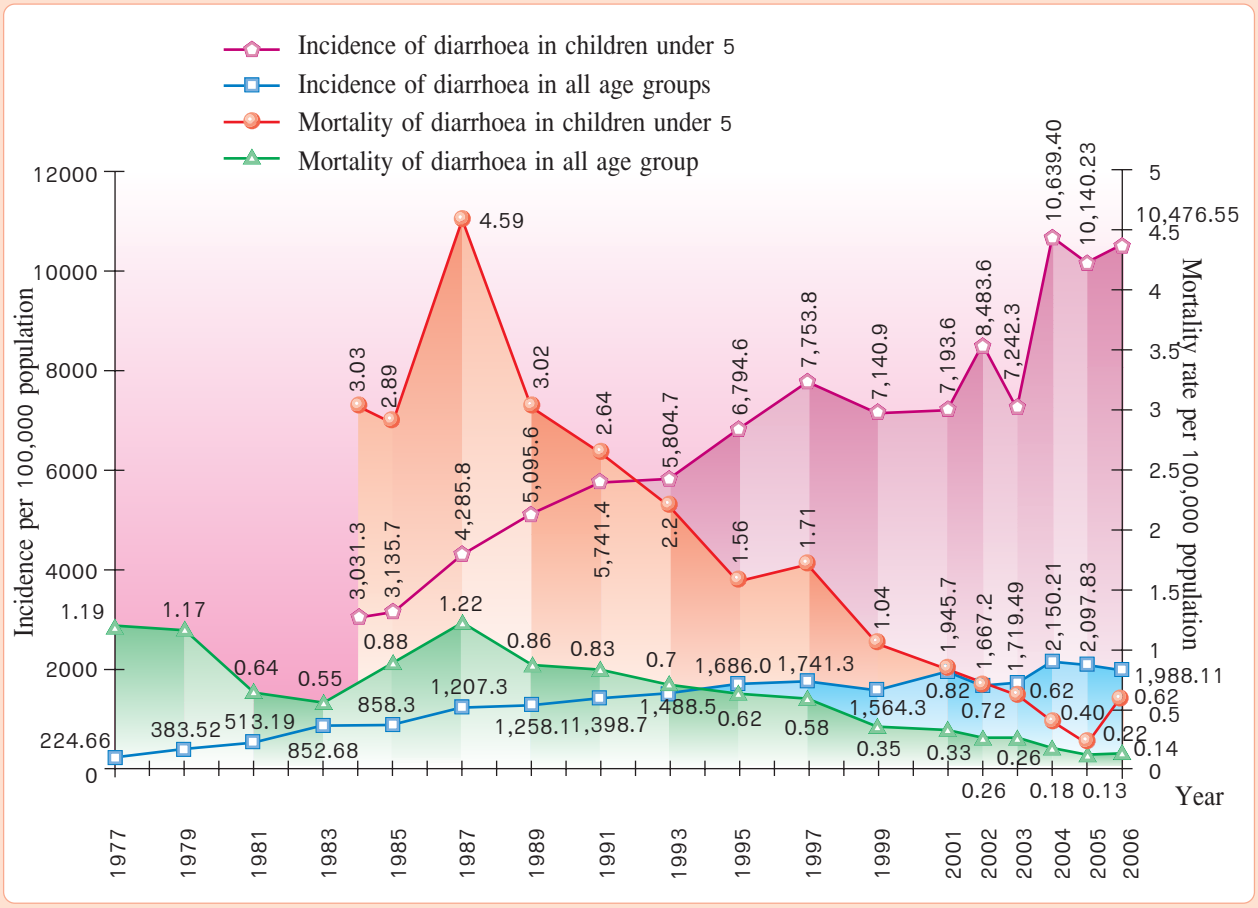
Source: Bureau of Epidemiology, Department of Disease Control.

2.1.2 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 5.10). A recent provincial health status survey revealed that the diarrhoea incidence in children was declining from 6.0 episodes/person/ year in 1995 to 3.6 episodes/person/year in 2001.[7] Nevertheless, the incidence was 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 and extensive coverage health services as well as the success of the campaign on oral rehydration therapy (ORT).

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

Figure 5.10 Incidence and mortality rates of diarrhoea in Thailand, 1977-2006



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

Type of areas	Illness (episodes/person/year)			
	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.

2.1.3 Helminthiasis

Overall, the prevalence of intestinal parasitic diseases has been declining, except for liver fluke whose prevalence is relatively increasing in the North (Table 5.12). 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.[8]

However, another report on helminthiasis surveillance in Nan province, under the Phufa Development Programme according to the initiation of HRH Princess Maha Chakri Sirindhorn, between 2002 and 2004, revealed that among three groups of people (primary schoolchildren, students at the Hilltribe Community Learning Centre, and the general public) the people in that locality still have helminthic diseases at a prevalence rate higher than the set target of 20% (Table 5.13).

Table 5.12 Prevalence rates 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.

[8] 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.

Table 5.13 Prevalence of helminthiasis in Nan province

Helminthiasis	Prevalence (percent) in population groups								
	2002			2003			2004		
	1	2	3	1	2	3	1	2	3
Liver and intestinal fluke infections	22.5	1.0	65.3	19.6	3.4	58.4	5.5	1.6	42.1
Hookworm infection	41.4	37.0	45.8	25.0	14.1	44.1	21.5	9.1	38.3
Ascariasis (roundworm)	35.5	88.0	12.4	38.1	86.9	19.5	49.3	60.5	27.3
Trichuriasis (whipworm)	37.9	62.5	6.8	37.3	48.3	12.1	47.3	63.4	13.7
Enterobiasis (pinworm)	1.9	0.8	1.2	1.2	0.2	0.2	1.5	0.3	0.9
Taeniasis (tapeworm)	0.2	0.0	4.2	0.4	0.0	3.6	0.1	0.0	4.2

Source: Report on helminthiasis surveillance in Nan province, under the Phufa Development Programme according to the initiation of HRH Princess Maha Chakri Sirindhorn, between 2002 and 2004.

Note: Population groups:

1 = primary schoolchildren;

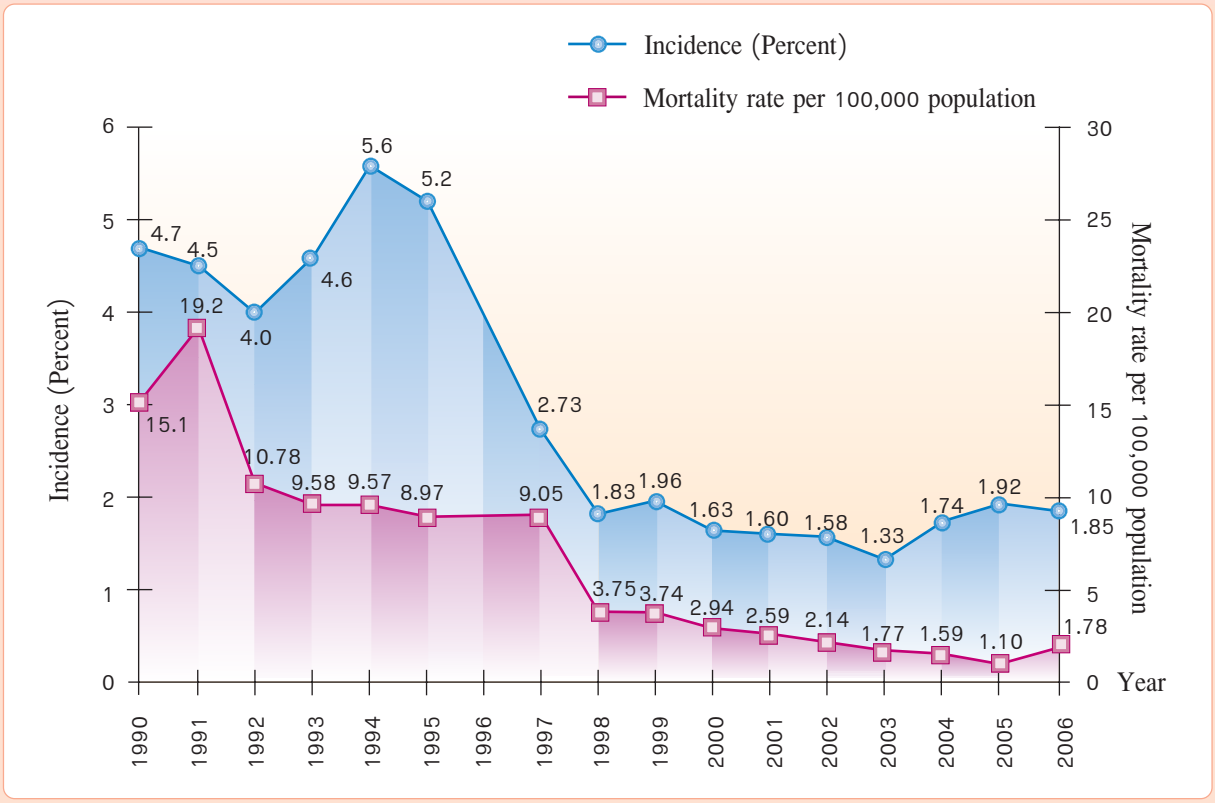
2 = students at Hilltribe Community Learning Centre; and

3 = general public.

2.1.4 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 1.85% in 2006; and its mortality rate (per 100,000 population) has steadily dropped from 15.1 in 1990 to 1.78 in 2006 (Figure 5.11).

Figure 5.11 Incidence and mortality of pneumonia in children under five in Thailand, 1990-2006

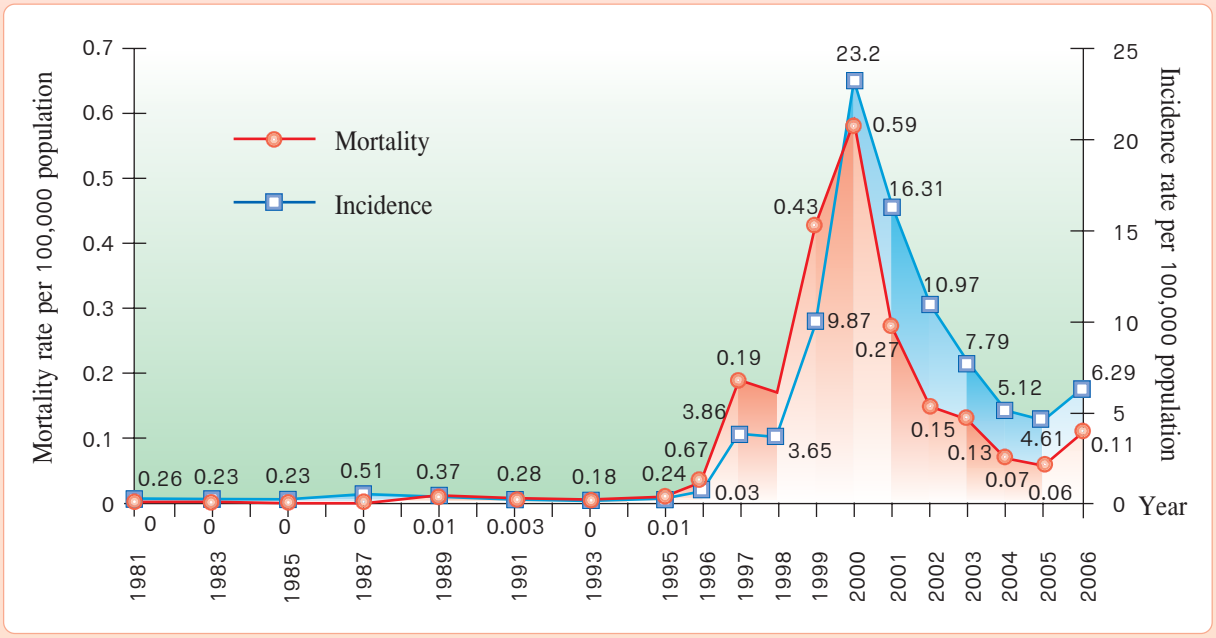


Sources: (1) Department of Disease Control, Ministry of Public Health.
(2) Bureau of Epidemiology, Department of Disease Control.

2.1.5 Leptospirosis

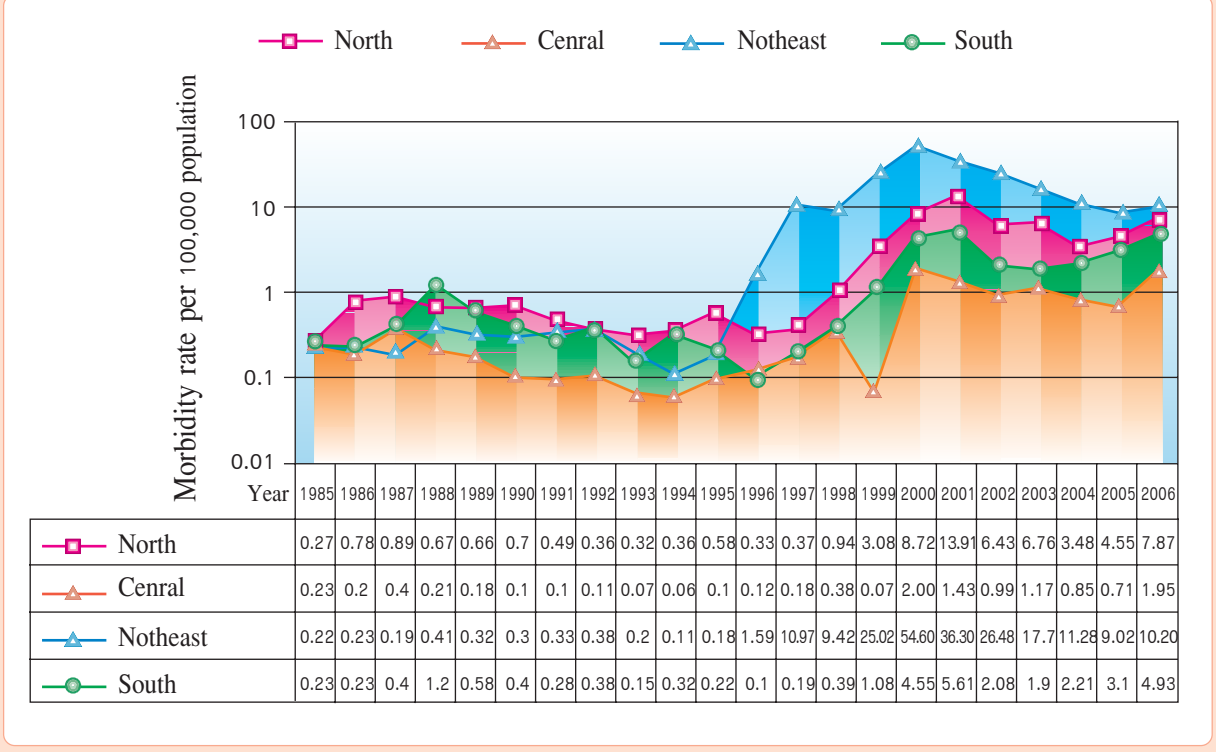
Leptospirosis is a re-emerging infectious disease having an incidence rate between 0.2 and 0.7 per 100,000 population during the period 1981-1996. But the incidence and mortality rates was on the rise, i.e. the incidence per 100,000 population rising from 0.67 in 1996 to 23.2 in 2000, but dropping to 6.29 in 2006 (Figure 5.12). Over 90% of the patients live in the Northeastern region of the country (Figure 5.13). However, for the period 2001-2006, both the incidence and mortality rates were declining.

Figure 5.12 Incidence and mortality rates of leptospirosis in Thailand, 1981-2006



Source: Bureau of Epidemiology, Department of Disease Control.

Figure 5.13 Morbidity rate of leptospirosis by region in Thailand, 1985-2006



Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
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	3.48	4.55	7.87
Cenral	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	0.85	0.71	1.95
Notheast	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	11.28	9.02	10.20
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	2.21	3.1	4.93

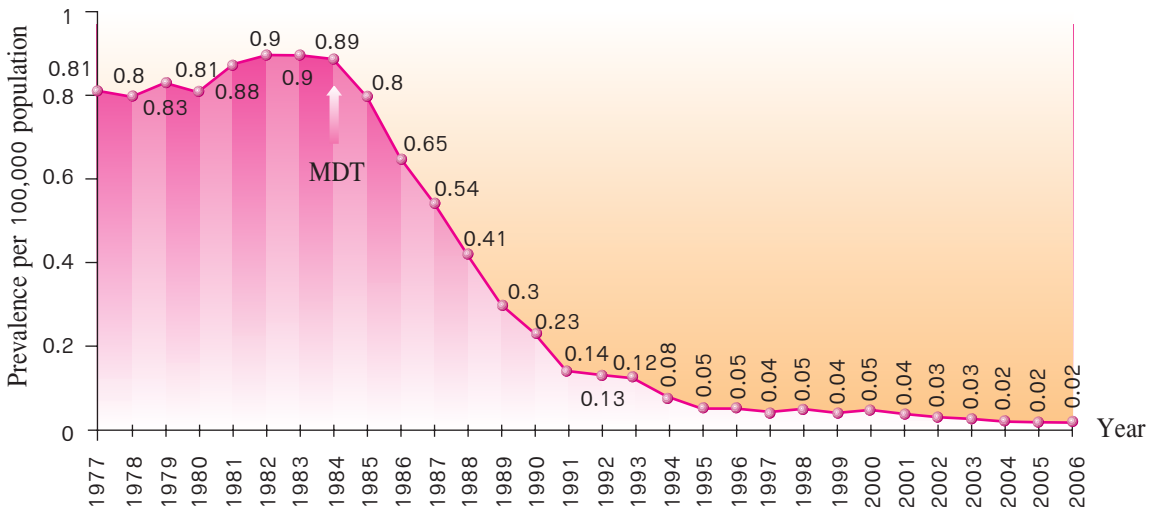
Source: Bureau of Epidemiology, Department of Disease Control.

2.1.6 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 0.02 per 1,000 population in 2006 - a nearly 100-fold reduction (Figure 5.14). 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 5.14 Incidence of Leprosy in Thailand, 1977-2006



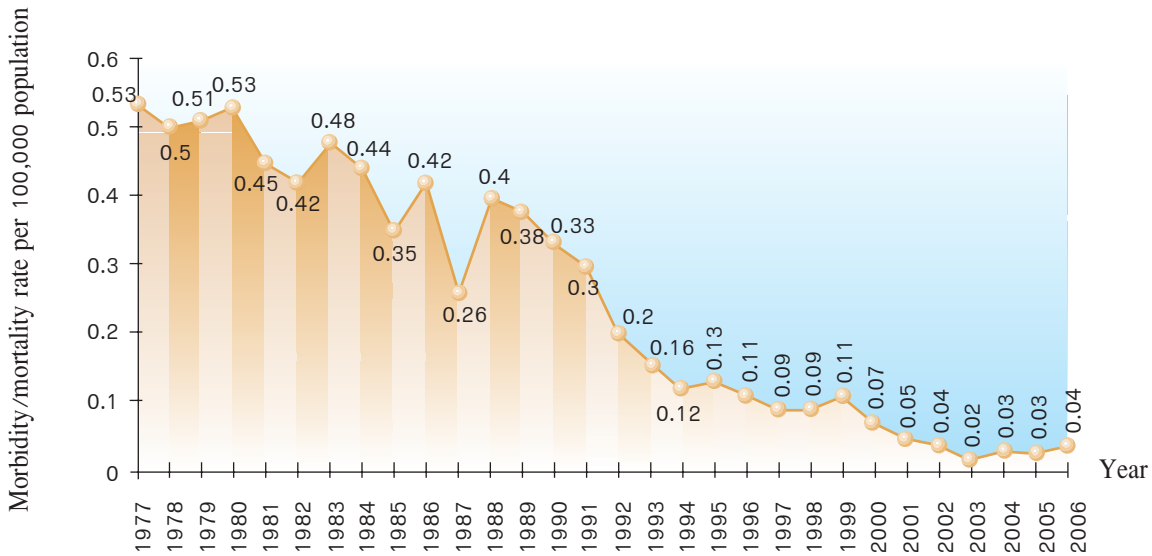
Source: Department of Disease Control, Ministry of Public Health.

Note: MDT = Multiple-drug therapy

2.1.7 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 0.04 per 100,000 population in 2006 (Figure 5.15).

Figure 5.15 Morbidity/mortality rate of rabies in Thailand, 1977-2006



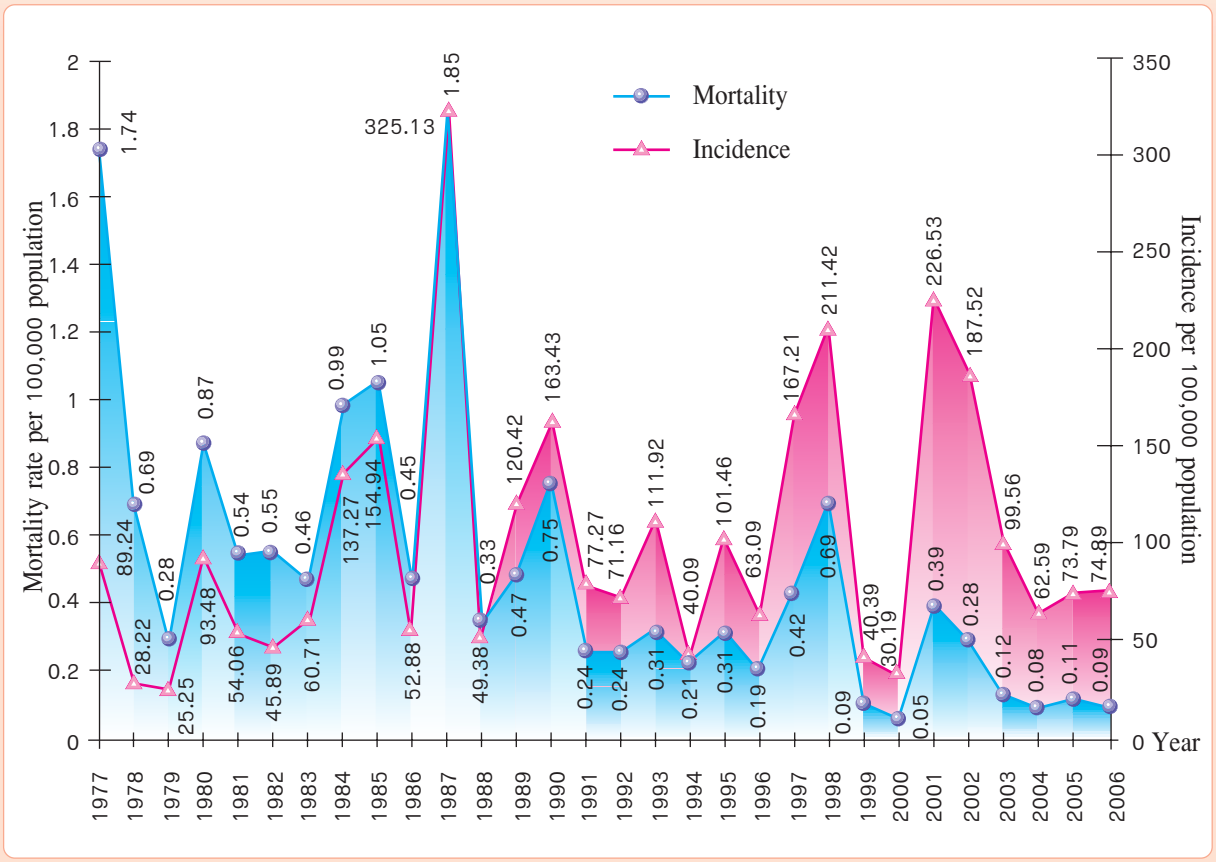
Source: Bureau of Epidemiology, Department of Disease Control.

2.2 Vector-Borne Diseases

2.2.1 Dengue Haemorrhagic Fever

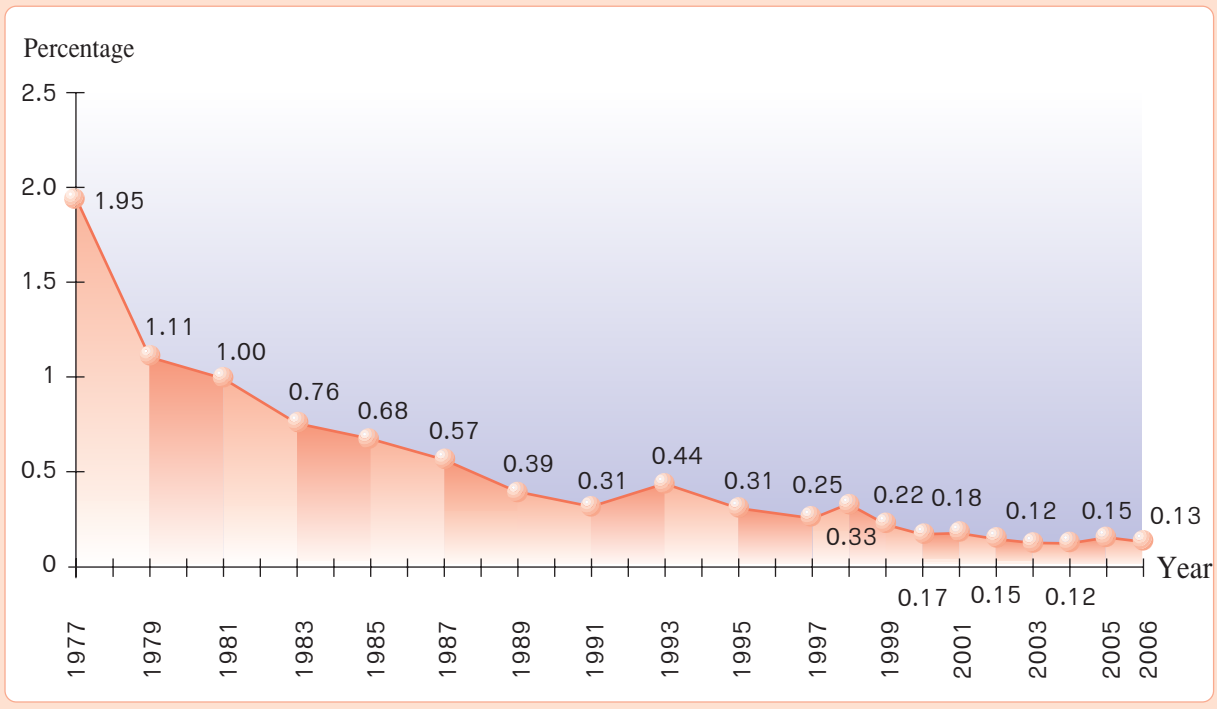
Dengue haemorrhagic fever has been a major public health problem of the country over the past 30 years without a declining trend. In particular, for the periods 1997- 1998 and 2001-2002, there was a rising trend with epidemics occurring for two years and non-epidemic for the following two years. However, the DHF case-fatality rate has been declining (Figure 5.16).

