

R. Choiejit  
Department of Economics, Faculty of Social  
Science, Srinakharinwirot University, Bangkok,  
Thailand

R. Teungfung  
Rajamongkala Institute of Technology, Nonthaburi  
Campus, Nonthaburi, Thailand

## The Patterns of Traffic Accidents in Thailand

### Abstract

Traffic accidents were ranked the third among the major causes of death in Thailand. About 13,438 deaths and the death rate from traffic accident was 21.5 per 100,000 of population in 2002. The deaths and death rate varied upon the economic situation. After the economic crisis, traffic accidents were increased as well as the period of the bubble economy. In the Central region of Thailand numbers of road traffic crashes were lower than Bangkok Metropolis, but the highest in the number of deaths, death rate and serious injuries in 2002. Men aged 15–29 years old had higher numbers of deaths than men in other age groups and higher than women. Deaths and injuries from road traffic crashes were the highest in April and January, because there was a long weekend in those months. About 80 percent of road traffic crashes were caused by private car and motorcycle. In 2000 about 51 percent of traffic accidents took place on the straight way, followed by the junction and curves. In 2002, about 97 percent of road traffic crashes were caused by human factors including improper passing, speeding and disregarding to traffic signal, however, the identification of causes of traffic accident needed to improve. Drunk driving, disregarding on safety equipment usage, inefficiency of law enforcement and discontinuing of road safety programs were the deepest causes of traffic accidents. Research based information, a broad coalition of stakeholder and urban planning policy were needed to incorporate for a comprehensive road safety policy formulation and actions.

### Introduction

Traffic accidents became a major problem in Thailand, not only a public health problem, but also

a Thai society problem. Deaths and injuries from road traffic accident increased rapidly following the rapid motorization during the period of bubble economy in the late 1980s. During that time, more than 200,000 and 250,000 newly registered personal cars and motorcycles, respectively, increased annually [1]. The negative effect of motorization in Thailand was an rapid increasing of the road traffic crashes. However, the number of traffic crashes in Thailand decreased during the period of the economic crisis in the late 2000s. Then, after the period of economic crisis, number of road traffic crashes increased in the period of economic recovery. This means that Thai society has to confront with a traffic accident problem. This study aims to explore the patterns and trends of traffic accidents in different geographic areas of Thailand, particularly after the period of economic crisis, and the characteristics of people injured or killed in road traffic crashes. Moreover, this study intends to investigate the risk factors of road traffic crashes.

### Materials and Methods

This study reviewed the patterns and trends of traffic accidents and associated injuries and deaths based on the data compiled by various Thai government agencies. The two main sources of material data for this study were derived from:

1. Public Health Statistics compiled by the Bureau of Health Policy and Strategy, Ministry of Public Health, which provide the data of major causes of deaths, number of deaths and death rates in road traffic accidents, the characters of the deaths.
2. Criminal Statistics compiled by the Royal Thai Police Office, Ministry of the Prime Minister Affairs, which provide the number of deaths, injuries. Mode of transport in road traffic crashes, causes and places of traffic accidents and also financial losses due to traffic accidents were reported by this source of data.

### Results

Traffic accidents were ranked the third among the leading causes of deaths in Thailand. About 13,438 deaths from traffic accidents as compared to 45,834 and 32,896 deaths caused by all forms of cancers and the disease of the heart and

cerebrovascular, respectively in 2002. The death rate from traffic accident was 21.5 per 100,000 of population as compared to 73.3 and 52.6 per 100,000 of population of the cancers and the disease of the heart and cerebrovascular, respectively in 2002 (table 1). A recent study on road traffic injuries in Thailand showed that the number and rate of traffic injury in Thailand swung from a low record during the economic recovery in the early of 1980s to a high record during the period of bubble economy, and then to a decline during the period of economic crisis. However, after the period of economic crisis, the number and rate of traffic accident in Thailand increased [2].

Table 2 shows in 1998 the lowest record in the period of economic crisis, about 7,986 deaths from traffic accidents. The number of deaths from traffic accident increased to 13,348 in 2002. The death rate increased from 13.1 to 21.5 per 100,000 of population between 1998 and 2002, respectively. This means that numbers of deaths and the death rates from traffic accidents in Thailand varied upon the economic situation. After the period of economic crisis, the trends of traffic accident in Thailand increased nearly as strong as in the period of the bubble economy [2], similarly to other Asian countries, for example, in Vietnam, China, and South Korea, where rapid motorization was fueled by economic growth over the last decade, resulting in a steadily increasing trend in the number of traffic crashes [3-5].

Data compiled by the Ministry of Public Health reported that the Central region of Thailand had the highest number of deaths and death rate both in 1998 and 2002. The number of deaths from road traffic crashes increased from 2,676 in 1998 to 5,054 in 2002. The death rate in the Central region also increased from 18.9 to 34.3 per 100,000 of population between 1998 and 2002, while Bangkok Metropolis, the capital city of Thailand, had the lowest, both in the number of deaths and death rates between 1998 and 2002 (table 3).

After the period of economic crisis in 1998 until the period of the economic recovery in 2002, the numbers of deaths and death rate of traffic accidents increased in all regions of Thailand, especially the Central region, the only region which had nearly a double increase in the number of deaths and death rate. This means that traffic accidents became a severe problem in Thailand, particularly in the Central region.

Leading Causes of Death	Deaths	
	Number	Rates
Total	380,364	608.1
Malignant neoplasm, all forms	45,834	73.3
Accident and Poisonings	34,566	55.3
Traffic Accidents	13,438	21.5
Disease of the heart and cerebrovascular	32,896	52.6
Pneumonia and other diseases of lung	13,