Figure 5.16 Incidence and mortality rates of dengue haemorrhagic fever, Thailand, 1977-2006



Source: Bureau of Epidemiology, Department of Disease Control.

Figure 5.17 Case-fatality rate of dengue haemorrhagic fever, 1977-2006

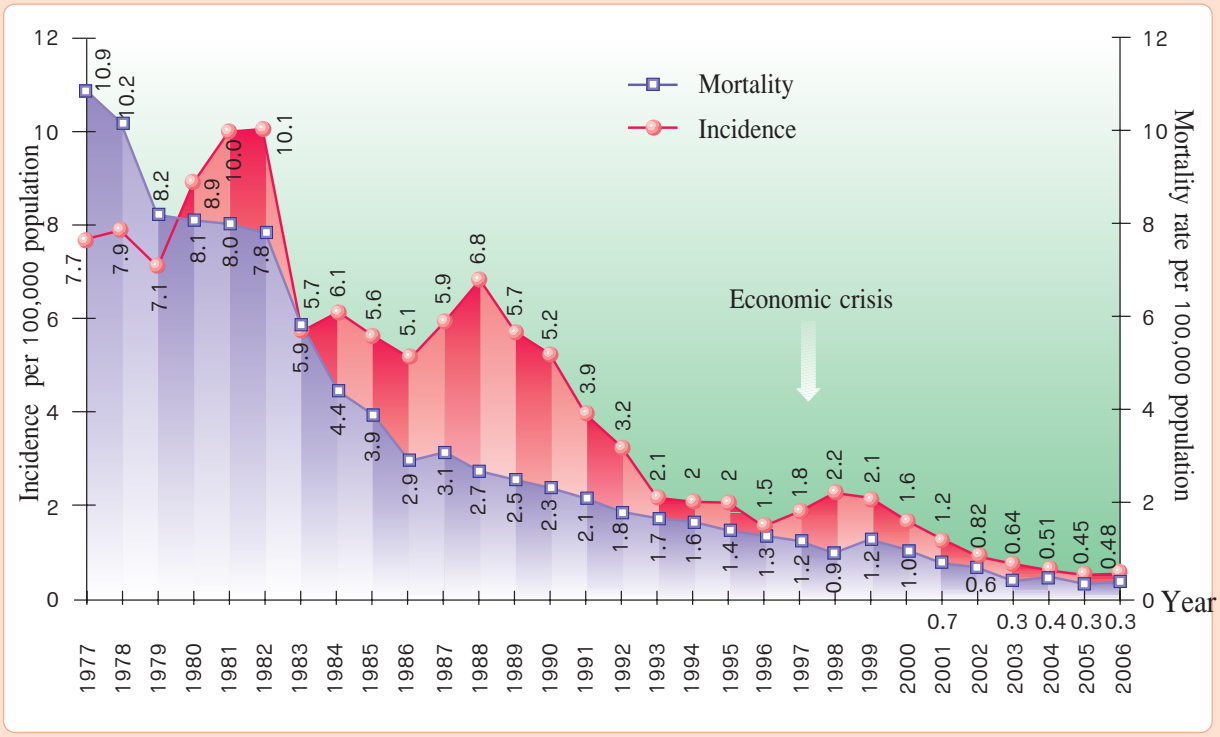


Source: Bureau of Epidemiology, Department of Disease Control.

2.2.2 Malaria

Thailand has succeeded, to a certain extent, in controlling malaria, leading to a considerable reduction in incidence and mortality rates (Figure 5.18). 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 related to the discontinuation of DDT spraying, EI Nino phenomena and the restructuring of communicable disease control programmes. As a result, Malaria Units were upgraded/restructured 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 5.18 Incidence and mortality rates of malaria in Thailand, 1977-2006

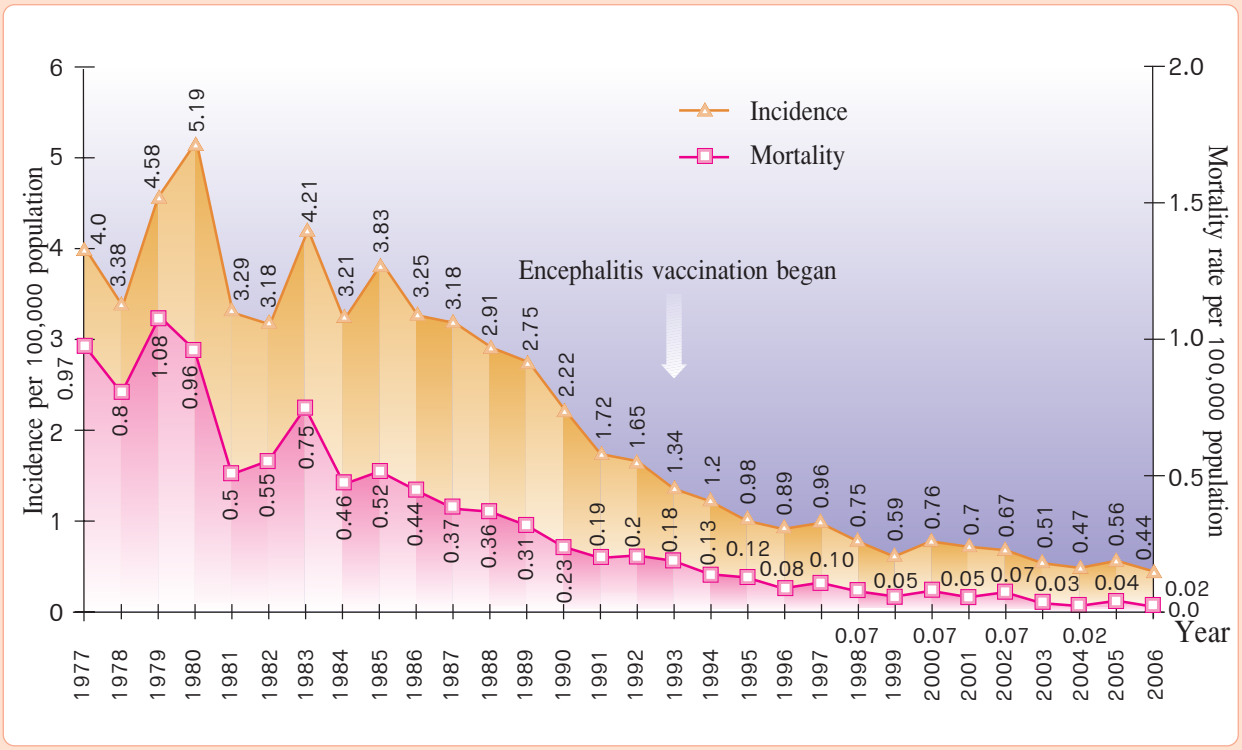


Sources: (1) Department of Disease Control, Ministry of Public Health.
(2) Bureau of Policy and Strategy, Ministry of Public Health.

2.2.3 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 5.19). In 2006, the incidence of encephalitis was recorded at 0.44 per 100,000 population and the mortality at 0.02 per 100,000 population.

Figure 5.19 Incidence and mortality rates of encephalitis in Thailand, 1977-2006

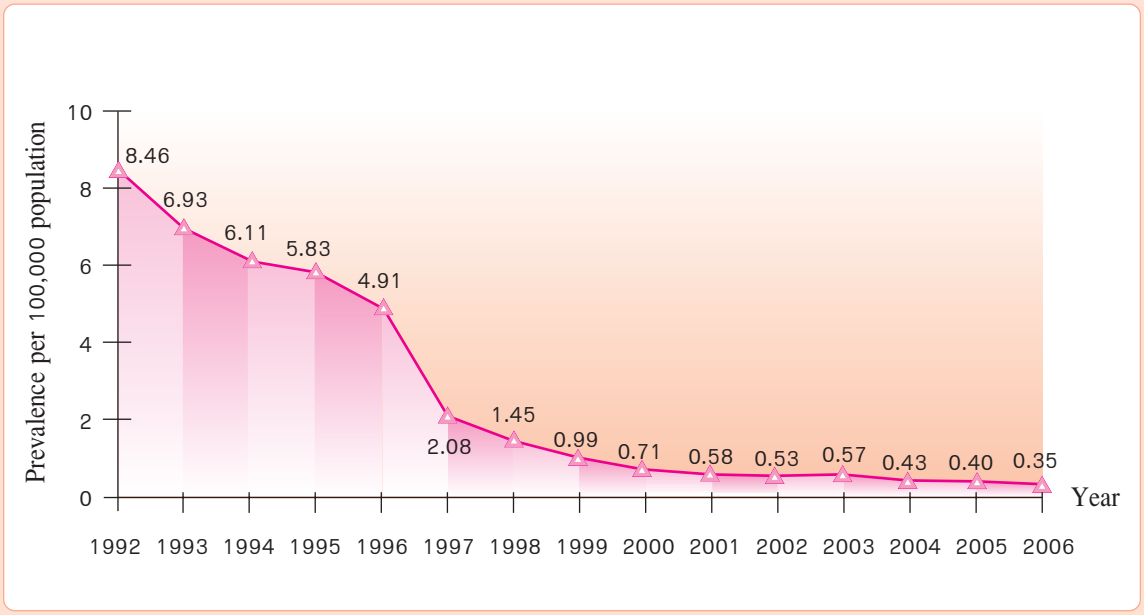


Source: Bureau of Epidemiology, Department of Disease Control.

2.2.4 Filariasis

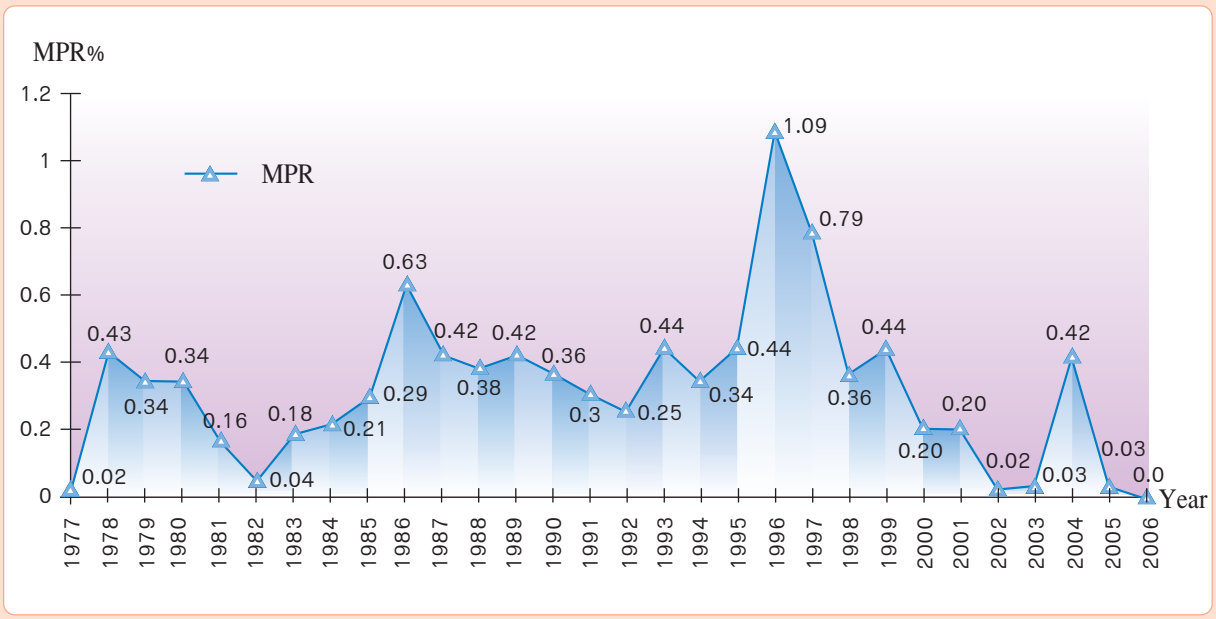
Overall, the filariasis control efforts have been able to reduce the prevalence rate (per 100,000 population) from 8.46 in 1992 to 0.35 in 2006 (Figure 5.20) and reduce the microfilaria positivity rate in alien workers to less than 1% over the period of almost 30 years (1977-2006), except that in 1996 the rate was greater than 1% as a result of intensive health checkups for foreign workers (Figure 5.21). 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 especially from Myanmar cross over to find jobs in Thailand.

Figure 5.20 Prevalence rate of filariasis, Thailand, 1992-2006



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

Figure 5.21 Microfilaria positivity rate in alien workers, 1977-2006



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

2.3 HIV/AIDS, Tuberculosis and Sexually Transmitted Infections

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 1989-2006, the situation and trends can be summarized as follows:

Blood Donors. The prevalence increased from 0.28% in 1989 to the peak of 0.81% in 1992, and then gradually dropped to 0.29% in 2006 (Figure 5.22).

Pregnant Women Attending Antenatal Care Clinics. The prevalence climbed from 0.68% in 1991 to the peak of 2.29% in 1995, and then gradually reduced to 0.87% in 2006 (Figure 5.22).

Injecting Drug Users. The prevalence was approximately 30-43% throughout the period 1989-1997. After 1997, the prevalence rose to the peak of 50.77% in 1999, and fell to 36.33% in 2006 (Figure 5.23).

Male Clients Attending STI Clinics. The prevalence jumped from 2.50% in 1990 to the peak of 8.5% in 1994 and remained stable at 7-9% during 1995-1999, but declined to 3.39% in 2006 (Figure 5.23).

Direct Female Commercial Sex Workers (CSWs). The prevalence rose from 3.47% in 1989 to the peak of 33.15% in 1994, and fell to 4.59% in 2006 (Figure 5.23).

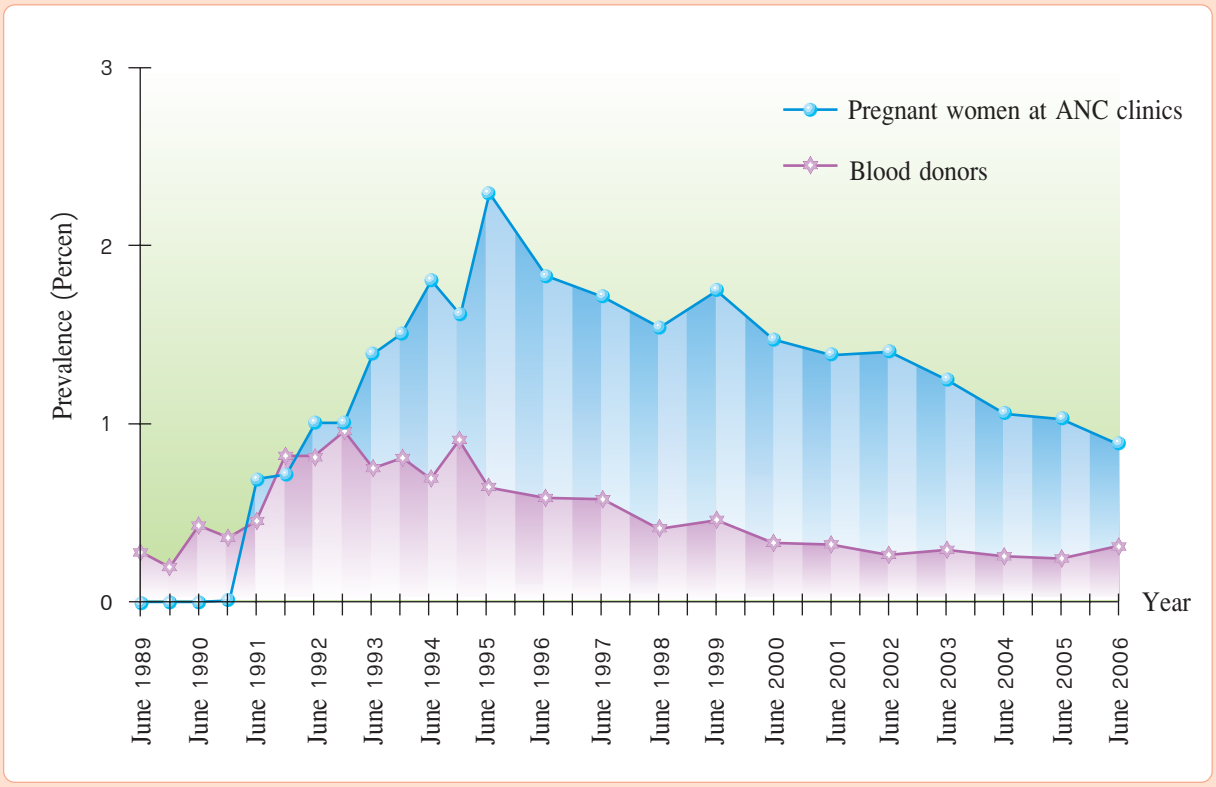
Indirect Female CSWs. The prevalence escalated from 2% in 1990 to the peak of 10.14% in 1996. Since then the rate has gradually declined to 2.27% in 2006 (Figure 5.23).

Military Recruits or Conscripts. The prevalence increased from 1.6% in 1990 to the peak of 4% in 1993, and since then has dropped to 0.4% in 2006 (Figure 5.24).

It is noteworthy that 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.

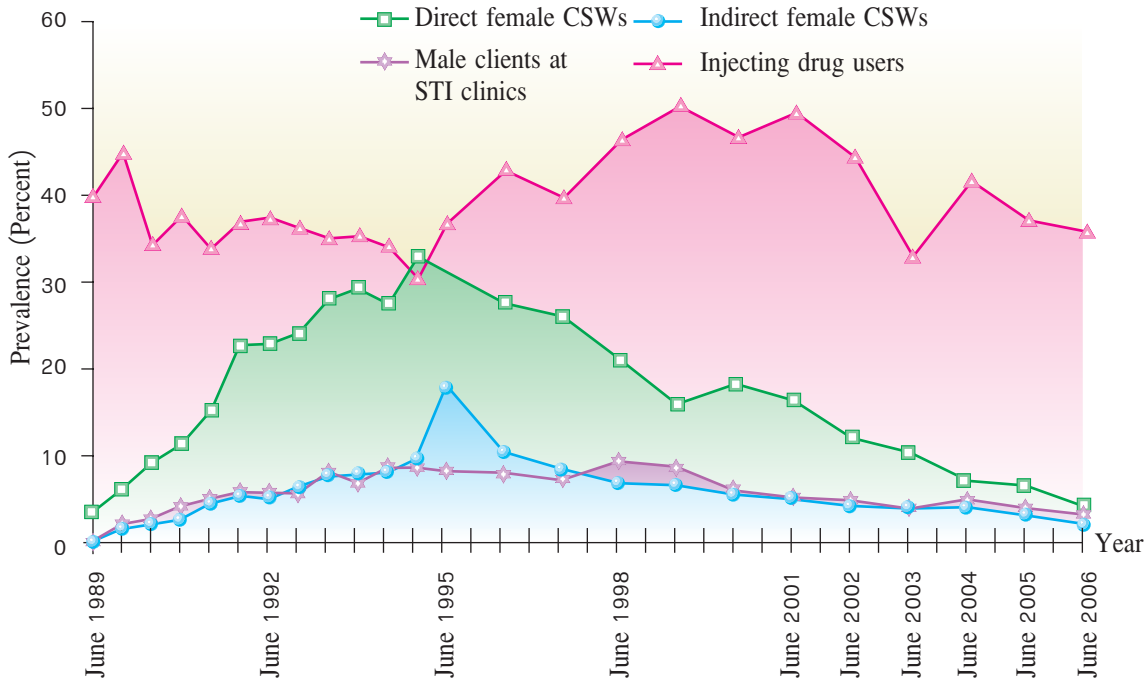
Nevertheless, the reduction in the HIV transmission in the heterosexual group during 1995-1996 was possibly a result of intensive health education campaigns among the high-risk group, coupled with the 100% condom use campaigns among female CSWs (Figure 5.29).

Figure 5.22 Prevalence of HIV infections in blood donors and pregnant women at the ANC clinics in government hospitals, 1989-2006



Source: Bureau of Epidemiology, Department of Disease Control.

Figure 5.23 Prevalence of HIV infections in direct and indirect female CSWs, male clients at STI clinics, and injecting drug users, Thailand, 1989-2006

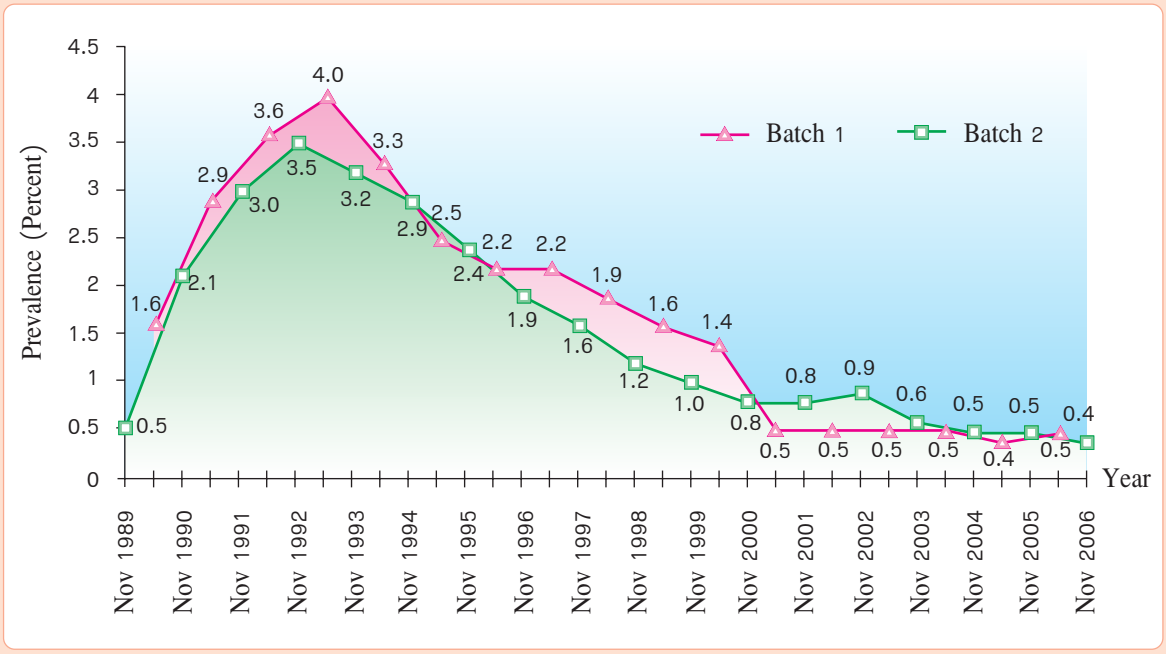


Group	June 1989	June 1990	June 1991	June 1992	June 1993	June 1994	June 1995	June 1996	June 1997	June 1998	June 1999	June 2000	June 2001	June 2002	June 2003	June 2004	June 2005	June 2006
Direct female CSWs	3.47	9.30	15.24	22.97	28.25	27.64	33.15[1]	27.78	26.14	21.13	16.00	18.46	16.56	12.34	10.63	7.36	6.80	4.59
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	4.00	3.37	2.27
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	5.00	4.13	3.39
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	42.22	37.64	36.33
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	1.04	1.01	0.87
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	0.23	0.22	0.29

Source: Bureau of Epidemiology, Department of Disease Control.

Note: [1] Data for December 1994.

Figure 5.24 Prevalence of HIV infections in Thai male military recruits, November 1989-November 2006



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

(2) Prevalence of AIDS Cases

According to the report on the number of AIDS patients during 1984-2006 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 5.25).

Nonetheless, the number of reported cases remains lower than actuality; as a matter of fact only 30-60%[9] 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 5.26).

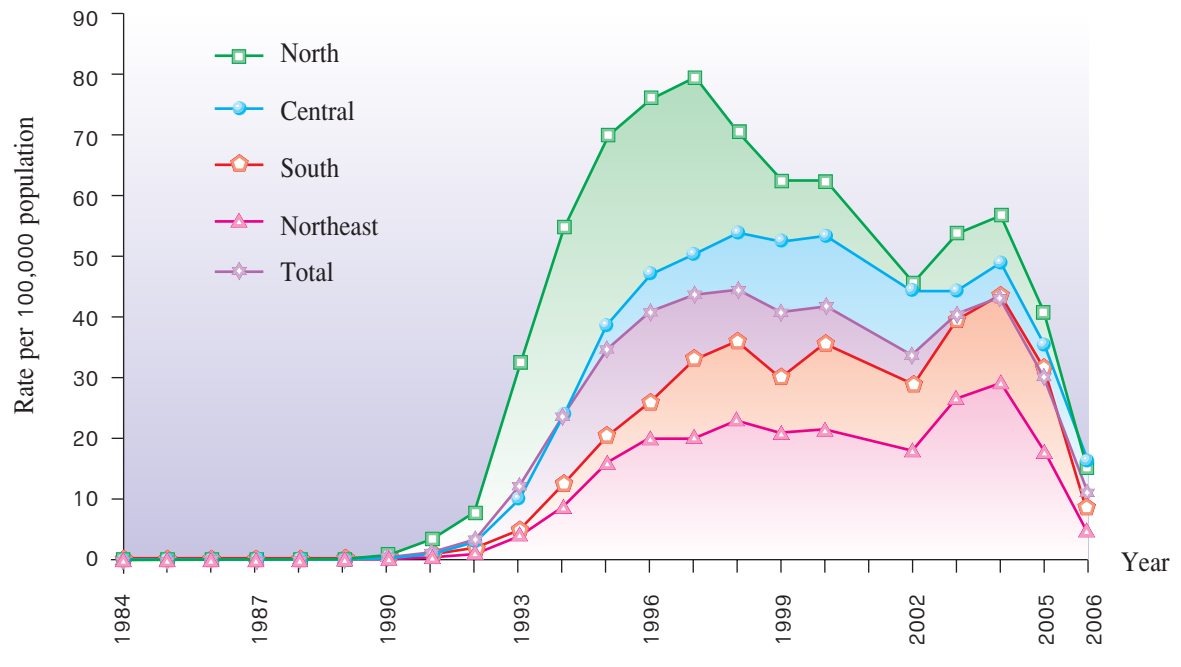
[9] Division of Epidemiology, MOPH. Assessment of the Completeness of AIDS Patients Reporting, 2000.

Table 5.14 Projection of the numbers of HIV-infected persons, AIDS cases and deaths, 2003-2020

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 Health.

Figure 5.25 Rates of reported AIDS cases by region, Thailand, 1984-2006

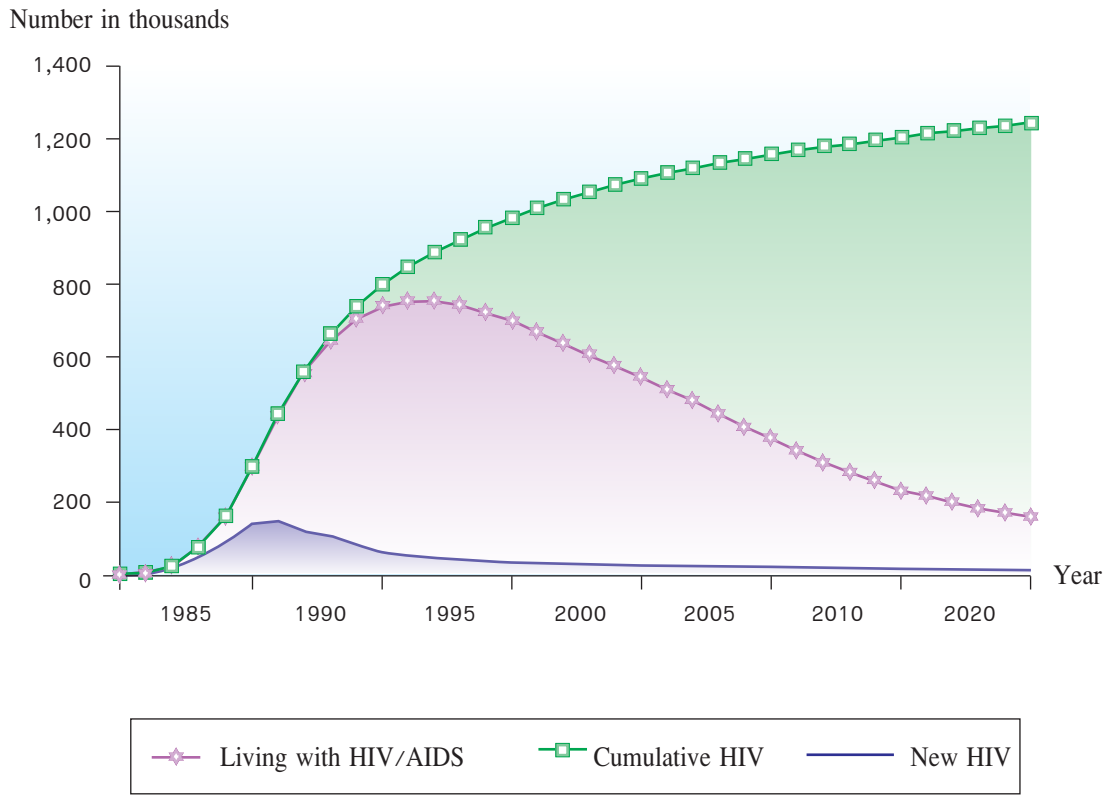


Region	1984	1986	1988	1990	1992	1994	1996	1998	2000	2002	2003	2004	2005	2006
North	-	-	0.04	0.61	7.76	55.08	76.66	71.17	62.86	45.73	54.26	57.15	41.31	15.7
Central	0.01	0.01	0.03	0.40	2.85	23.97	47.15	54.22	53.65	44.83	44.76	49.28	35.73	16.51
South	-	-	0.01	0.07	1.35	12.46	25.81	36.06	35.98	29.15	39.84	43.88	32.18	8.63
Northeast	-	-	0.01	0.11	1.14	8.82	20.15	23.27	21.74	18.16	27.12	29.66	18.15	5.06
Total	**-**	**-**	**0.02**	**0.30**	**3.06**	**23.49**	**40.89**	**44.66**	**42.06**	**33.71**	**40.85**	**43.32**	**30.29**	**11.36**

Source: Bureau of Epidemiology, Department of Disease Control.

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

Figure 5.26 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.

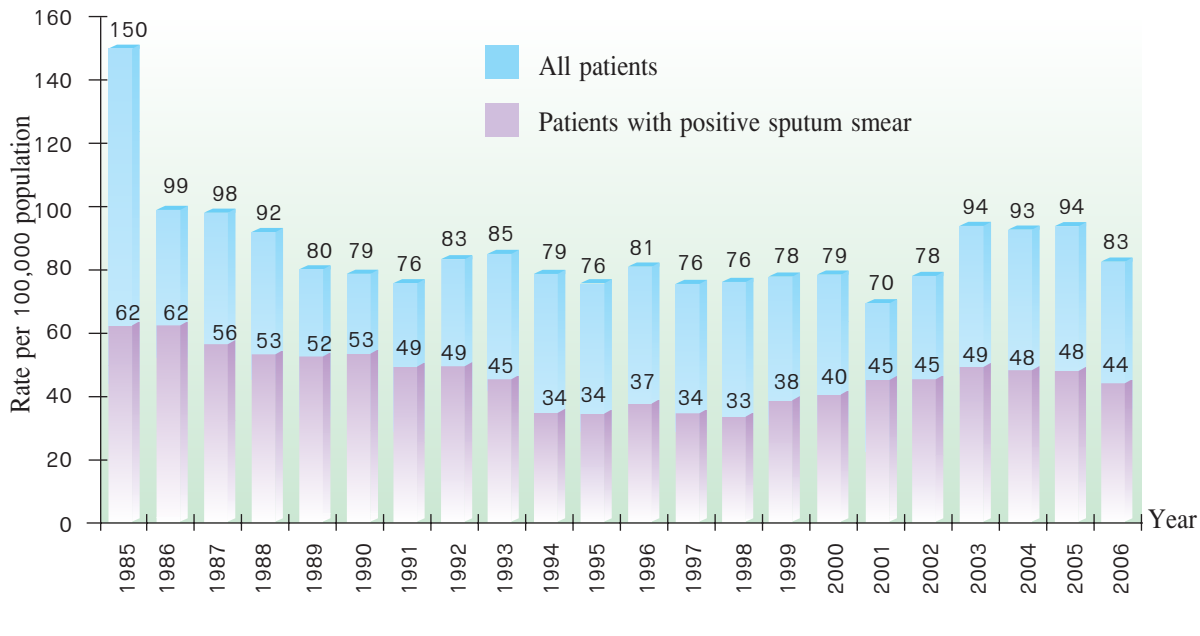
2) Tuberculosis

The tuberculosis prevalence (per 100,000 population) was actually declining between 1985 and 1989 from 150 to 80; but between 1990 and 2005 it did not decrease, rather it increased slightly (Figure 5.27).

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 4.1% in 1991 to 15.1% in 2005. Overall, for the entire country for over 10 years, the coinfection prevalence has increased from 14.5% in 1989 to 28.7% in 2005 (Figure 5.28).

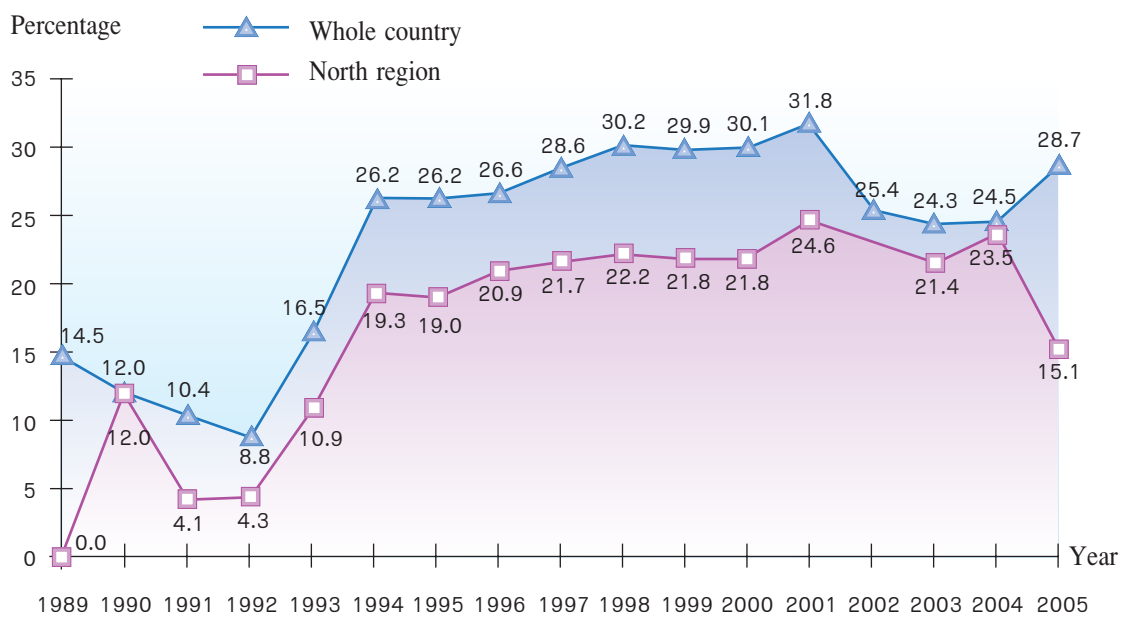
According to WHO's projections, HIV/AIDS has resulted in an annual increase of 4% of tuberculosis cases. In actuality, in Thailand the tuberculosis prevalence has risen by 2% each year during the past five years and there was no tendency to decline during the period 1995-2002. However, it has been reported that new cases of multidrug-resistant tuberculosis during 1997-1998 was 2.02% on average across the country. Despite a 6% prevalence in Chiang Rai (a high-prevalence area), the rate 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 5.27 Rate of newly registered tuberculosis patients in Thailand, 1985-2006



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

Figure 5.28 Percentage of tuberculosis infection in HIV/AIDS patients in Thailand, 1989-2005



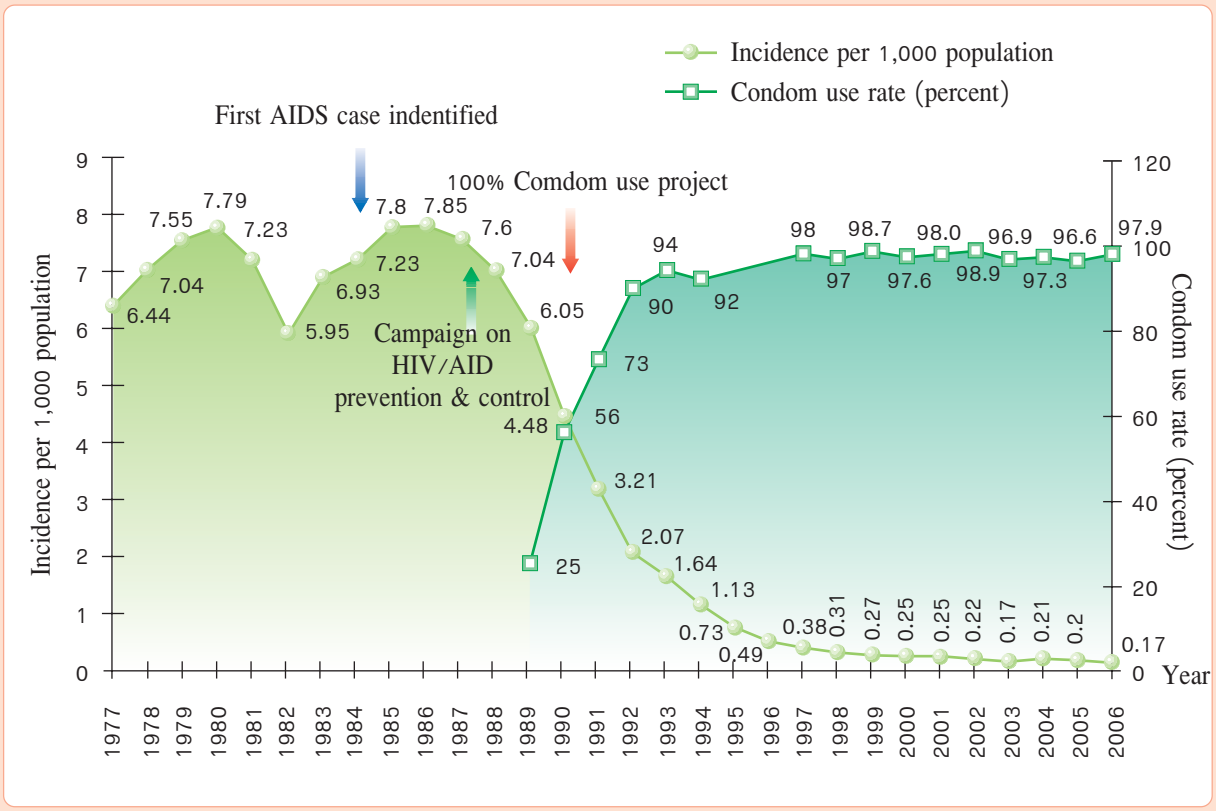
Source: Bureau of Epidemiology, Department of Disease Control.

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

3) Sexually Transmitted Infections (STIs)

Overall, the trends in STI prevalence in Thailand between 1977 and 2005 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 2006 (Figure 5.29) as a result of the intensive campaigns on HIV/AIDS prevention and control.

Figure 5.29 Incidence of sexually transmitted infections and condom use rate among female commercial sex workers, Thailand, 1977-2006



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.

2.4 Problems of Emerging Diseases

2.4.1 Avian Influenza

According to the WHO report on avian influenza situation from 2003 to 23 September 2006 worldwide, there were 251 human causes and 148 deaths. For Thailand, cumulatively there were 25 confirmed cases and 17 deaths, a case-fatality rate of 68.0%; in 2006 (as of September) Thailand reported 3 confirmed cases and 3 deaths. At present, there has been no report of human-to-human transmission of the disease (Table 5.15).

Table 5.15 Avian influenza: numbers of confirmed cases and deaths in Thailand, 2003-2006

Case / death	No. of cases or deaths				
	2003	2004	2005	2006	Total
Confirmed cases	0	17	5	3	25
Deaths	0	12	2	3	17
Case-fatality rate (%)	0.0	70.6	40.0	100.0	68.0

Source: National Institute of Health, Department of Medical Sciences, MoPH.

2.4.2 SARS

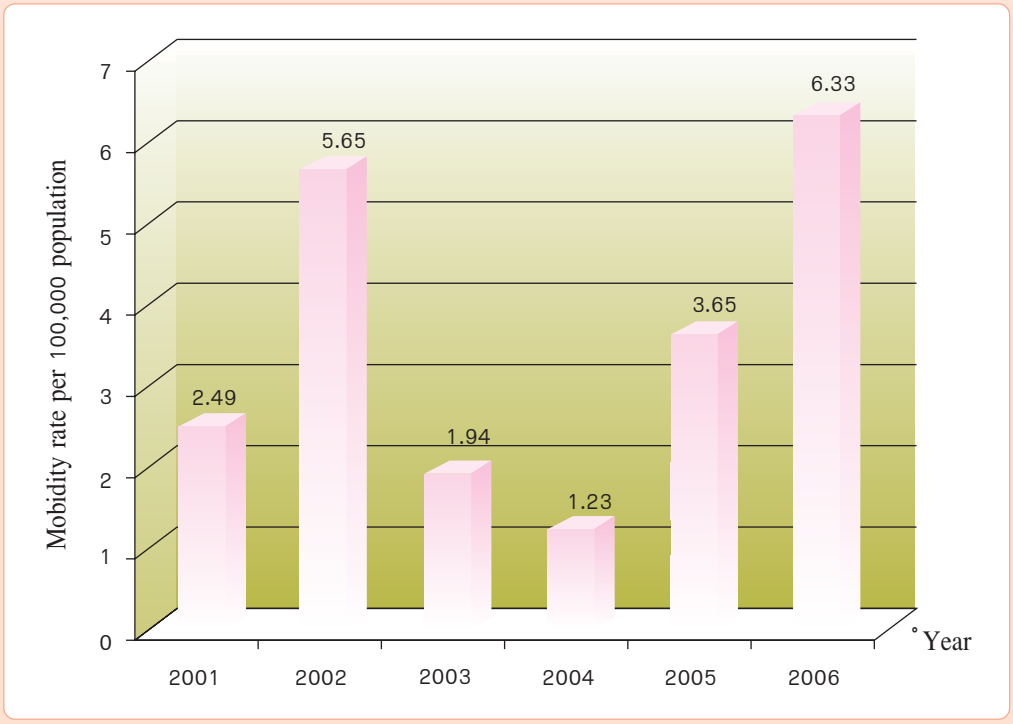
Severe acute respiratory syndrome (SARS) is an emerging disease. The SARS epidemic occurred in November 2002 in Quandong province in the southern region of the People's Republic of China. The outbreak could be controlled in June 2003 but had caused illness in 8,437 individuals and 813 deaths in 29 countries; 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.

2.4.3 Hand-Foot-Mouth Disease

Hand-foot-mouth disease is another emerging disease; its outbreak was reported in 1997 in Malaysia. For Thailand, for the period 2000-2006, there were 3,961 reported cases and 7 deaths, a morbidity rate of 6.33 per 100,000 population (Figure 5.30).

Figure 5.30 Morbidity rate of hand-foot-mouth disease, 2001-2006



Source: Bureau of Epidemiology, Department of Disease Control.

Laboratory testing for enterovirus 71 conducted by the National Institute of Health of the Department of Medical Sciences in 2006 found that 13.5% of the samples (26 cases) were positive for the virus. (Table 5.16)

Table 5.16 Number of cases and laboratory testing results for hand-foot-month disease, 2001-2006 (Sept 2006)

Year	Surveillance situation		Lab testing results (No. of positive specimens)	
	Cases	Deaths	Enterovirus 71	Echovirus
2001	1,545	0	2	2
2002	3,533	2	3	0
2003	871	2	10	4
2004	474	0	51	0
2005	2,270	0	40	0
2006	3,961	7	26	0

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

2.5 Non-communicable Diseases

2.5.1 Cancer

1) 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 5.17) especially in Bangkok Metropolis (Figure 5.31). According to the cancer registry in five member provinces, the highest rate of cervical cancer was recorded in Chiang Mai Province, while the highest rate of breast cancer was recorded in Bangkok (Table 5.18). Classified by age, females aged 35 and older have a greater incidence rate of cervical and breast cancers than those aged under 35. 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 5.19 and 5.20). Besides, it was found that 80% of Thai female breast cancer patients were in the invasive stage.[10]

According to the 2004 health examination survey and the 2006 reproduction health survey among females aged 15-59 years across the country, it was found that 49% of respondents had ever undergone a cervical cancer screening test, the highest proportion was noted in the age group 30-44, and the lowest in the age group 15-29 (Table 5.21).

Regarding breast self-examination, it was found in 2004 that approximately 50% of respondents had ever done a breast self-examination, while the 2006 survey, revealed that only 25% had ever done so. concerning breast examination conducted by health personnel, in 2004 and 2006, about 23-24% of females had ever received such service, the highest proportion was noted among those aged 30 and over and lowest among the 15-29 age group (Table 5.21). However, only 4% of females aged 40-59 nationwide had ever taken a mammogram (Table 5.21).

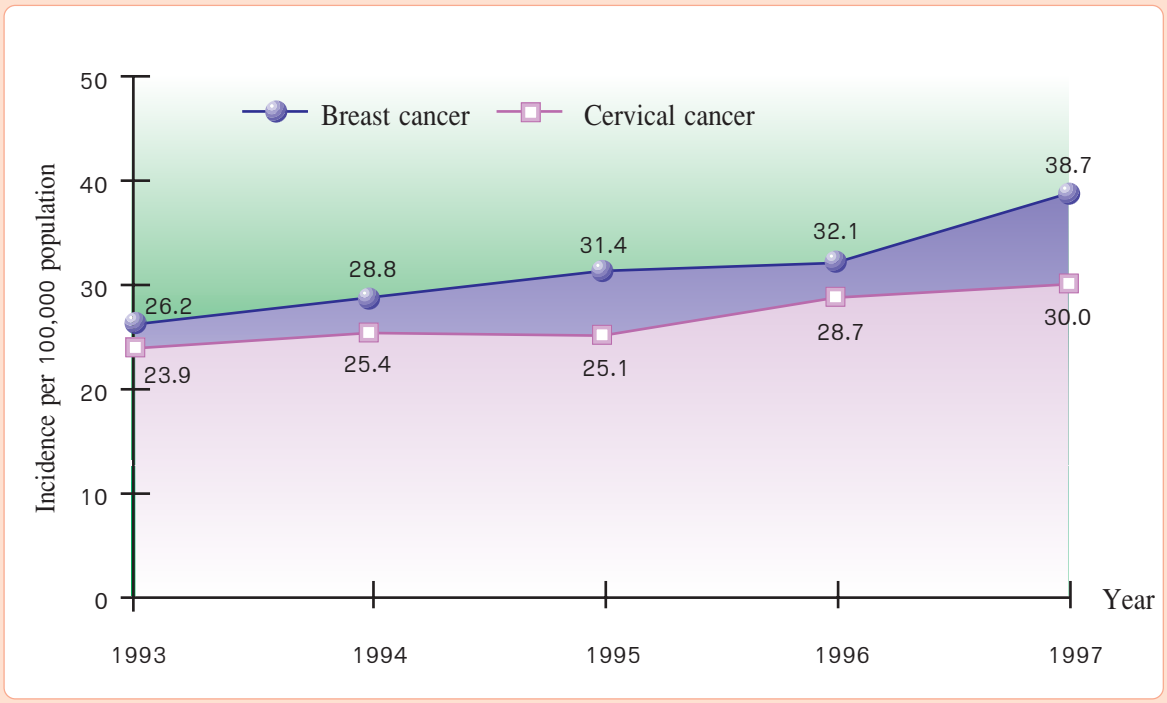
[10] Thammanit Angsusingh. Screening Mammography. Breast Cancer Treatment Centre, Siriraj Hospital.

Table 5.17 Incidence of cancers commonly found among Thai females, 1990, 1993, 1996, 1999 and 2000

Number	Type of cancer	Incidence rate per 100,000 population				
		1990	1993	1996	1999	2000
1	Cervical cancer	23.4	20.9	19.5	19.8	24.7
2	Breast cancer	13.5	16.3	17.2	19.9	20.5
3	Liver cancer	16.3	15.5	16.0	14.3	12.3
4	Lung cancer	12.1	11.1	10.0	9.9	9.3
5	Ovarian cancer	4.5	4.7	5.2	6.2	6.0

Source: National Cancer Institute, Ministry of Public Health.

Figure 5.31 Incidence of cervical and breast cancers among females in Bangkok, 1993-1997



Source: National Cancer Institute, Ministry of Public Health.

Table 5.18 Percentage of cancers of the reproductive organs recorded at provincial cancer registries, 1993, and 1995-1997 and 1998-2000

Province	Cervical cancer, %			Breast cancer, %			Ovarian cancer, %		
	1993	1995-1997	1998-2000	1993	1995-1997	1998-2000	1993	1995-1997	1998-2000
Chiang Mai	25.7	25.6	29.4	15.2	17.6	20.7	6.0	4.7	6.9
Lampang	23.1	23.6	22.3	15.0	16.4	20.8	4.4	3.7	4.6
Khon Kaen	18.0	15.0	15.9	8.6	11.6	13.7	4.5	5.6	6.2
Bangkok	18.5	20.7	19.3	20.6	25.4	24.3	4.2	5.9	6.1
Songkhla	15.8	16.1	20.6	11.5	12.1	17.2	3.1	4.6	5.7

Source: National Cancer Institute, Ministry of Public Health.

Table 5.19 Estimates of the number of breast cancer patients in American females by age group, 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 5.20 Ages of Thai women with breast cancer, 1983-2006

Siriraj Hospital's Surgery Department 1,353 cases (1983-1994)			Thanyarak Centre 5,994 cases (1995-2004)		Thanyarak Centre 219 cases (2005)		Thanyarak Centre 499 cases (2006)	
Age (yrs)	Case	percent	Case	percent	Case	percent	Case	percent
< 40	311	23.0	996	16.6	39	13.4	53	11.8
40-49	437	32.3	2,487	41.5	97	33.4	158	32.2
50-59	353	26.1	1,721	28.7	92	31.6	139	31.0
60-69	162	12.0	597	10.0	37	12.7	68	15.1
70 and over	90	6.6	193	3.2	26	8.9	31	6.9
Total	**1,353**	**100**	**5,994**	**100**	**291**	**100**	**449**	**100**

Source: Thammanit Angsusing. Screening Mammography, Thanyarak Breast Cancer Centre.

Table 5.21 Percentage of Thai women who have ever taken screening tests for cervical and breast cancer by age group, 2004 and 2006

Screening	Percentage by age group, 2004 (1)				2006 (2)
	15-29	30-44	45-59	Total	
- Pap smear for cervical cancer	29.0	62.2	55.0	48.5	49.8
- Breast self-examination	35.0	58.3	53.5	48.7	24.6
- Breast examination by health personnel	13.2	28.1	27.9	22.7	24.5
- Mammogram (40-59 yrs)	-	-	-	4.0	-

Source: 1. Report on Health Examination Survey, Third Round, 2003-2004. Health Systems Research Institute, MoPH.

2. Report in Reproduction Health Survey, 2006. National Statistical Office.

2) Liver Cancer

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. Eating improperly heated food, especially fresh-water fish, might cause opisthorchiasis or liver fluke disease (Table 5.12) which is a major cause of liver cancer (Table 5.22). It has been noted that Thailand has the highest incidence of liver cancer in the world.[11]

Table 5.22 Incidence of liver cancer Thailand, 1993, 1996, 1999 and 2000

Year	Incidence per 100,000 population	
	Males	Females
1993	37.4	15.5
1996	40.5	16.0
1999	38.6	14.3
2000	31.2	11.5

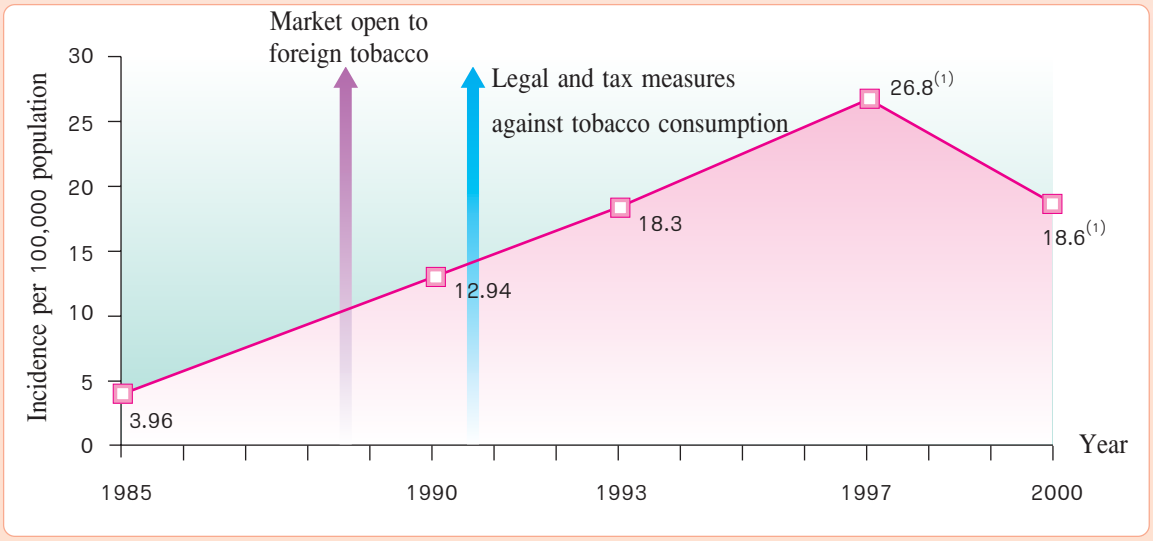
Source: Cancer in Thailand, 1995-2000.

3) Lung Cancer

The incidence of lung cancer increased sevenfold from 3.96 per 100,000 population in 1985 to 26.8 per 100,000 population in 1997, but dropped to 18.6 per 100,000 population in 2000, which was probably associated with tobacco consumption and air pollution (Figure 5.32).

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

Figure 5.32 Incidence of lung cancer in Thailand, 1985-2000

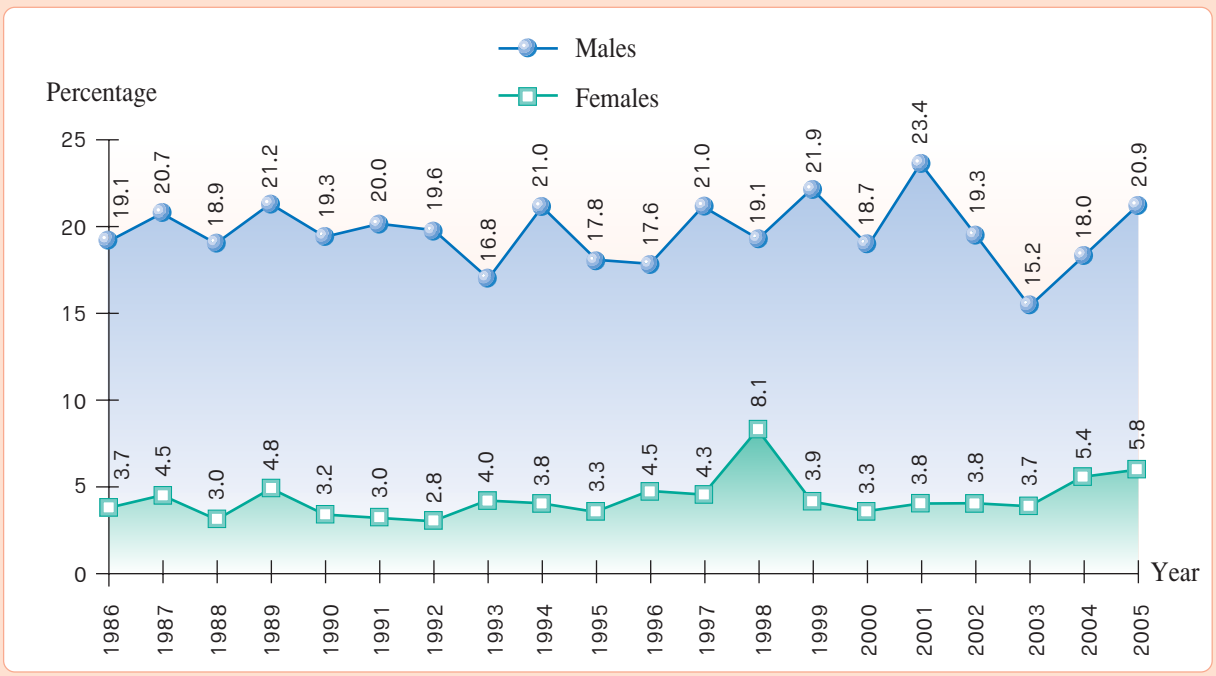


Source: National Cancer Institute, Department of Medical Services, MoPH.

Note: (1) Incidence of lung cancer in males.

Besides, according to the report on inpatient services at the National Cancer Institute between 1986 and 2005, 15% to 23% of inpatients were males, 3 to 8 times higher than in females (Figure 5.33).

Figure 5.33 Percentage of lung cancer patients registered for treatment at the National Cancer Institute, 1986-2005



Source: National Cancer Institute, Department of Medical Services.

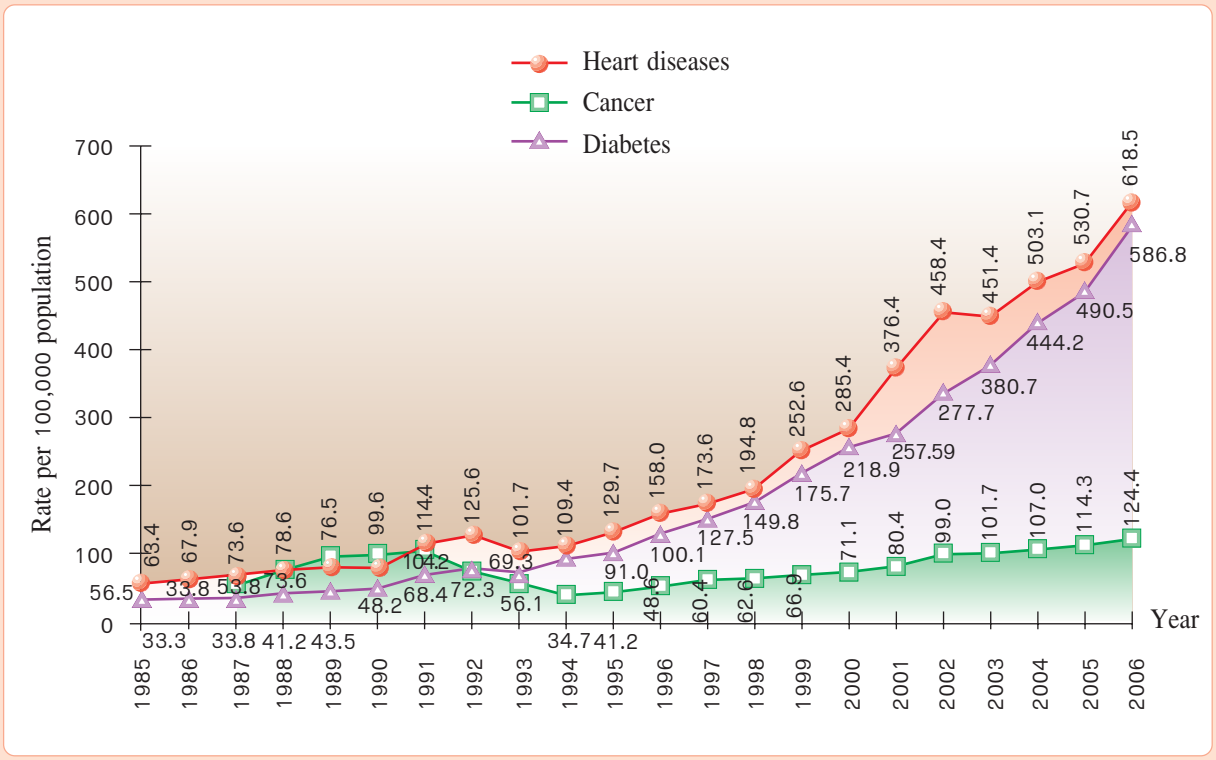
Note: As percentage of all cancer cases.

2.5.2 Heart Diseases, Diabetes and Hypertension

Currently, non-communicable diseases, such as heart diseases and cancer, have become the leading causes of morbidity and mortality among 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 618.5 in 2006.
- Cancer. The admission rate per 100,000 population has risen from 34.7 in 1994 to 124.4 in 2006.
- Diabetes. The admission rate has also risen from 33.3 per 100,000 population in 1985 to 91.0 in 1994 and 586.8 in 2006 (Figure 5.34).

Figure 5.34 Rate of hospitalizations of patients with heart diseases, cancers and diabetes, 1985-2006

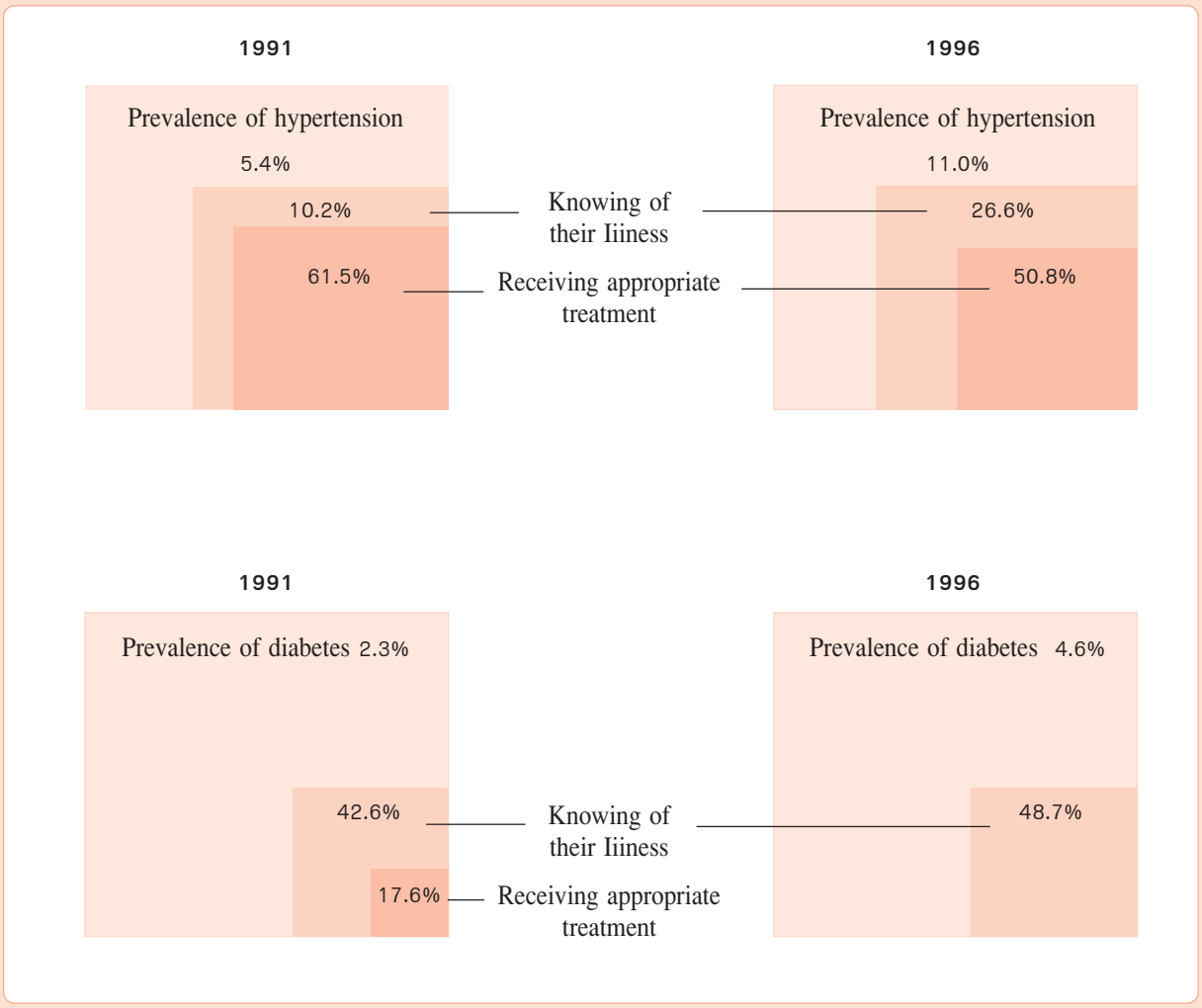


Source: Inpatients Report. Bureau of Policy and Strategy, Ministry of Public Health.

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

Besides, the 2003-2004 health examination survey on Thai people revealed that the prevalence of hypertension had a tendency to rise from 5.4% in 1991 to 11.0% in 1996 and to 22% or 10.1 million individuals in 2004. Similarly, the diabetes prevalence had risen from 2.3% in 1991 to 4.6% in 1996 and 6.9% or 3.2 million individuals in 2004. This is evident that the prevalence of non-communicable diseases has a rising trend; and more importantly, the proportion of patients who has never had any diagnosis is also higher, resulting in a lower rate of patients receiving medical treatment. Thus, the people in this group do not have a chance to receive preventive care for their complications that might occur after getting ill with the disease (Figure 5.34 and Table 5.23).

Figure 5.35 Prevalence of diabetes and hypertension as well as appropriate treatment among Thai people, 1991-1996



Source: National Health Foundation, 1998.

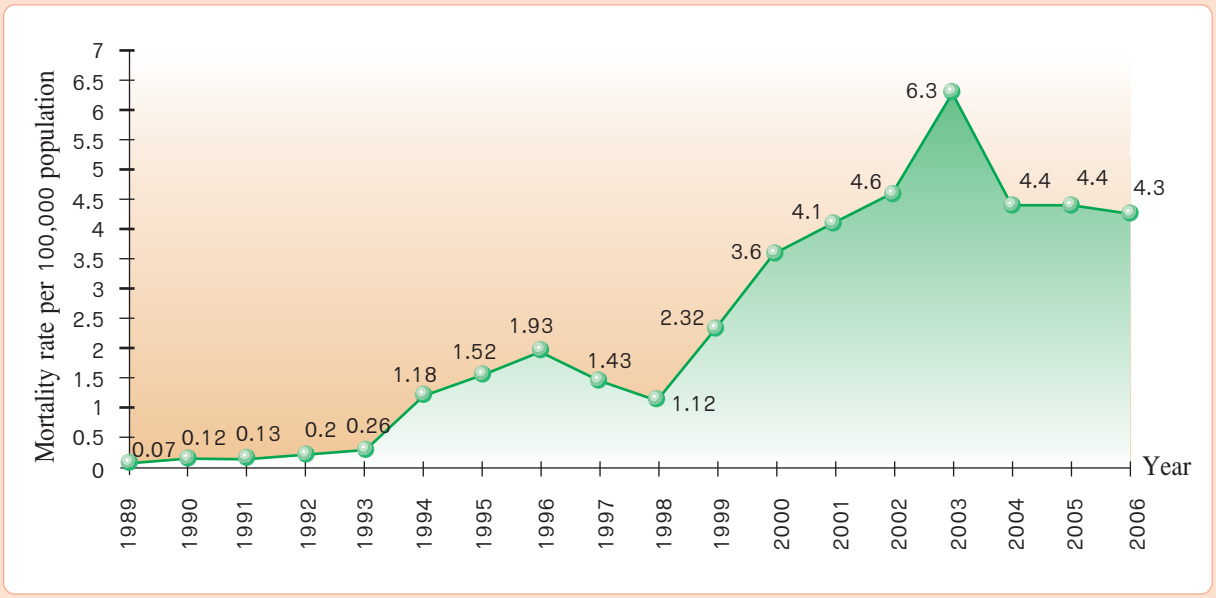
Table 5.23 Prevalence, diagnosis and treatment of chronic diseases among Thai people, 2004

Prevalence and care	Hypentension, %		Hyperlipidemia, %		Diabetes, %	
	Males	Females	Males	Females	Males	Females
Prevalence	**23.3**	**20.9**	**13.7**	**17.1**	**6.4**	**7.3**
- Never had diagnosis	78.6	63.8	87.6	86.8	65.5	49.2
- Diagnosed but not treated	4.5	5.4	3.1	4.1	1.9	1.7
- Treatment received but could not control	11.2	19.0	2.7	3.3	24.1	33.9
- Treatment received and symptoms controlled	5.7	11.7	6.7	5.9	8.5	15.2

Source: Report on Health Examination Survey, Third Round, 2003-2004. Health Systems Research Institute, MoPH.

2.5.3 Emphysema. The prevalence of emphysema has risen from 0.07% in 1989 to 4.3% in 2006 (Figure 5.36).

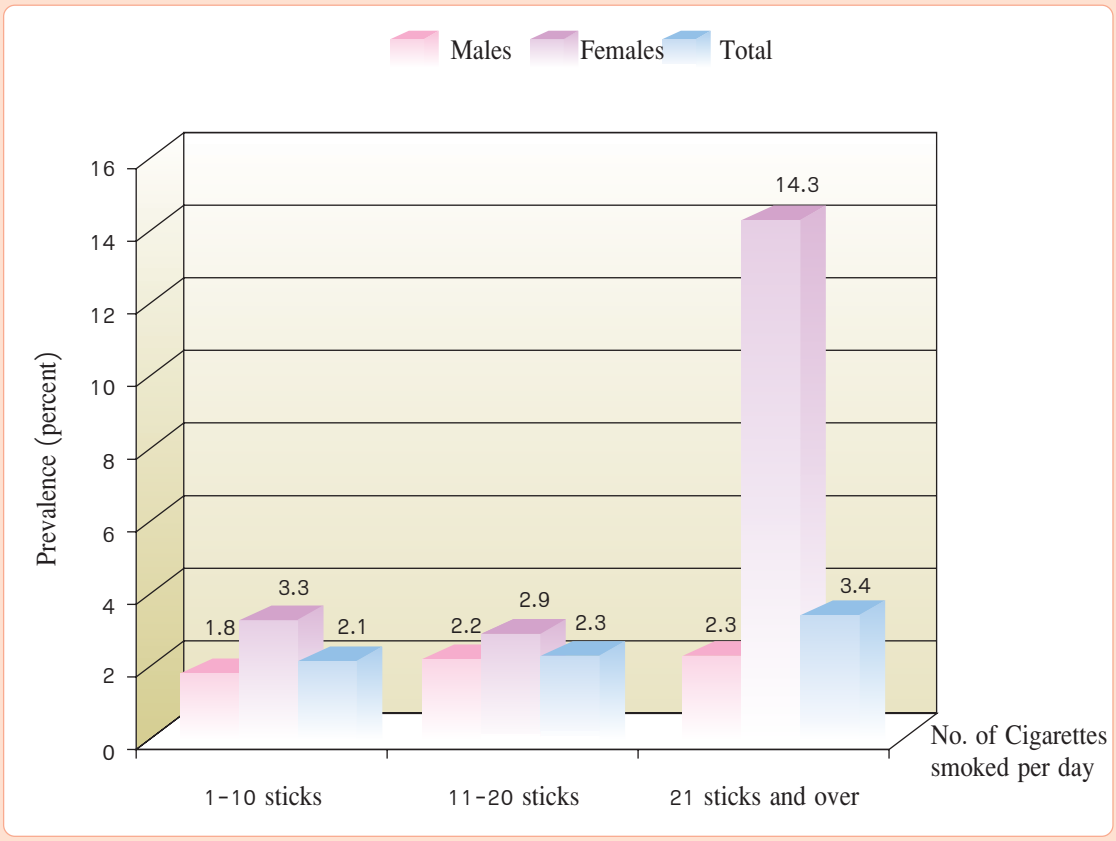
Figure 5.36 Mortality rate due to emphysema, 1989-2006



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

2.5.4 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 5.37). By 2010, it has been estimated that the prevalence of COPD would be 7,035 per 100,000 population[12] (Figure 5.38).

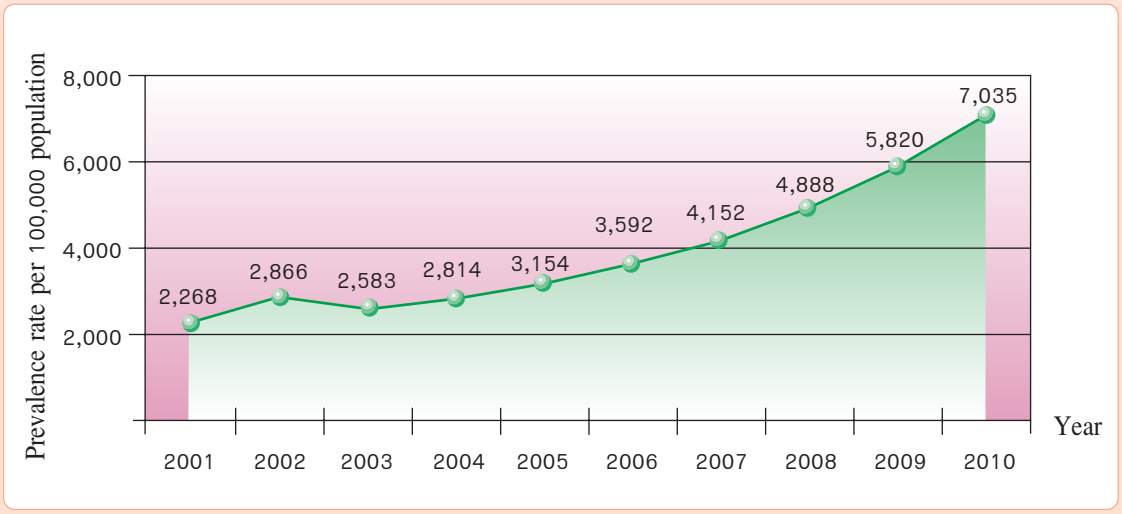
Figure 5.37 Prevalence rate of chronic obstructive pulmonary disease among Thai people aged 15 and over by the number of cigarettes smoked and sex



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

[12] 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.

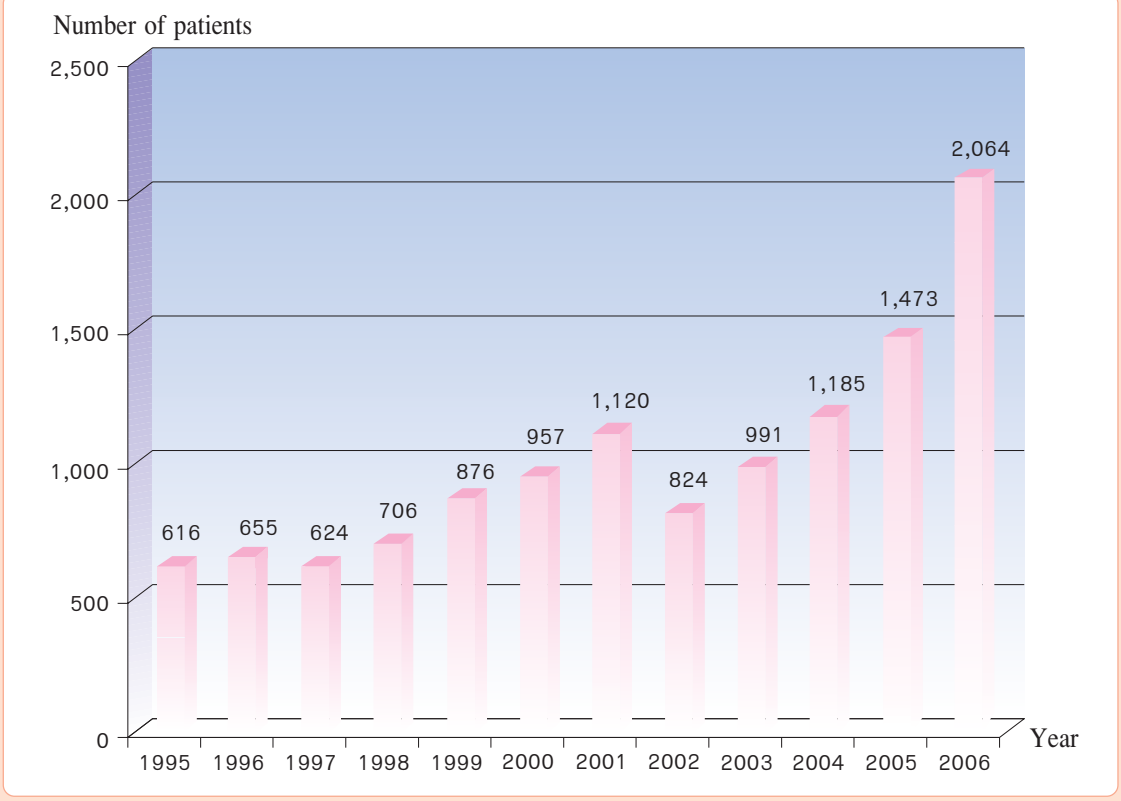
Figure 5.38 Projection of chronic obstructive pulmonary disease prevalence, Thailand, 2001-2010



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

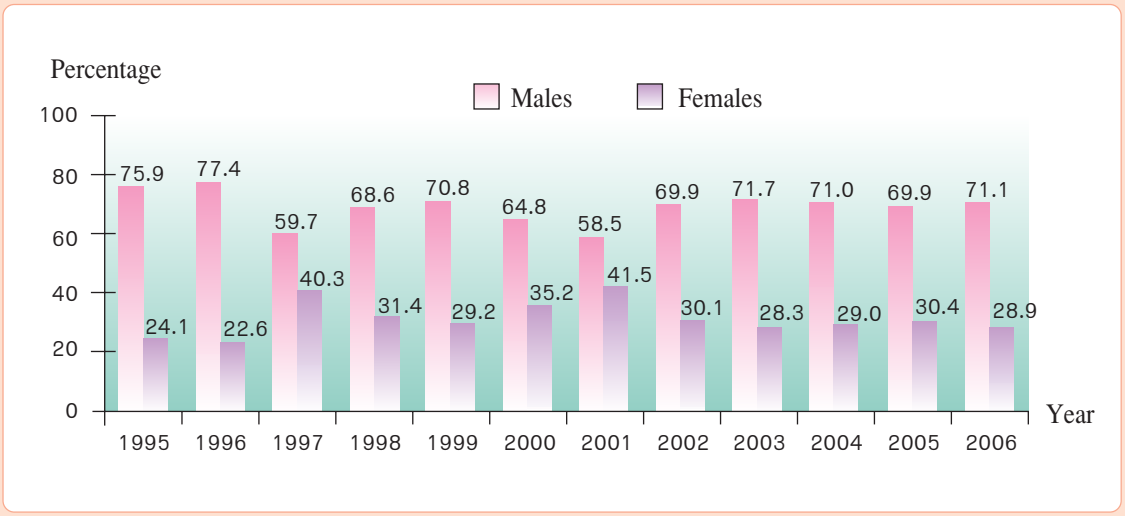
2.5.5 Coronary Atherosclerosis. This disease has a rising trend, especially among females (Figures 5.39 and 5.40), due to tobacco use, physical inactivity, hyperlipidaemia and overweight.

Figure 5.39 Number of patients with coronary atherosclerosis treated at the Cardiology Institute, 1995-2006



Source: Institute of Cardiology, Department of Medical Services, MoPH.

Figure 5.40 Proportion of patients with coronary atherosclerosis undergoing surgery at the Cardiology Institute by sex, 1995-2006

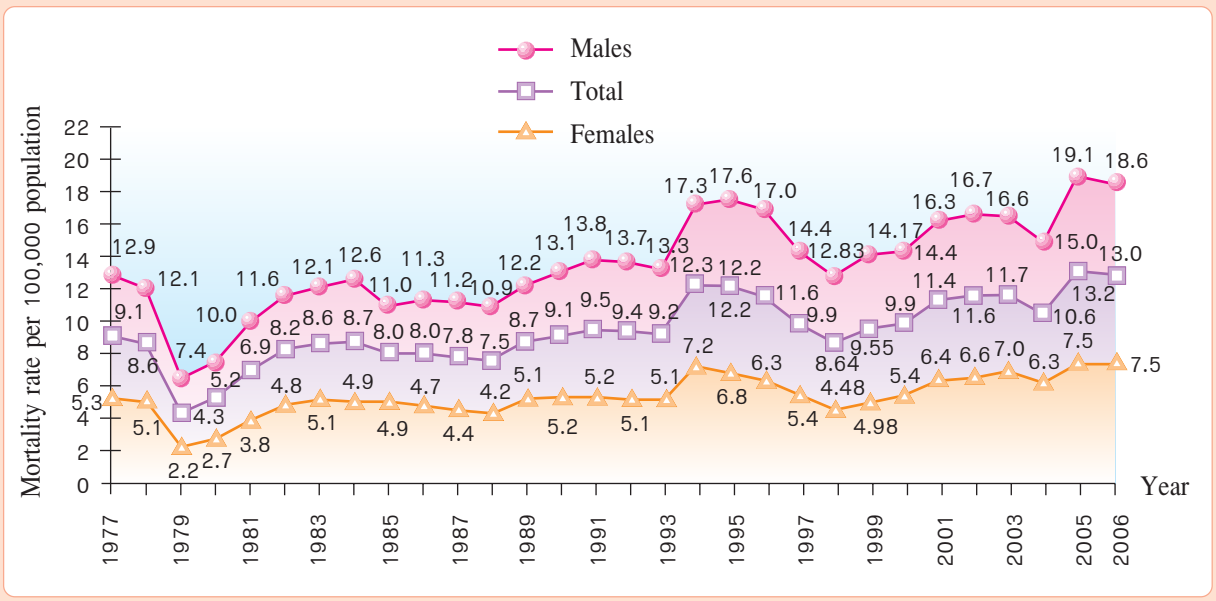


Source: Institute of Cardiology, Department of Medical Services, MoPH.

2.5.6 Cirrhosis

Consumption of alcohol for a long time negatively affects the liver as it has been found that, between 1977 and 2006, the mortality rates of liver disease and chronic cirrhosis were reported at 4.3-13.2 per 100,000 population, the rates being 6-19 in males and 2-7 in females, i.e. 2-4 times higher in males than in females (Figure 5.41). However, the trend in cirrhosis resulting from hepatitis B virus is declining.

Figure 5.41 Mortality rate of liver disease and cirrhosis, Thailand, 1977-2006



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

2.6 Injuries and Accidents

2.6.1 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 90,000-125,000 accidents with 13,000-14,000 deaths or a mortality rate of 21-22.26 per 100,000 population. And there were approximately 70,000-95,000 injuries a year or an injury rate of 110.8-151.72 per 100,000 population (Figure 5.42).

Primarily, traffic accidents are caused by humans (69.6) and a small proportion by the vehicles and environment (1.2% and 0.6%, respectively, Figure 5.44). By cause category of road traffic accidents, the most commonly found category is speeding (17.3%), followed by cutting across the path of another vehicle in short distance, illegal overtaking, violating traffic lights rules, and following another vehicle too closely (Figure 5.45).

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 result of economic expansion, 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 = 0.818; Table 5.26).

Besides, a study of Yordphol Tanaboriboon and colleagues (2006) revealed that the number of deaths from road traffic accidents tends to be in accordance with the economic situation and the level of fuel used in the country[13] (Figure 5.46).

This kind of situation caused a direct loss of property worth 3,643.7 million baht in 2006 (Table 5.24). But actually there are other incalculable losses including life losses, medical expenses, disabilities, etc. According to the 2000-2002 study on economic losses from road traffic accidents, the economic loss is as high as 106,994 to 115,337 million baht or 2-2.3% of gross domestic product. [14,15]

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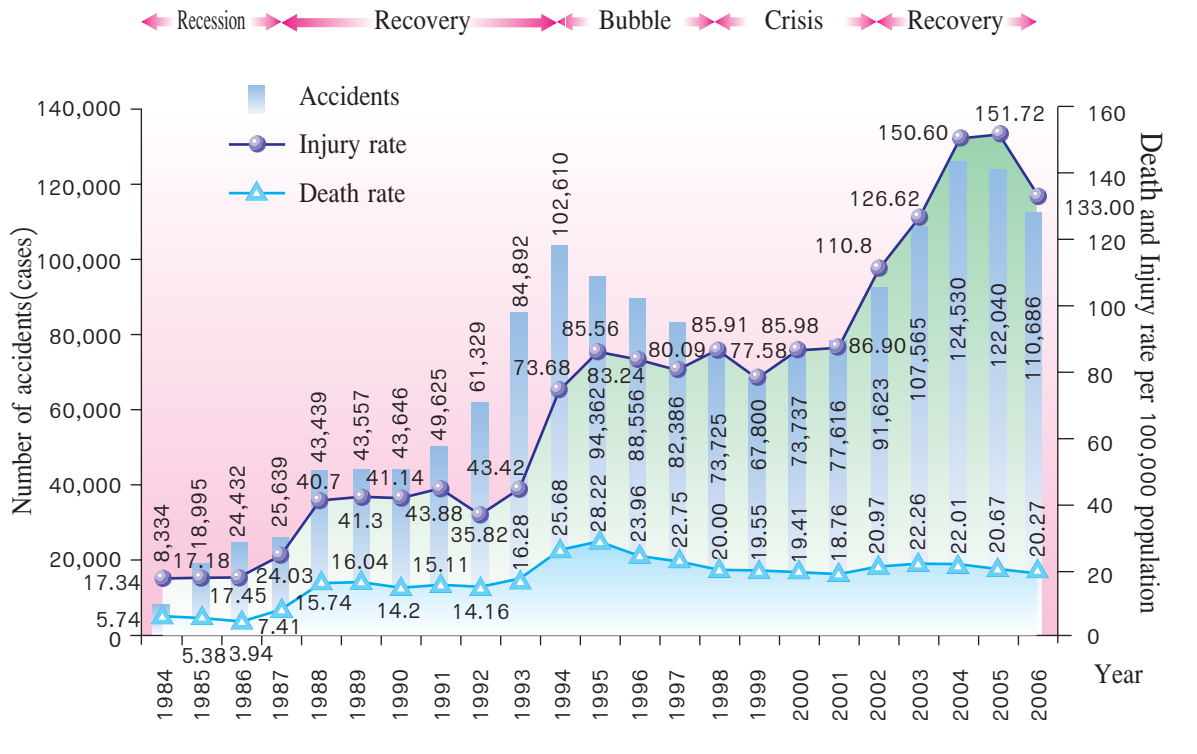
[13] Yordphol Tanaboriboon et al. Situation of Road Traffic Accidents in Thailand, 2006.

[14] Centre for Development Policy Studies, Faculty of Economics, Chulalongkorn University. Loss Due to Road Traffic Accidents in Thailand, 2005.

[15] 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 Traffic Accidents, 2002.

Figure 5.42 Death and injury rates from road traffic accidents, Thailand, 1984-2006



Source: Police Information System Centre, Royal Thai Police.

Table 5.24 Numbers and rates of accidental deaths and injuries and estimated damages, 1984-2006

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
2003	62,939,819	107,565	14,012	22.26	79,692	126.62	1,750,964,040
2004	62,526,693	124,530	13,766	22.01	94,164	150.60	1,623,081,112
2005	62,195,839	122,040	12,858	20.67	94,364	151.72	3,238,226,110
2006	62,623,416	110,686	12,693	20.27	83,290	133.00	3,643,747,912

Source: Police Information System Centre, Royal Thai Police.

Table 5.25 Number and percentage of deaths from road traffic accidents by age group, 1996-2006

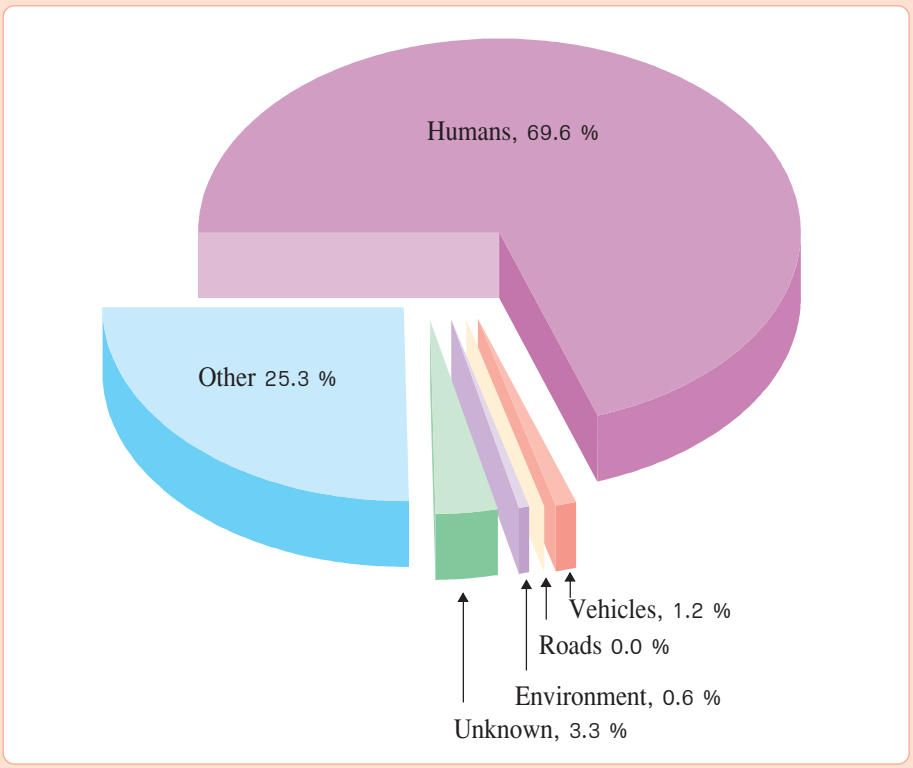
Age group (years)	1996		1997		1998		1999		2000		2001		2002		2003		2004		2005		2006	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
0 - 4	291	1.7	175	1.3	210	2.6	254	2.2	287	2.2	243	1.9	205	1.5	164	1.3	154	1.3	158	1.5	135	1.3
5 - 9	389	2.3	227	1.8	146	1.8	261	2.2	287	2.2	256	2.0	214	1.6	196	1.5	183	1.5	151	1.4	149	1.4
10 - 14	599	3.6	392	3.0	237	3.0	300	2.6	387	2.9	356	2.7	428	3.2	363	2.8	425	3.4	359	3.3	375	3.6
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	1,829	14.3	1,811	14.7	1,534	13.9	1,408	13.5
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	2,040	15.9	1,819	14.7	1,598	14.5	1,405	13.5
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	1,623	12.7	1,530	12.4	1,334	12.1	1,244	11.9
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	1,279	10.0	1,233	10.0	1,103	10.0	986	9.5
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	1,198	9.4	1,094	8.9	1,016	9.2	956	9.2
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	1,030	8.0	950	7.7	891	8.1	886	8.5
45 - 49	870	5.2	750	5.8	488	6.1	785	6.8	884	6.7	912	7.0	903	6.7	847	6.6	832	6.8	759	6.9	745	7.2
50 - 54	594	3.6	484	3.7	329	4.1	561	4.8	638	4.8	650	5.0	697	5.2	651	5.1	654	5.3	614	5.6	648	6.2
55 - 59	546	3.3	468	3.6	320	4.0	444	3.8	507	3.8	463	3.6	488	3.6	493	3.8	510	4.1	449	4.0	421	4.0
60 - 64	421	2.5	371	2.9	287	3.6	392	3.4	448	3.4	450	3.5	408	3.0	371	2.9	422	3.4	395	3.5	352	3.4
65 - 69	304	1.8	209	1.6	205	2.6	283	2.4	352	2.7	341	2.6	355	2.7	316	2.5	295	2.4	272	2.4	277	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	225	1.8	232	1.9	201	1.8	233	2.2
75 - 79	112	0.6	67	0.5	66	0.8	83	0.7	135	1.0	124	1.0	139	1.0	116	0.9	126	1.0	123	1.1	125	1.2
80 - 84	39	0.2	37	0.3	22	0.3	56	0.5	59	0.5	65	0.5	56	0.4	43	0.3	43	0.3	52	0.5	45	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	27	0.2	27	0.2	32	0.2	31	0.3

Source: Bureau of Policy and Stategy, Office of the Permanent Secretary, Ministry of Public Health.

Figure 5.43 Proportion of deaths from road traffic accidents by sex, 1996-2006

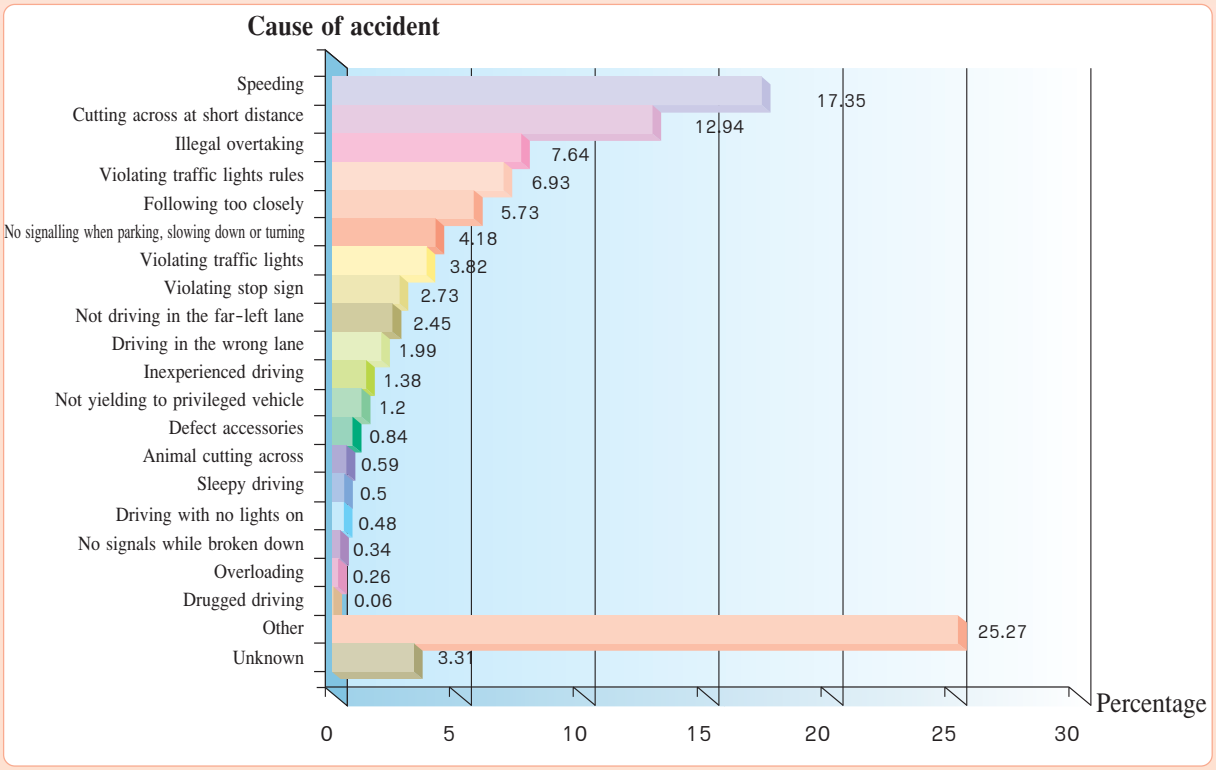
Source: Bureau of Policy and Strategy, Office of The Permanent Secretary, Ministry of Public Health.

Figure 5.44 Major causes of road traffic accident, 2006



Source: Royal Thai Police.

Figure 5.45 Causes of road traffic accidents by traffic-police charge, 2006



Source: Royal Thai Police.

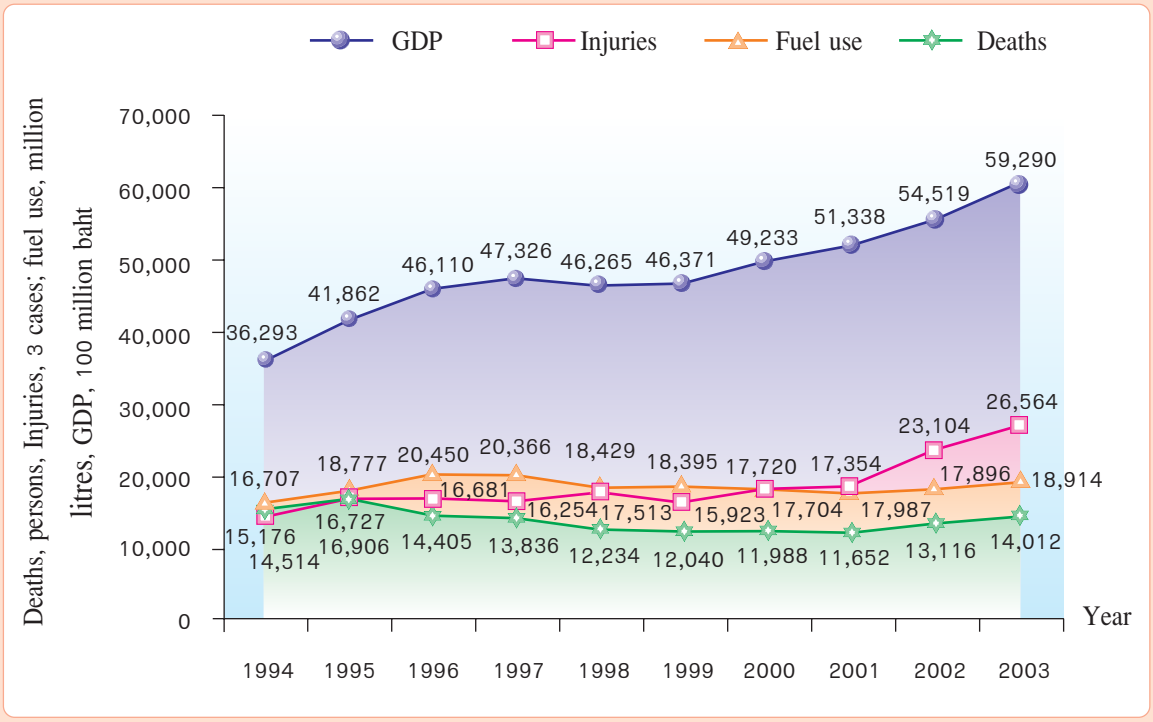
Table 5.26 Correlation between the number of accidents and overall automobile sales, 1990-2006

Year	Number of accidents[1] (cases)	Automobile sales	
		Number[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%
2003	107,565	533,176	+30.0%
2004	124,530	626,026	+17.4%
2005	122,040	703,432	+12.4%
2006	110,686	682,500	-3.1%
Correlation coefficient	**=**	**0.818**	

Sources: [1] Royal Thai Police.

[2] Toyota Motors (Thailand) Co., Ltd.

Figure 5.46 Trends in GDP growth, fuel use for transportation, injuries and deaths from road traffic accidents, 1994-2003



Source: Yordphol Tanaboriboon el al. Situation of Road Traffic Accidents in Thailand, 2006.

Regarding the type of vehicles with accidents, it was found that motorcycles, pickup trucks, vans, private passenger cars, and bicycles/tricycles caused the highest number of injuries and deaths than other types of vehicles. But in terms of severity of accidents, the types of vehicles that caused the highest number of deaths during the three-year period (2001-2003) were private passenger cars, pickups/vans and motorcycles (Table 5.27).

Table 5.27 Injuries and deaths from road traffic accidents by type of vehicles, 1997-2003

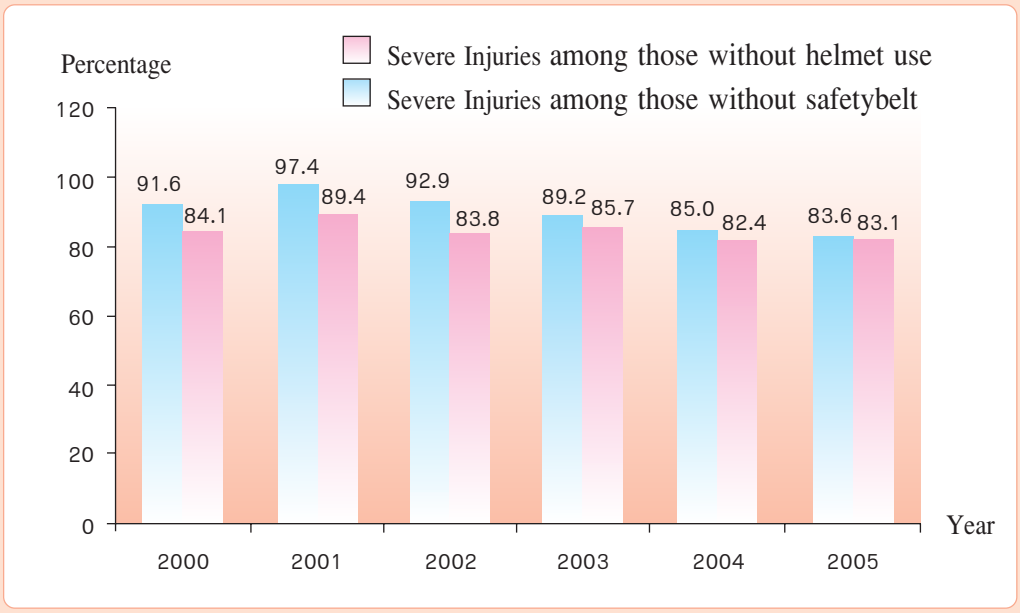
type of vehicles	1997			1998			1999			2000			2001			2002			2003		
	Injuries	Deaths	Death rate (%)	Injuries	Deaths	Death rate (%)	Injuries	Deaths	Death rate (%)	Injuries	Deaths	Death rate (%)	Injuries	Deaths	Death rate (%)	Injuries	Deaths	Death rate (%)	Injuries	Deaths	Death rate (%)
Bicycles and tricycles	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	1,812	108	6.0
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	42,048	3,144	7.5
Three-wheel/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	431	34	7.9
Private 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	886	90	10.2
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	3,743	359	9.6
Trucks (6-wheel 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	805	70	8.7
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	72	7	9.7
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	199	13	6.5
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	204	11	55.4
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	390	20	5.1
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	184	10	5.4
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**	**50,774**	**3,866**	**7.6**

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

Note: Data for 2001-2003 include only severely injured cases (injuries/deaths before reaching hospital, deaths in emergency rooms, and injured cases admitted/hospitalized for observation or as inpatients).

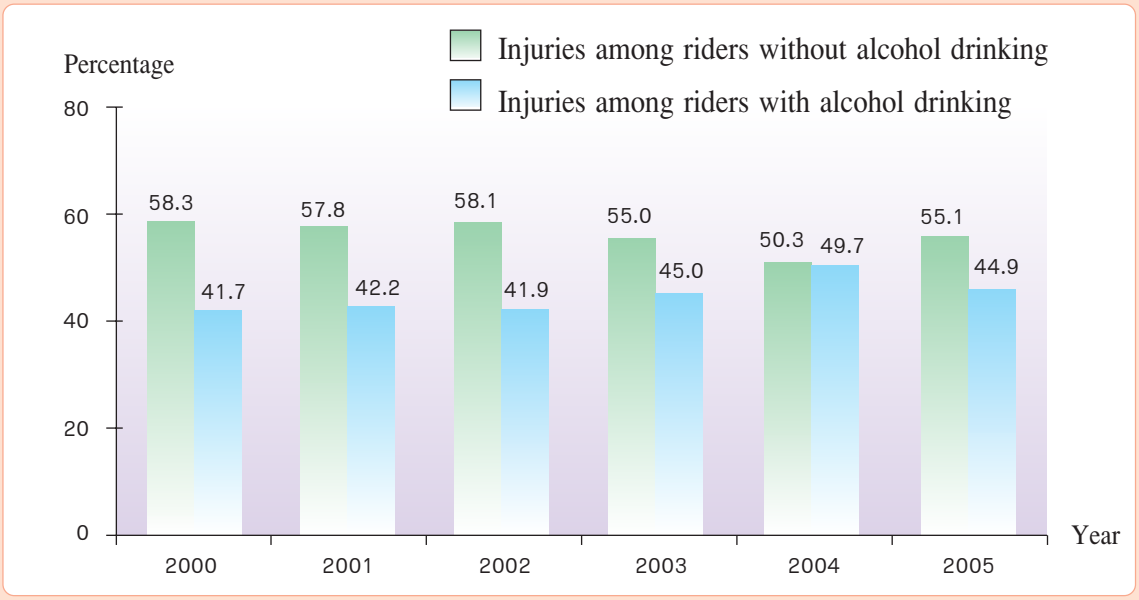
Even though the Royal Decree on Anti-crash Helmets has been enforced in all provinces throughout the country since 1 January 1996, the data from the injury surveillance system have shown that motorcycle riders/passengers who do not wear helmets as well as motor vehicle drivers/passengers who do not use safety belts are 80% more likely to have serious injuries from traffic accidents than those who do so (Figure 5.47); and nearly half of those motorcycle accident victims with severe injuries have drunk alcohol before riding (Figure 5.48).

Figure 5.47 Proportion of serious injuries from traffic accidents among riders/drivers and passengers with and without safetybelt/helmet use, 2000-2005



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

Figure 5.48 Proportion of severe injuries among motorcycle riders with and without alcohol drinking, 2000-2005



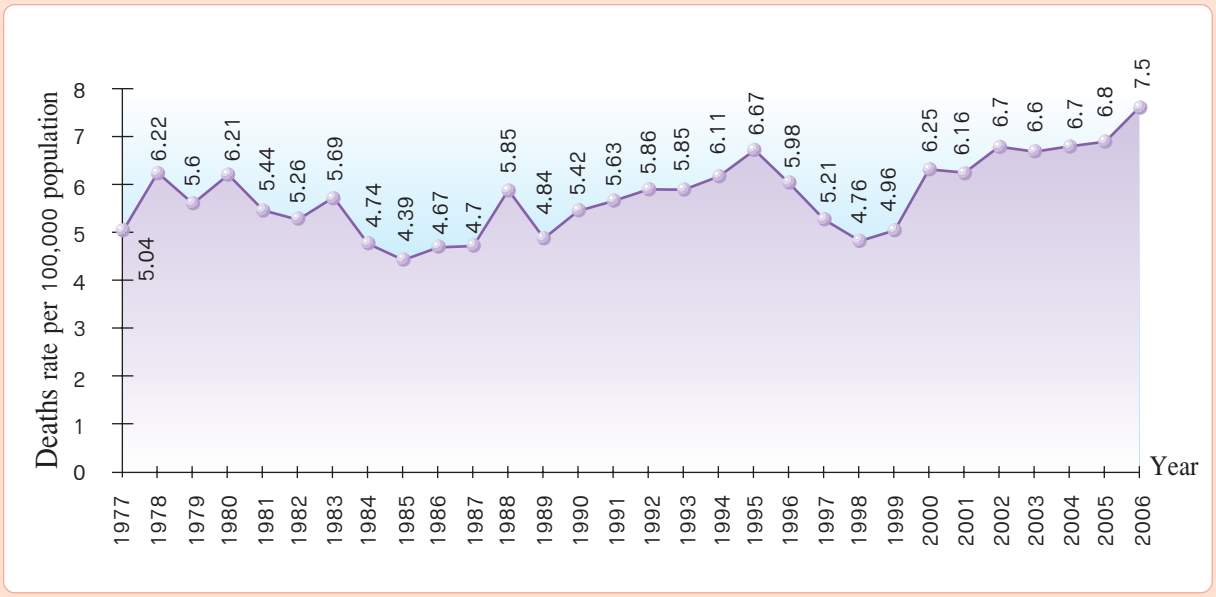
Source: Report on Injury Surveillance in Thailand. Bureau of Epidemiology, Department of Disease Control.

2.6.2 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 even through the drowning rate in Thai children is 5 to 15 times higher than that in developed countries.[16] During 1977-2006, the rate of deaths from drowning and falling into water was 4.4-7.5 cases per 100,000 population (Figure 5.49). An epidemiological analysis of water-related accidents in Thailand during the period 1996-2006 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 5.50). This might result from their lack of experience in playing safely in the water and thus being less capable of helping themselves.

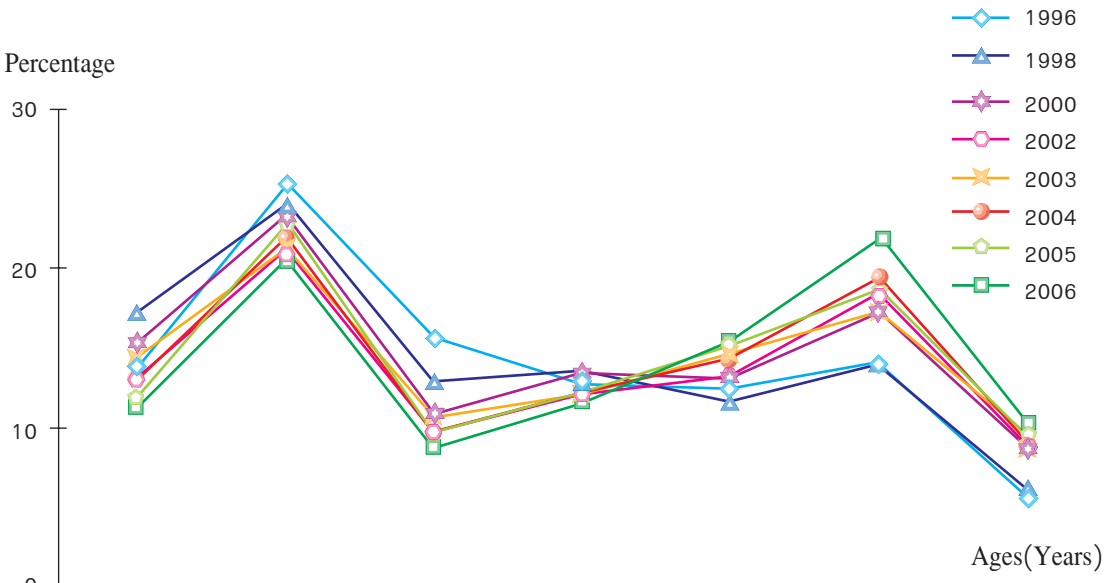
[16] Adisak Plitponkarnpim. Child Safety Promotion and Injury Prevention Research Centre of Ramathibodi Hospital, 2006.

Figure 5.49 Rate of deaths from accidental drowning in Thailand, 1977-2006

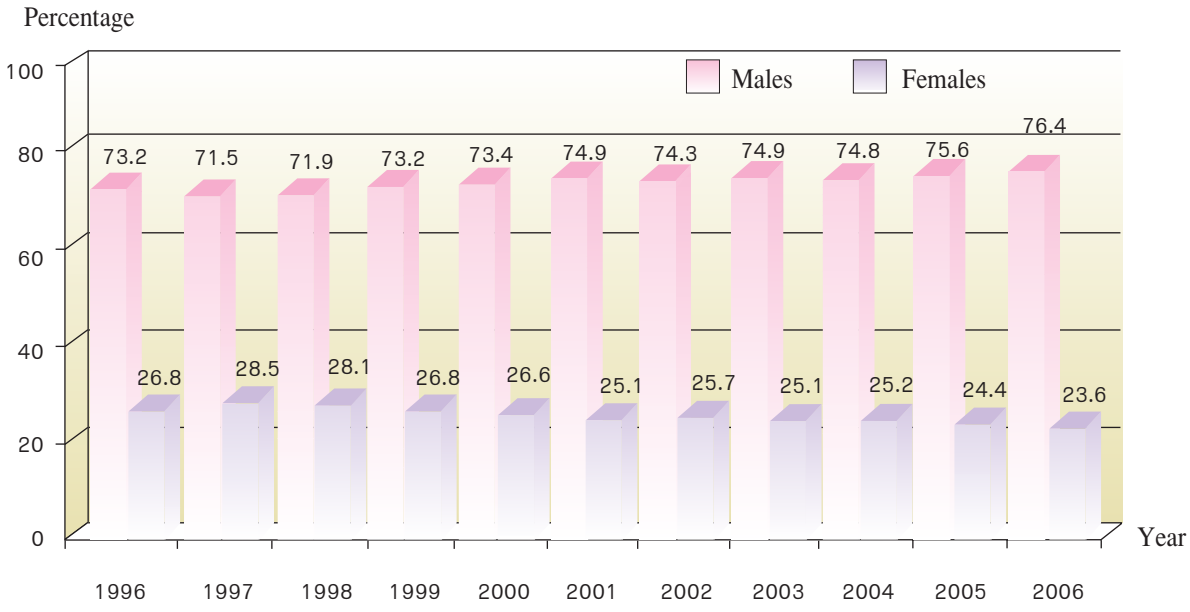


Source: Bureau of Policy and Strategy, Ministry of Public Health.

Figure 5.50 Percentage of reported deaths from accidental drowning by age and gender in Thailand, 1996-2006



	< 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
2004	13.0	22.0	9.8	12.2	14.4	19.6	9.0
2005	11.8	22.9	9.7	12.1	15.2	18.8	9.5
2006	11.2	20.6	8.7	11.5	15.5	22.1	10.4



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

2.7 Occupational and Environmental Diseases

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

2.7.1 Pesticide Poisoning

Based on the Department of Health's cholinesterase level examinations among farmers during 1992-2006, 13-31% of farmers had abnormal enzyme levels resulting from pesticide exposure. The trend is unlikely to decline and the rate of pesticide poisoning is between 2 and 6 cases per 100,000 population (Table 5.28).

Table 5.28 Cholinesterase test/results and morbidity/mortality due to pesticide poisoning among farmers, 1992-2006

Year	Cholinesterase test[1]			Pesticide poisoning [2]		
	Number (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	21,758	24.19	2,652	15	4.27
2002	115,105	33,858	29.4	2,571	14	4.11
2003	NA	NA	NA	2,342	9	3.72
2004	NA	NA	NA	1,864	9	2.98
2005	84,046	26,034	31.0	1,321	0	2.12
2006	133,255	36,776	27.6	1,183	0	1.90

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

2.7.2 Occupational Diseases in the Industrial Sector

In the industrial sector, an increasing number of workers encounter occupational diseases 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 2.4% in 2006 (Table 4.20). This is because of industrial expansion in manufacture and services with inappropriate use of new technologies, lack of training for personnel to have skills in using equipment or devices, and ineffective law enforcement measures.

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

1) Silicosis (stone dust pulmonary disease). 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 has dropped to lower than 250. In Thailand, at present an estimated 211,796 workers in 7,845 worksites are at 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, and 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) Byssinosis (cotton dust disease). The then 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 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 maximum 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.

3) Lead Poisoning. According to the 1993 study of the 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 including 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.

4) Risks from Organic Solvents. According to a study of risks for chemical hazards by Dr. Nalinee Sripuang[17] in 1999 on workers in petrochemical, auto-making and electronics industries, the workers were found to be at high risk for exposure to solvents in the aromatic hydrocarbon group. And it was found that female workers had a higher urine metabolite concentration 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 (of all the samples, 0.5% had a phenol content and 1.4% had a hippuric acid content higher than the maximum allowable levels).

In 2003, Dr. Nalinee Sripuang[18] conducted another study on impacts of occupational and environmental solvents on health in Thailand, collecting data on types of hazardous chemicals used and methods for management of chemical hazards in 62 provinces. It reveled that the major problems were found for four major groups of organic solvents resulting in three types of health problems, namely, (1) causing accidents, (2) causing illnesses, and (3) causing nuisances; and the industrial operations with a high risk for solvent exposure included washing operations, extracting operations, chemical production, fuel services, auto-repair operation, printing operation, paint production, and pesticide production, warehousing and sales.

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

[18] Nalinee Sripuang et al. Impact of Occupational and Environmental Solvents on Health in Thailand, 2003.

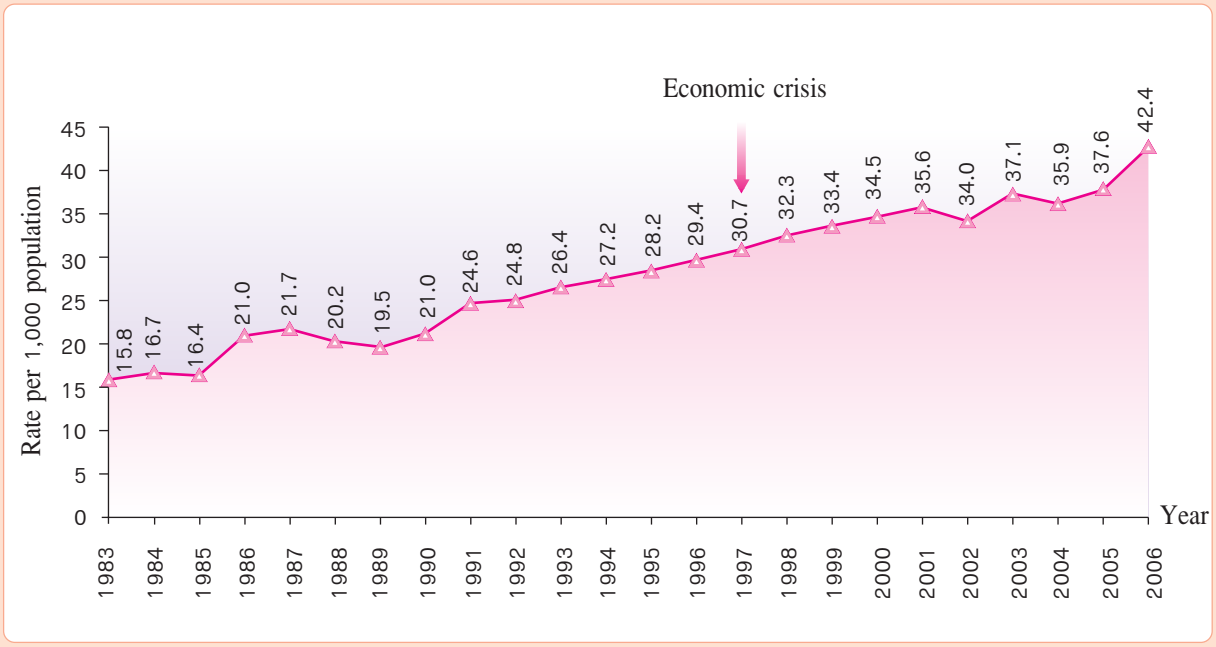
5) Hearing Loss. The Division of Occupational Health, MoPH, conducted a study in 1998[19] on hearing capacity of workers who encountered loud noise in industries. The study demonstrated that 69.3% of the workers had hearing impairment.

19 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.

2.8 Mental Health Problem

Mental health problems, based on the prevalence of 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 42.4 per 1,000 population in 2006 (Figure 5.51); and the numbers of patients with psychosis, depression and epilepsy are on the rise (Table 5.29). In addition, the rate of admissions of patients with psychosis and mental disorders has also risen from 90.74 per 100,000 population in 1981 to 227.2 per 100,000 population in 2006 (Figure 5.52).

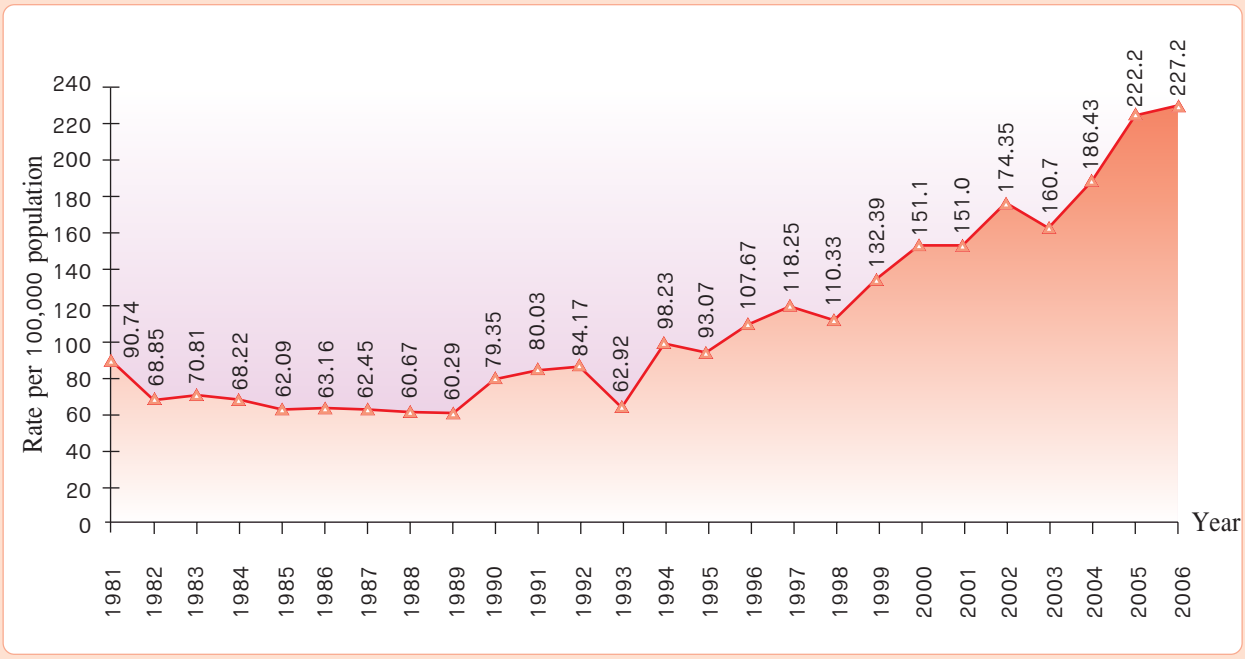
Figure 5.51 Rate of outpatient visits with mental and behavioural disorders, 1983-2006



Source: Outpatients Report. Bureau of Policy and Strategy, Office of the Permanent Secretary, Ministry of Public Health.

19 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.

Figure 5.52 Rate of admissions of patients with psychosis and mental disorders, Thailand, 1981-2006



Source: Inpatients Report. Bureau of Policy and Strategy, Office of the Permanent Secretary, Ministry of Public Health.

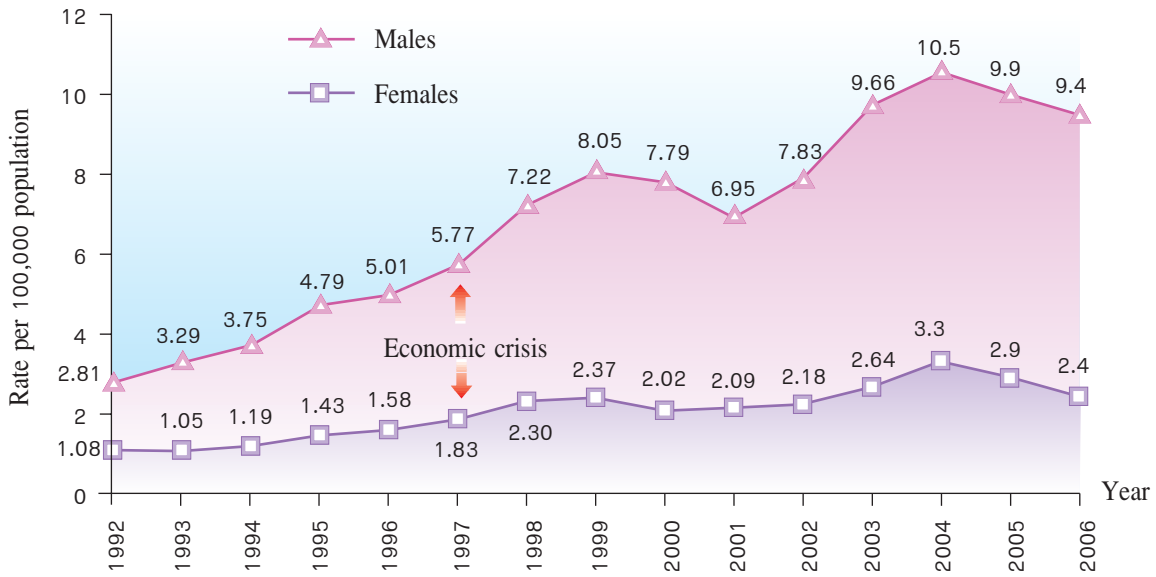
Table 5.29 Prevalence of mental disorders, 1997-2006

Mental disorder	Prevalence per 100,000 population									
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
- Psychosis	440.1	435.3	424.8	451.0	519.6	828.0	751.4	682.7	572.3	640.6
- Anxiety disorder	789.9	822.6	764.7	812.2	776.0	862.5	865.6	667.6	596.8	548.8
- Major depression	55.9	74.3	99.5	130.3	94.9	134.8	163.8	140.6	149.9	186.0
- Mental retardation	44.7	52.9	58.2	52.4	51.7	62.3	56.6	55.5	51.7	60.8
- Epilepsy	109.3	125.8	NA	149.8	182.5	200.3	193.5	180.5	195.2	172.1

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 tends to be on the rise; the rate in males being almost four times greater than that in females (Figure 5.53).

Figure 5.53 Rate of suicides, 1992-2006



Sources: 1. Data for 1992-2003 were derived from the database of the Royal Thai Police.

2. Data for 2004-2006 were derived from the Bureau of Policy and Strategy, Office of the Permanent Secretary, MoPH.

2.9 Nutritional Diseases

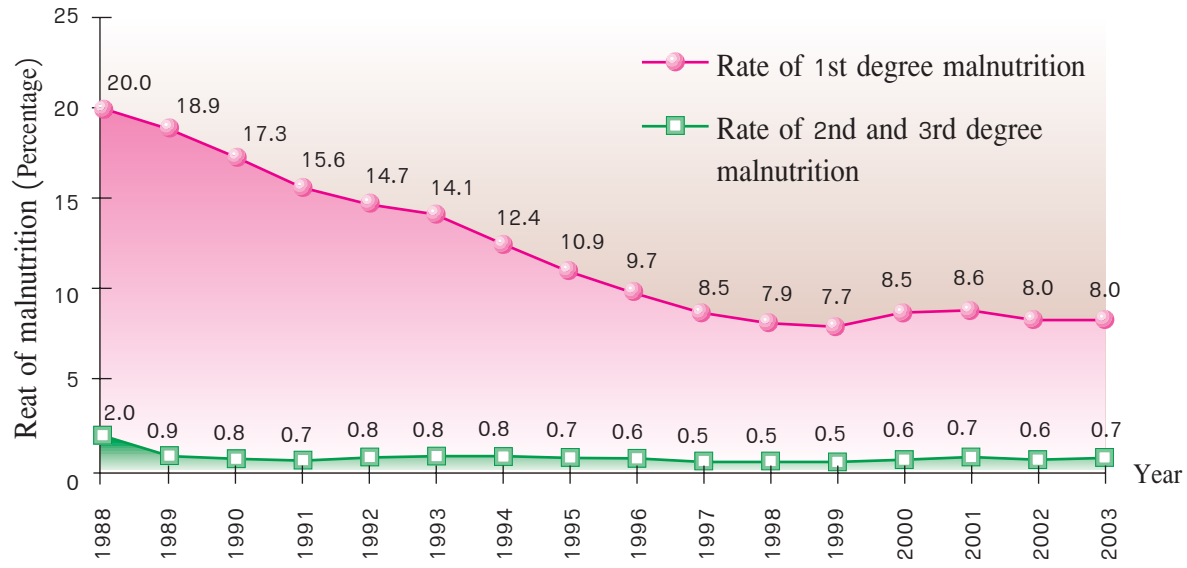
2.9.1 Malnutrition

The nutritional status of preschool children has generally improved (Figure 5.54). 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 almost eight times greater than that for Bangkok (Tables 5.30 and 5.31).

According to the World Health Report,[20] it was estimated that in 2000 approximately 27% of children under 5 years of age worldwide (168 million) were malnourished (weigh-for-age scale), making them more vulnerable to death due to diarrhoea and pneumonia.

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

Figure 5.54 Situation of protein and energy malnutrition among children aged 0-5 years, Thailand, 1988-2003



Source: Department of Health, Ministry of Public Health.

Table 5.30 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.

Table 5.31 Nutritional status (weight-for-age, percentage) of children aged 0-6 years by region, 2004-2006

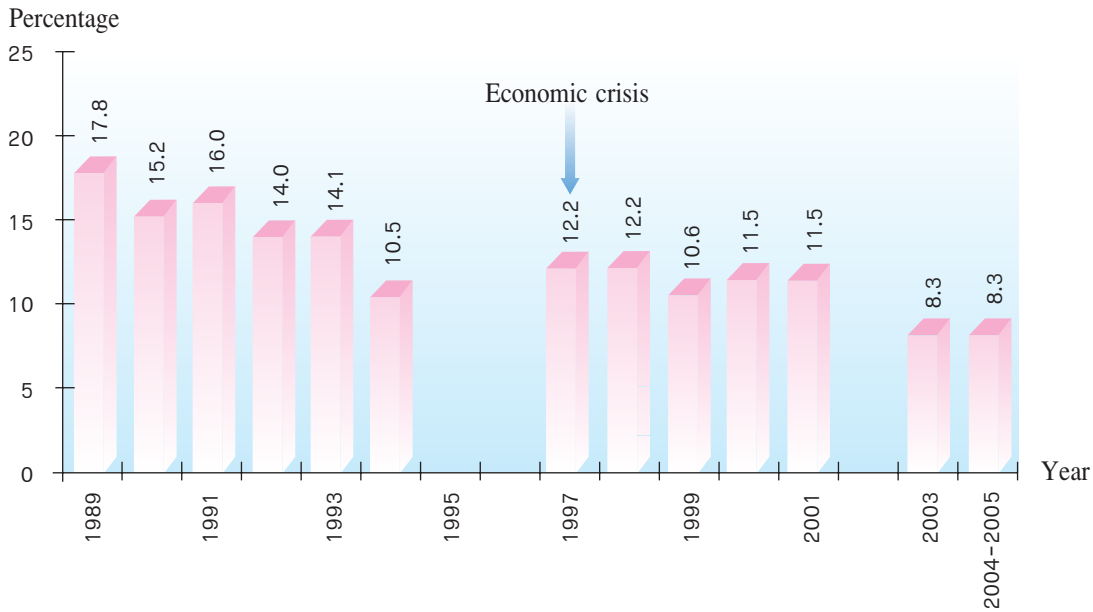
Year	Central		Northeast		North		South		Total	
	Rather low	Lower than standard	Rather low	Lower than standard	Rather low	Lower than standard	Rather low	Lower than standard	Rather low	Lower than standard
2004	2.68	1.35	8.02	3.03	7.56	2.67	5.24	2.81	6.23	2.53
2005	3.01	1.91	6.58	3.23	5.98	3.39	4.99	2.68	5.30	2.83
2006	2.90	2.81	6.44	2.98	4.74	2.72	4.36	3.27	5.19	2.94

Sources: Department of Health, Ministry of Public Health.

Note: Since 2004, the Department of Health has charged the criteria for assessing nutritional status of children.

The rate of underweight primary schoolchildren dropped steadily from 17.8% in 1989 to 10.5% in 1994. Nonetheless, during the economic crisis, such a rate increased slightly (Figure 5.55).

Figure 5.55 Proportion of underweight primary schoolchildren, 1989-2005



Source: Department of Health, Ministry of Public Health.

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

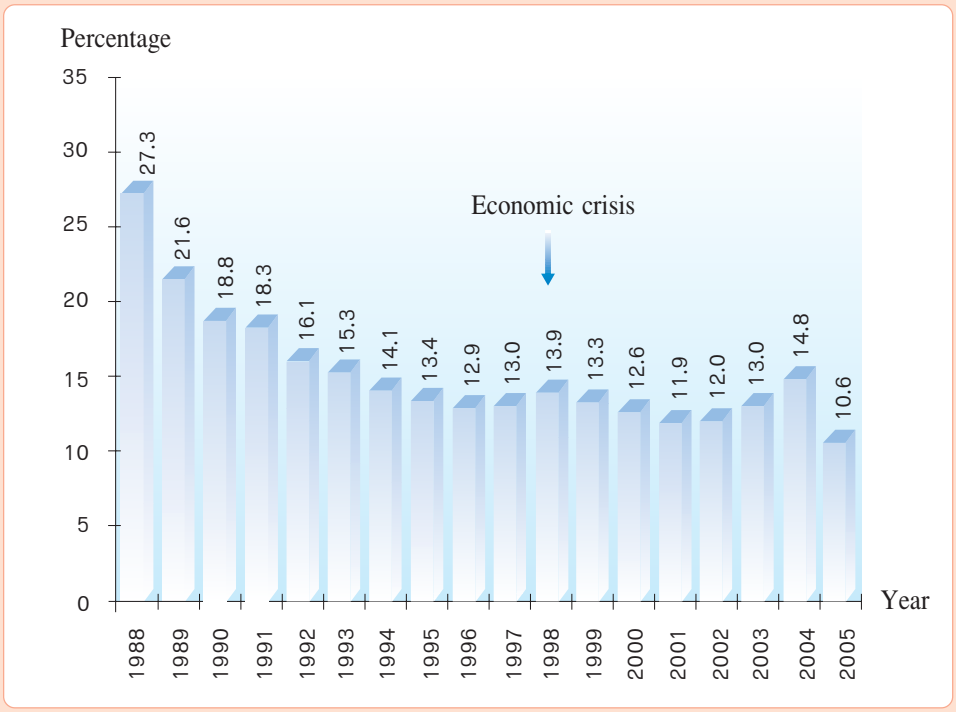
For 2003, data were derived from Thailand Diet and Nutrition Survey, Fifth Round, Department of Health, MoPH.

For 2005, data were derived from Child and Youth Survey, 2004-2005. Thai Health Promotion Foundation, 2006.

2.9.2 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 10.6% in 2005 (Figure 5.56).

Figure 5.56 Proportion of anaemic pregnant women (Hct <33%), 1988-2005

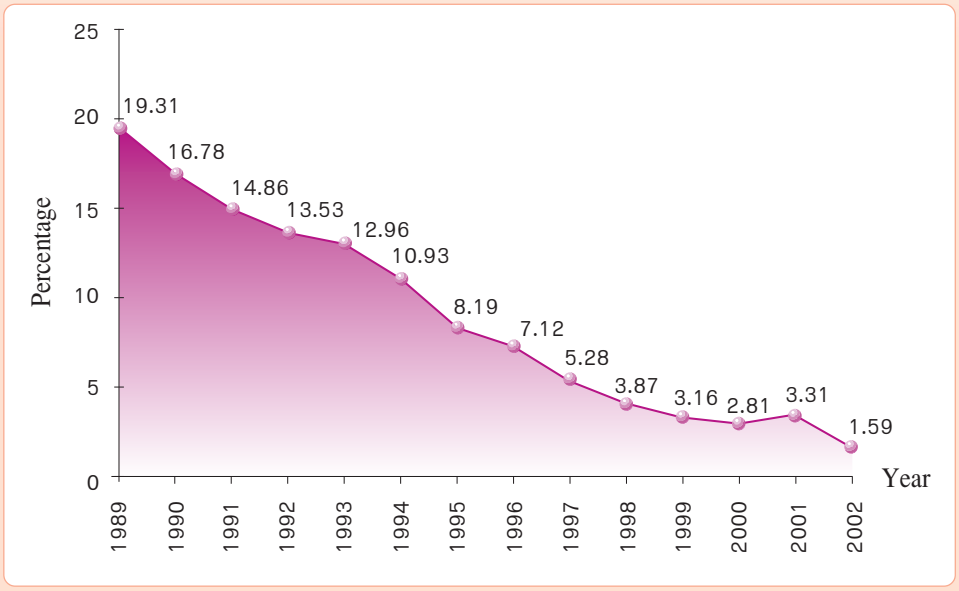


Source: Department of Health, Ministry of Public Health.

2.9.3 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 dropped from 19.31% in 1989 to 1.59% in 2002 (Figure 5.57); and the national average of goitre prevalence rate also dropped to 1.3% in 2003. But the IDD surveillance programme for preventing intellectual problems among newborn babies revealed that the trend in iodine deficiency among pregnant women is rising (Figure 5.58).

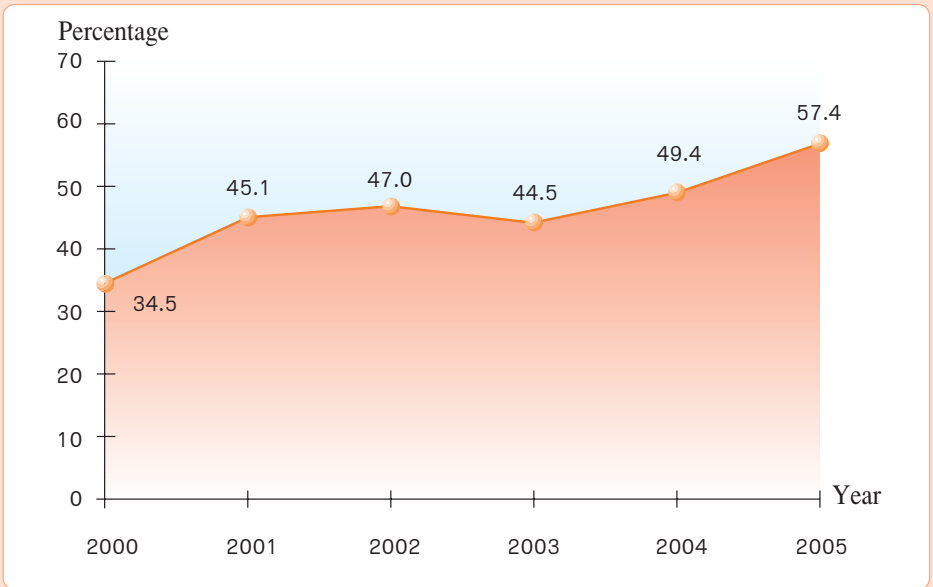
Figure 5.57 Situation of iodine deficiency disorders among primary schoolchildren, 1989-2002



Source: Department of Health, Ministry of Public Health.

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

Figure 5.58 Percentage of pregnant women with iodine deficiency (<10 μg/dl), 2000-2005

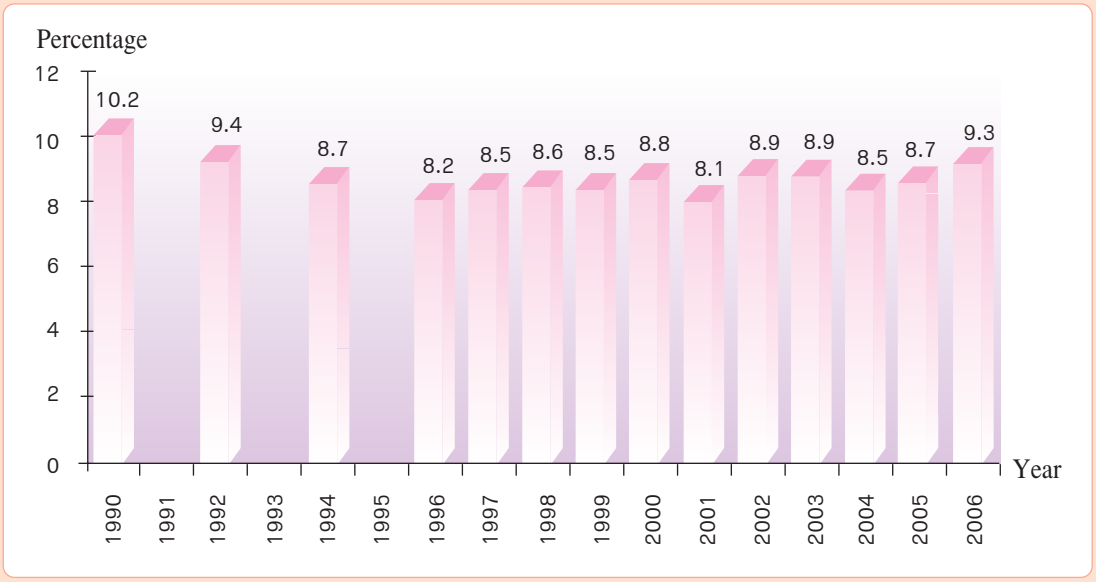


Source: Department of Health, Ministry of Public Health.

2.9.4 Neonates with Birth Weight under 2,500 Grams

Even though the rate of low birth weight (below 2,500 grams) in general has declined from 10.2% in 1990 to 9.3% in 2006 (Figure 5.59), after the economic crisis the rate of low birth weight in Thailand has been on a rising trend, particularly among the poor and unemployed population groups whose rates are higher than that among the non-poor; and the rates are highest in the South and the Northeast.

Figure 5.59 Percentage of newborns with low birth weight (under 2,500 grams), 1990-2006



Source: 1. Department of Health, MoPH.

2. For 2006, data were derived from the Child Situation Survey in Thailand, Dec 2005 - Feb 2006, National Statistical Office.

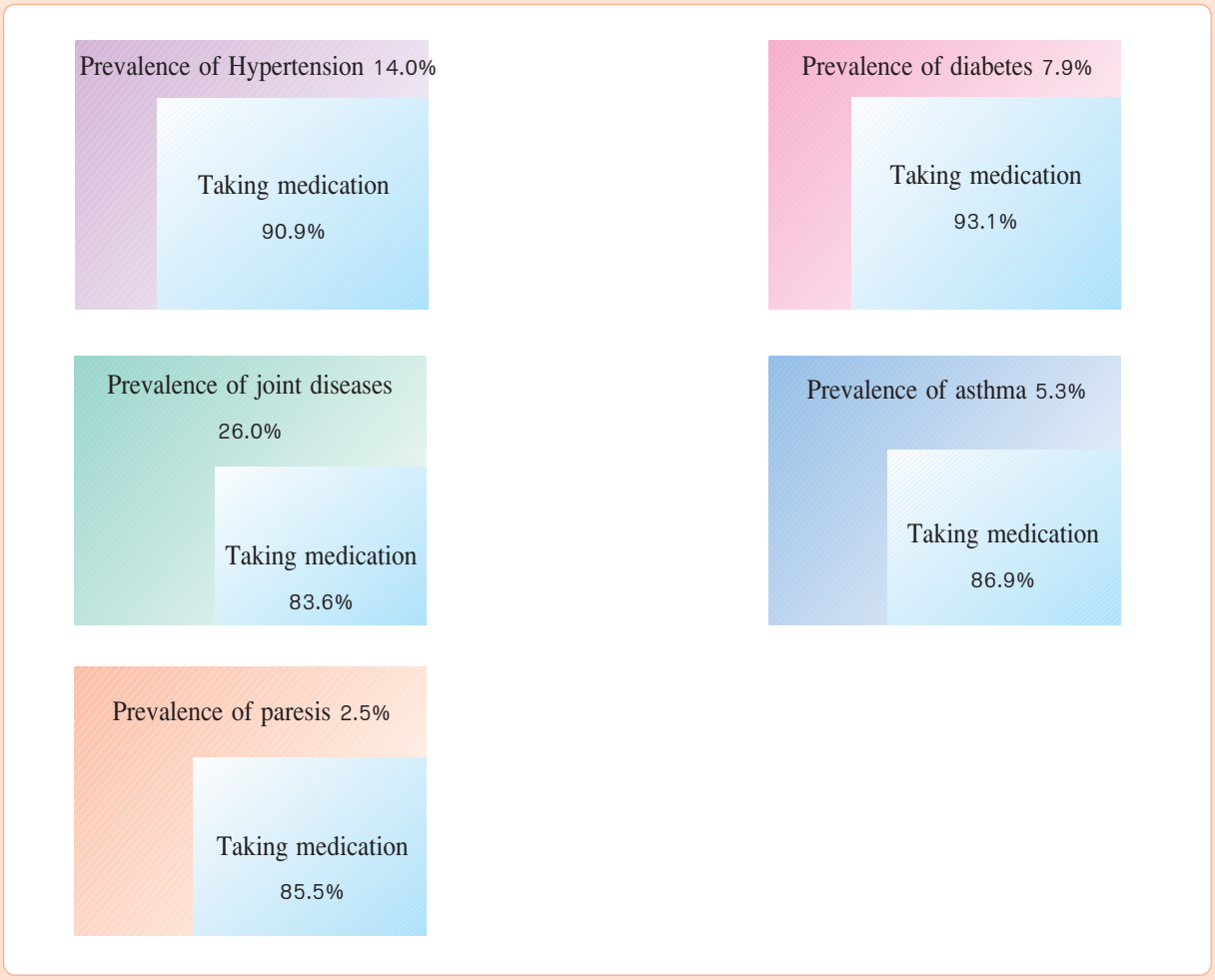
2.10 Health Problems of the Elderly

2.10.1 Diseases and Deficiencies 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 5.60).

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 5.32), and the prevalence is higher in females than in males (Table 5.33). The 2006 survey on risks of Thai elders, conducted by the Ministry of Social Development and Human Security, revealed that three-fourths of all elders had commonly found illnesses, i.e. hypertension, bone/joint diseases, diabetes, eye diseases and cardiovascular disease.

Figure 5.60 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 5.32 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 (degenerative)	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 5.33 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 (degenerative)	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.

2.10.2 Rising Trends in Health Problems of the Elderly

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

(1) Hypertension is a major health problem of the elderly that has a rising trend (Table 5.34) 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 loss in non-fatal health status or loss of healthy life years.

Table 5.34 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#	

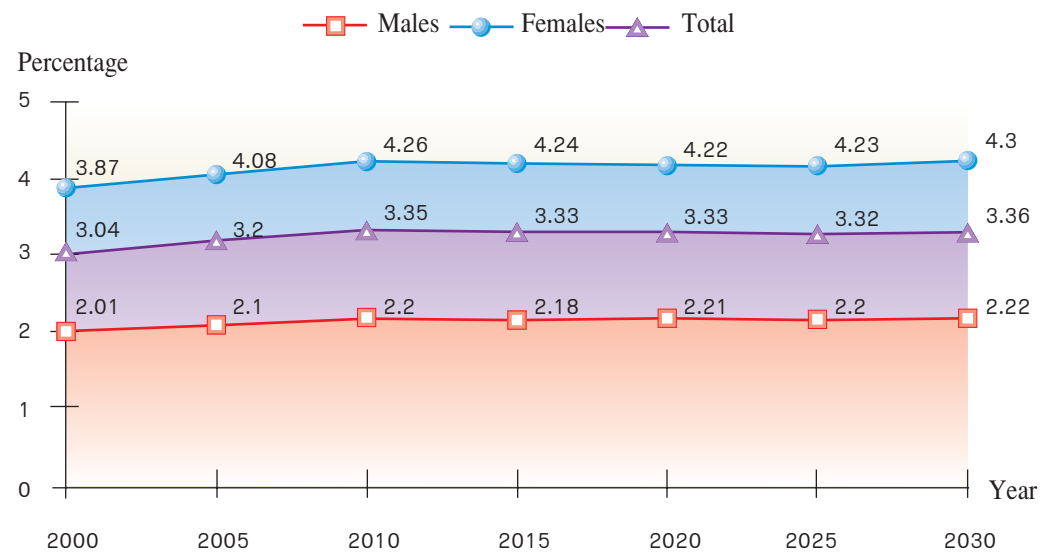
Source: Sutthichai Jitapunkul. The Spread of Chronic Diseases and Disabilities in Thailand: A Hypothesis Based on the Data from Studies on the Elderly, 2000.

Notes: * Criteria used only for hypertension + Age 65+ yrs

** Criteria used only for history taking # National survey

(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% in 2030 (the female to male ratio being 2:1) (Figure 5.61). Besides, the prevalence of dementia is rising with age. A screening test of elders' brains reveals a rising proportion of both male and female elders with brain defects which might be dementia, more prevalent in females than in males (Table 5.35). 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 rates of increase are comparable (Table 5.36).

Figure 5.61 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 on a Study of Health Problems among Thai Elders, 1998.

Table 5.35 Results of brain screening examinations of the elderly by sex and age

Sex	Age (years)	Dementia (%)
Male	60-69	16.3
	70-79	27.0
	80+	47.2
	Total	**23.8**
Female	60-69	22.1
	70-79	38.6
	80+	70.3
	Total	**35.2**

Source: Report on Health Examination Survey, Thailand, Third Round, 2003-2004. Health Systems Research Institute.

Table 5.36 Comparison of dementia prevalence among Thai and American elders

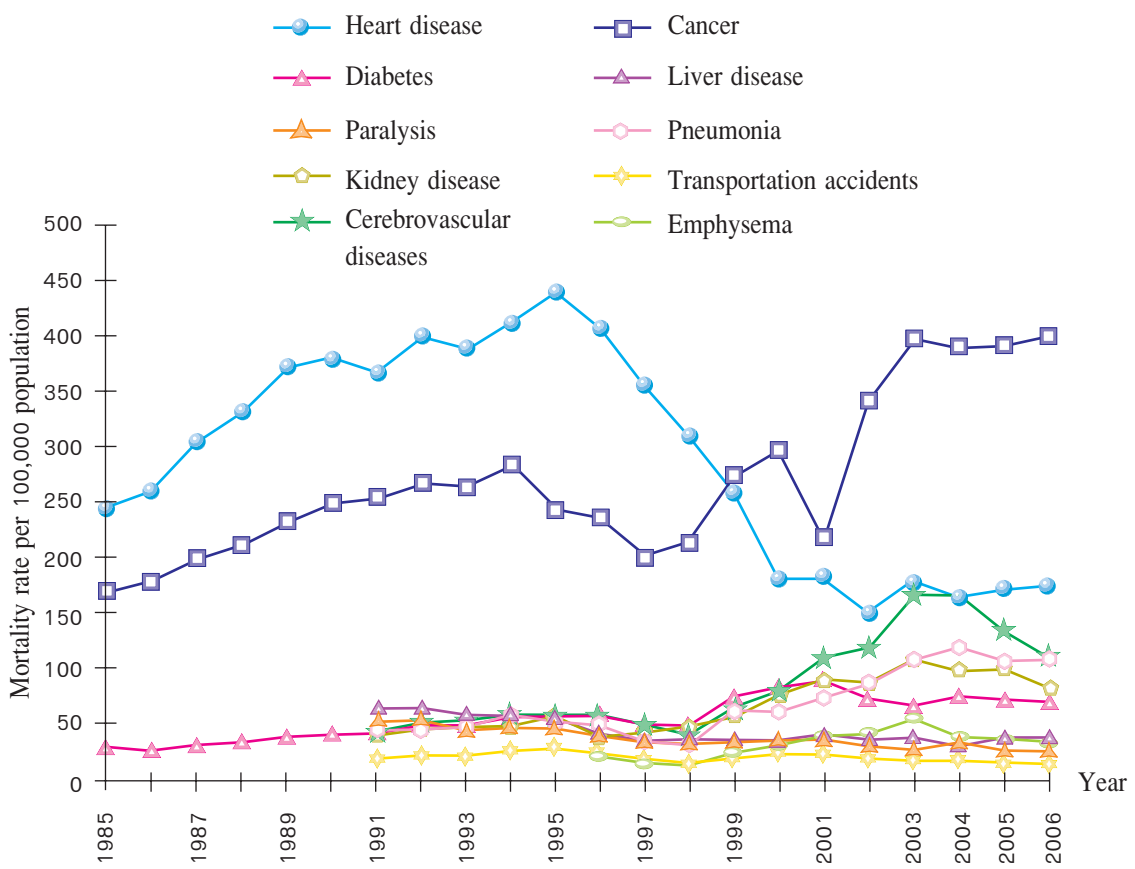
Age (years)	Prevalence	
	Thai elders	American elders
60 - 64	1%	-
65 - 69	2%	2.5%
70 - 74	3%	5%
75 - 79	5%	10%
80 - 84	7.5%	15%
85 - 89	12.5%	30%
90+	30%	-

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, cancer, heart disease, cerebrovascular disease, pneumonia, kidney disease and diabetes. It has been found that the mortality rate per 100,000 population from cancer has risen from 169.1 in 1985 to 402.5 in 2006. The rate of mortality due to cerebrovascular disease (per 100,000 population) has also risen from 54.9 in 1996 to 110.9 in 2006. The rates of mortality have also risen for diabetes from 28.8 to 71.3 for the same period and for pneumonia from 42.0 in 1991 to 110.3 in 2006 (Figure 5.62 and Table 5.37).

Figure 5.62 Mortality rates of major causes of death in the elderly, 1985-2006



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

Table 5.37 Mortality rates of diabetes, heart disease, cancer, paralysis, liver diseases, kidney diseases, pneumonia, transportation accidents, cerebrovascular disease, and emphysema among the elderly, 1985-2006

Year	Mortality rate per 100,000 population among the elderly									
	Diabetes	Heart diseases	Cancer	Liver diseases	Kidney diseases	Paralysis	Pneumonia	Transportation accidents	Cerebrovascular diseases	Emphysema
1985	28.8	245.0	169.1	n.a.	n.a.	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.	n.a.	n.a.
1987	30.3	304.3	199.1	n.a.	n.a.	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.	n.a.	n.a.
1989	37.2	372.3	231.9	n.a.	n.a.	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.	n.a.	n.a.
1991	39.9	386.7	253.9	62.6	38.3	49.5	42.0	16.9	n.a.	n.a.
1992	49.5	400.3	266.8	63.4	48.0	51.5	42.3	20.1	n.a.	n.a.
1993	50.8	389.7	262.9	57.1	45.9	42.4	45.3	19.5	n.a.	n.a.
1994	57.2	412.2	283.9	56.3	47.5	44.9	56.0	24.1	n.a.	n.a.
1995	56.2	440.7	242.1	52.2	55.3	45.5	51.0	26.3	n.a.	n.a.
1996	57.4	407.5	236.2	41.4	38.2	37.4	46.8	22.4	54.9	18.4
1997	48.5	356.1	199.4	33.1	40.5	32.0	33.7	17.1	49.1	13.3
1998	47.7	310.0	213.0	34.4	46.7	31.3	28.9	13.3	38.0	11.0
1999	74.8	257.7	273.7	34.0	56.1	32.3	61.1	18.5	63.8	23.0
2000	82.1	179.9	297.6	34.0	75.5	33.9	59.9	22.6	79.7	29.5
2001	88.4	182.2	218.2	40.6	89.6	34.8	73.0	21.5	110.1	38.8
2002	72.1	149.4	342.6	35.5	87.2	29.2	85.5	18.9	118.7	40.2
2003	66.7	177.1	399.5	38.3	108.0	26.8	107.4	16.7	166.8	54.9
2004	75.8	163.8	393.1	30.7	98.9	32.8	119.2	17.3	166.3	37.7
2005	73.0	172.3	393.6	39.5	100.3	26.6	107.8	16.2	134.3	37.4
2006	71.3	175.3	402.5	39.2	83.0	25.9	110.3	15.2	110.9	35.1

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

Note: n.a. = Data not available

Table 5.37 Mortality rates of diabetes, heart disease, cancer, paralysis, liver diseases, kidney diseases, pneumonia, transportation accidents, cerebrovascular disease, and emphysema among the elderly, 1985-2006

Year	Mortality rate per 100,000 population among the elderly									
	Diabetes	Heart diseases	Cancer	Liver diseases	Kidney diseases	Paralysis	Pneumonia	Transportation accidents	Cerebrovascular diseases	Emphysema
1985	28.8	245.0	169.1	n.a.	n.a.	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.	n.a.	n.a.
1987	30.3	304.3	199.1	n.a.	n.a.	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.	n.a.	n.a.
1989	37.2	372.3	231.9	n.a.	n.a.	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.	n.a.	n.a.
1991	39.9	386.7	253.9	62.6	38.3	49.5	42.0	16.9	n.a.	n.a.
1992	49.5	400.3	266.8	63.4	48.0	51.5	42.3	20.1	n.a.	n.a.
1993	50.8	389.7	262.9	57.1	45.9	42.4	45.3	19.5	n.a.	n.a.
1994	57.2	412.2	283.9	56.3	47.5	44.9	56.0	24.1	n.a.	n.a.
1995	56.2	440.7	242.1	52.2	55.3	45.5	51.0	26.3	n.a.	n.a.
1996	57.4	407.5	236.2	41.4	38.2	37.4	46.8	22.4	54.9	18.4
1997	48.5	356.1	199.4	33.1	40.5	32.0	33.7	17.1	49.1	13.3
1998	47.7	310.0	213.0	34.4	46.7	31.3	28.9	13.3	38.0	11.0
1999	74.8	257.7	273.7	34.0	56.1	32.3	61.1	18.5	63.8	23.0
2000	82.1	179.9	297.6	34.0	75.5	33.9	59.9	22.6	79.7	29.5
2001	88.4	182.2	218.2	40.6	89.6	34.8	73.0	21.5	110.1	38.8
2002	72.1	149.4	342.6	35.5	87.2	29.2	85.5	18.9	118.7	40.2
2003	66.7	177.1	399.5	38.3	108.0	26.8	107.4	16.7	166.8	54.9
2004	75.8	163.8	393.1	30.7	98.9	32.8	119.2	17.3	166.3	37.7
2005	73.0	172.3	393.6	39.5	100.3	26.6	107.8	16.2	134.3	37.4
2006	71.3	175.3	402.5	39.2	83.0	25.9	110.3	15.2	110.9	35.1

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

Note: n.a. = Data not available

3. Conclusions

3.1 Equity in Health Status

3.1.1 Health Status According to Socioeconomic Factors at Individual Level

Social and economic factors at the individual or family level has some influence on health as they affect people's accessibility to factors required for livelihood and to services, particulary essential health care.

The 1996 health examination survey revealed a comparison of equalities in health status of the elderly with different economic status backgrounds, classified by family's financial conditions: unneedy, occasionally needy, somewhat needy, and very needy. It was found that the financially needy condition was significantly associated with disability; 22% of unneedy elders were disabled, and as high as 35% of very needy elders were disabled compared to the unneedy (Table 5.38).

Table 5.38 Disabilities of elders by level of financial neediness

Financial status	Long-term disability		total disability	
	Percent	Odds ratio	Percent	Odds ratio
Very needy (n =188)	25.5	1.63-3.4	34.6	1.59-3.09
Somewhat needy (n =591)	20.8	1.12-1.83	28.9	1.22-1.88
Occasionally needy (n =1,056)	19.6	1.08-1.61	27.0	1.15-1.65
Unneedy (n =2,213)	17.7	1.0	22.2	1.0

Source: Sutthichai Jitapunkul et al. 1999.

According to the 2004 Health and Welfare Survey, examining the proportion of sick people with and without hospitalized care and their income level, the lowest-income group had the highest proportion of illness (26%) while the highest-income group had an illness proportion of only 15% (Table 5.39). If the illness proportion was equal for all five income groups, the proportion should be 20%.

Table 5.39 Proportion (percentage) of people with illness (as outpatients and inpatients) by income level

Income level	Proportion of people with illness	
	Requiring non-hospitalization care (outpatient)	Requiring hospitalization care (inpatient)
Lowest	26.4	25.6
Low	21.0	21.1
Medium	20.4	19.3
High	17.2	19.0
Highest	15.0	15.0
Total	**100**	**100**

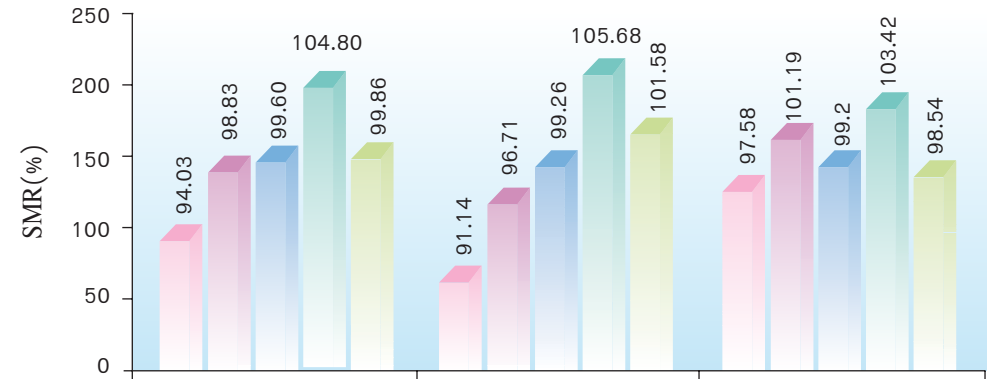
Source: Suphon Limwattananon et al. 2005.

So it can be said that the socioeconomic status of individuals or families mostly tends to be associated with illness conditions which are self-reported, including disabilities resulting from a lack of suitable care.

3.1.2 Health Status According to Socioeconomic Status at the Locality Level

An analysis of the relationship between the socioeconomic status of locality and mortality in 926 districts across the country (including Bangkok), categorized into five quintiles using socioeconomic indicators of districts derived from five socioeconomic variables from the population and housing census data, comparing standardized mortality ratio (SMR) in groups of districts, reveals that SMRs are different among groups of districts. The differences are found in the aspects of overall mortality, mortality by sex, and mortality by disease. For overall mortality in males, accidents and suicide are the top leading causes of death in the district groups with medium and high socioeconomic levels (quintile 4); a lower proportion is noted in poorer districts with regard to deaths due to liver cancer, the highest death proportion is found in poor district groups (quintiles 1 and 2) as they are located in the Northeast with a higher prevalence of bile duct cancer, compared with other regions. As for lung cancer, diabetes, ischemic heart disease and cerebrovascular disease, the highest death proportions are found in the rich group of districts (quintile 5), while the death proportions of leukemia and accidental drowning have no difference among district groups (Figures 5.63-5.66).

Figure 5.63 Standardized mortality ratios (overall and by sex) in groups of districts with various socioeconomic levels

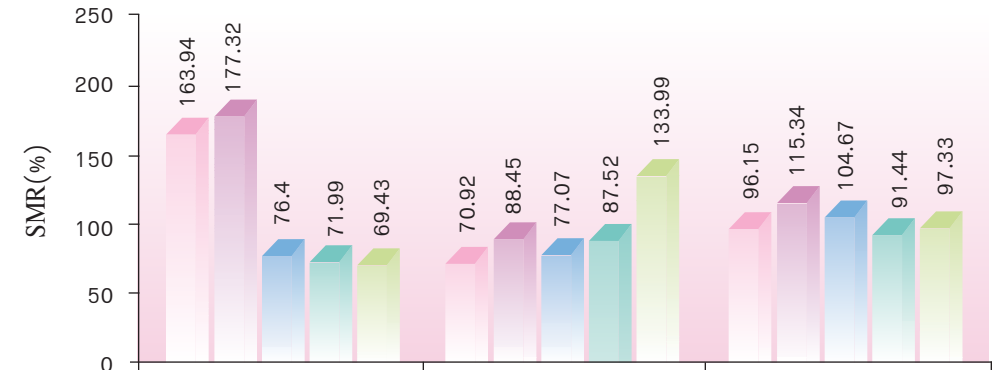


	SMR, Overall	SMR, Males	SMR, Females
Quintile 1	94.03	91.14	97.58
Quintile 2	98.83	96.71	101.19
Quintile 3	99.60	99.26	99.2
Quintile 4	104.80	105.68	103.42
Quintile 5	99.86	101.58	98.54

Quintile 1 = Poorest Quintile 5 = Richest

Source: Pinij Faramnuayphon and Pattama Wapattanawong, 2005.

Figure 5.64 Standardized mortality ratios of three cancers in groups of districts with various socioeconomic levels

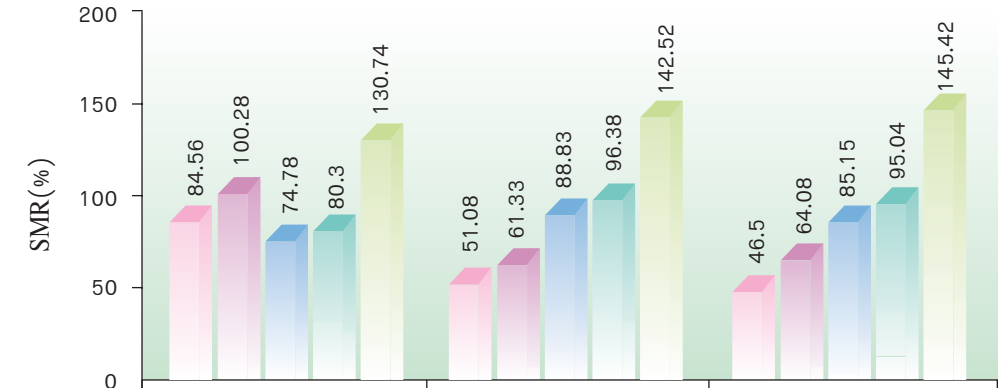


	Liver cancer	Lung Cancer	Leukemia
Quintile 1	163.94	70.92	96.15
Quintile 2	177.32	88.45	115.34
Quintile 3	76.4	77.07	104.67
Quintile 4	71.99	87.52	91.44
Quintile 5	69.43	133.99	97.33

Quintile 1 = Poorest Quintile 5 = Richest

Source: Pinij Faramnuayphon and Pattama Wapattanawong, 2005.

Figure 5.65 Standardized mortality ratios of three chronic diseases in groups of districts with various Socioeconomic Levels

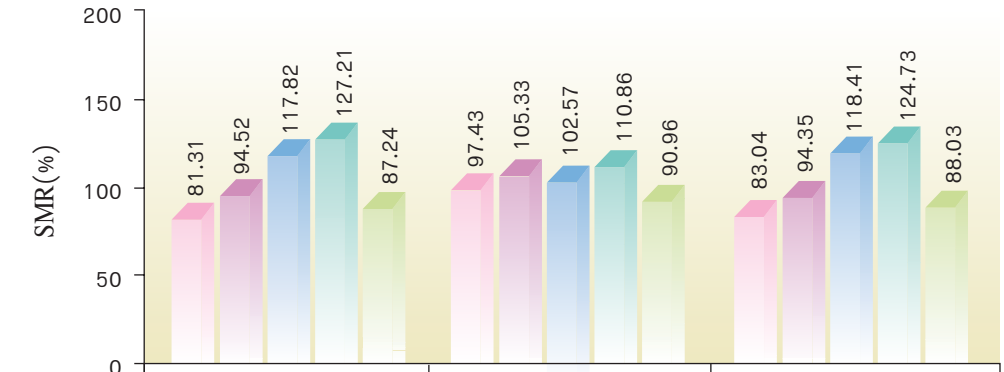


	Diabetes	Ischemic heart disease	Cerebrovascular disease
Quintile 1	84.56	51.08	46.5
Quintile 2	100.28	61.33	64.08
Quintile 3	74.78	88.83	85.15
Quintile 4	80.3	96.38	95.04
Quintile 5	130.74	142.52	145.42

Quintile 1 = Poorest Quintile 5 = Richest

Source: Pinij Faramnuayphon and Pattama Wapattanawong, 2005.

Figure 5.66 Standardized mortality ratios of accidents and suicide in groups of districts with various socioeconomic levels



	Traffic accident	Drowning	Suicide
Quintile 1	81.31	97.43	83.04
Quintile 2	94.52	105.33	94.35
Quintile 3	117.82	102.57	118.41
Quintile 4	127.21	110.86	124.73
Quintile 5	87.24	90.96	88.03

Quintile 1 = Poorest Quintile 5 = Richest

Source: Pinij Faramnuayphon and Pattama Wapattanawong, 2005.

Another explanation of the differences in morbidity and mortality rates in districts with different socioeconomic status is that they have different risk factors. For example, in municipal and non-municipal areas, according to the 1996-1997 and national health examination survey, the proportion municipal residents with a high cholesterol level (>200 mg/dl%) is 18% higher than that for non-municipal residents (Table 5.40).

Table 5.40 Percentage of people with high blood cholesterol by region and residence

Residential area	Population with cholesterol >200 mg/dl%					
	Bangkok	Central	North	Northeast	South	Total
Cholesterol >200 mg/dl%	56.1	48.4	36.1	15.7	41.7	35.8
Municipal areas		43.2	43.3	42.6	50.4	51.5
Non-municipal areas		49.3	35.5	13.9	40.3	33.9

Source: Second National Health Examination Survey.

The 1996-97 survey also shows that municipal residents are 1.2 times more likely to have hypertension than non-municipal people. Besides, differences are noted for risks for such illnesses as heart diseases, cerebrovacular diseases, etc, which are major causes of morbidity and mortality.

Moreover, the infant mortality rate is an indicator of health status disparities in various population groups. In non-municipal areas, the infant mortality rate is 1.56 times higher than that in municipal areas. Even though it has declined significantly during the part 30 years, the disparities between municipal and non-municipal areas are steadily on the rise (Table 5.41).

Table 5.41 Infant morbidity rates in municipal and non-municipal areas, 1964-2006

Survey	IMR (per 1,000 live births)			
	Total	Municipal areas	Non municipal areas	NM to M rates
SPC 1 (1964-1965)	84.3	67.6	85.5	1.26
SPC 2 (1974-1976)	51.8	39.6	58.7	1.48
SPC 3 (1985-1986)	40.7	27.6	42.6	1.54
SPC 4 (1989)	38.8	23.6	41.4	1.75
SPC 5 (1991)	34.5	21.0	37.0	1.76
SPC 6 (1995-1996)	26.05	15.24	28.23	1.85
SPC 7 (2005-2006)	11.26	7.92	12.39	1.56

Source: National Statistical Office.

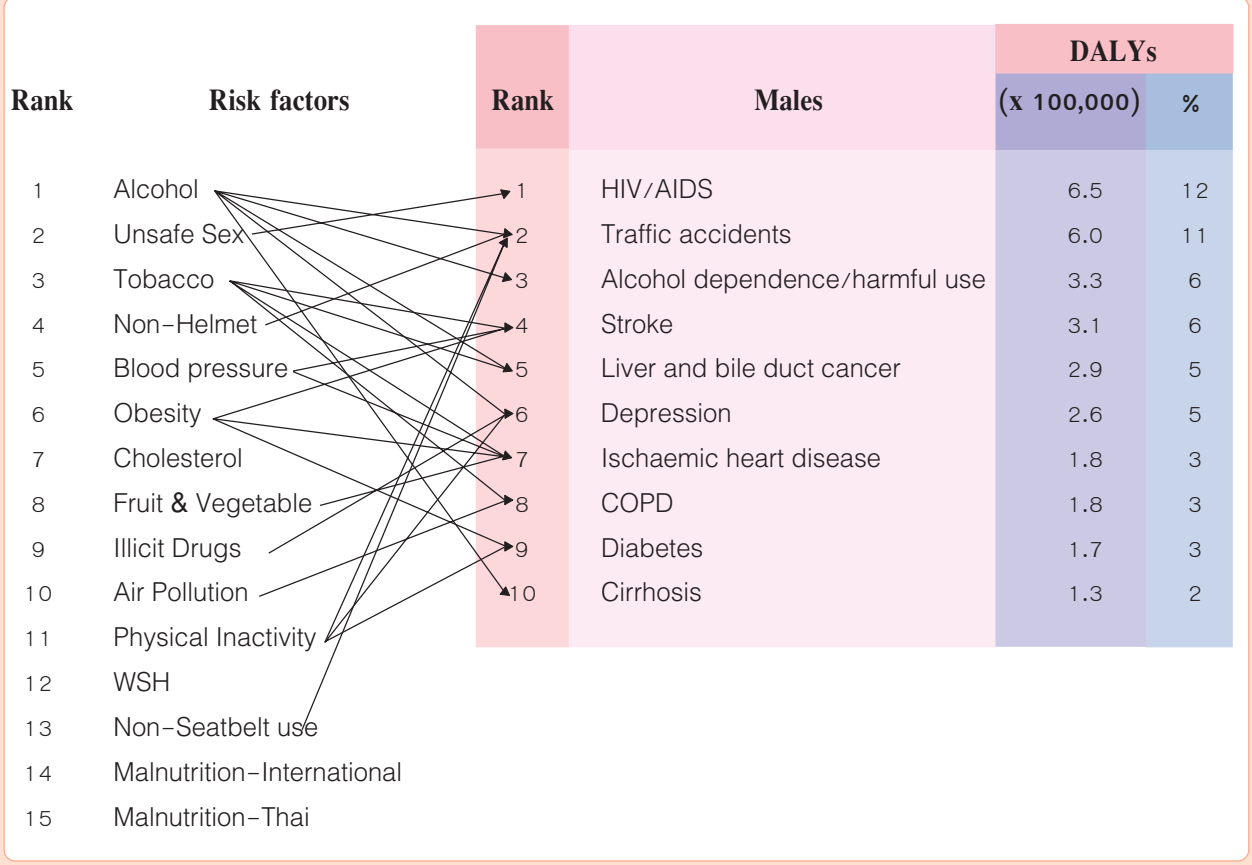
Note: SPC = Survey of Population Changes.

3.2 Relationship Between Risk Factors and Health Problems

An analysis of the relationship between risk factors and health problems reveals that smoking and alcohol drinking as are significant co-risk factors for major disease burden in males. Alcohol abuse is the major cause of road traffic accidents, alcoholic dependence, liver cancer, depression and cirrhosis, while smoking is the major risk factor for cerebrovascular disease, liver cancer, ischaemic heart disease, and chronic obstructive pulmonary disease for instance (Figure 5.67).

Among females, the risk factors for major disease burdens are, for example, overweight being a co-risk factor for cerebrovascular disease, depression, ischaemic heart disease, and knee-joint degeneration (Figure 5.68).

Figure 5.67 Diseases and risk factors among Thai males, 2004



Rank	Risk factors	Rank	Males	DALYs (x 100,000)	DALYs %
1	Alcohol	1	HIV/AIDS	6.5	12
2	Unsafe Sex	2	Traffic accidents	6.0	11
3	Tobacco	3	Alcohol dependence/harmful use	3.3	6
4	Non-Helmet	4	Stroke	3.1	6
5	Blood pressure	5	Liver and bile duct cancer	2.9	5
6	Obesity	6	Depression	2.6	5
7	Cholesterol	7	Ischaemic heart disease	1.8	3
8	Fruit & Vegetable	8	COPD	1.8	3
9	Illicit Drugs	9	Diabetes	1.7	3
10	Air Pollution	10	Cirrhosis	1.3	2
11	Physical Inactivity				
12	WSH				
13	Non-Seatbelt use				
14	Malnutrition-International				
15	Malnutrition-Thai				

Source: Working Group on Burden of Disease and Risk Factors in Thailand, International Health Policy Programme, 2006.

Figure 5.68 Diseases and risk factors among Thai females, 2006

Rank	Risk factors	Rank	Females	DALYs (x 100,000)	DALYs %
1	Unsafe Sex	1	Stroke	3.1	8
2	Obesity	2	HIV/AIDS	2.9	7
3	Blood pressure	3	Diabetes	2.9	7
4	Cholesterol	4	Depression	1.9	5
5	Non-Helmet	5	Liver and bile duct cancer	1.4	4
6	Tobacco	6	Traffic accidents	1.4	3
7	Physical Inactivity	7	Ischaemic heart disease	1.2	3
8	Fruit & Vegetable	8	Osteoarthritis	1.2	3
9	Alcohol	9	COPD	1.1	3
10	Air Pollution	10	Cirrhosis	1.1	3
11	WSH				
12	Illicit Drugs				
13	Malnutrition-International				
14	Malnutrition-Thai				
15	Non-Seatbelt use				

Source: Working Group in Burden of Disease and Risk Factors in Thailand, International Health Policy Programme, 2006.

3.3 Risk Factors and Disease Occurrence

In addition to risk factors that are behaviour related, factors at the individual level tend to result in getting chronic or non-communicable diseases such as obesity, hereditary diseases (family history), and high blood-chemical contents (such as cholesterol and sugar levels).

A cohort study on employees of the Electricity Generating Authority of Thailand (EGAT, 1985-1997) reveals that there are several factors that determine the chances of developing an illness such as age, sex, body mass index, waistline, hypertension, family history with diabetes, impaired glucose tolerance, triglyceride level, and HDL-cholesterol level. The study also indicates that a BMI level between 23 and 27.5 increases the chance of having diabetes 1.7 times, and a BMI of 27.5 or over increases such a chance 2.9 times, compared with a BMI under 23. The waistline greater than the maximum allowable limit (90 cm in males and 80 cm in females) increases the chance of developing diabetes 1.7 times; hypertension increases such a chance 1.7 times, and a family history increases it 2.7 times (Table 5.42). It is noteworthy that such risk factors clearly determine the chance of developing illnesses in the future; some of the risk factors can be controlled or modified.

Table 5.42 Odds ratios of various variables contributable to the occurrence of diabetes

Variable		Odds ratio (95% CI)
Age	35-39	1
	40-44	0.86 (0.60, 1.25)
	45-49	1.06 (0.72, 1.57)
	≥ 50	1.43 (0.81, 2.49)
Sex (male =1, female = 0)		1.64 (1.09, 2.47)
BMI (kg/m^2)	23 - ≤ 27.5	1.73 (1.26, 2.47)
	≥ 27.5	2.93 (1.59, 5.54)
Waistline: ≥90 cm in males, ≥ 80 cm in females		1.69 (1.12, 2.57)
Hypertension		1.67 (1.18, 2.35)
Diabetic history: father or mother or brother/sister		2.72 (2.03, 3.66)
Impaired Glucose tolerance		4.10 (2.97, 5.64)
Triglyceride ≥ 200		1.57 (1.11, 2.23)
HDL-C <40 in males, < 50 in females		1.30 (0.85, 1.98)

Source: Wichai Ekpalakorn, 2005.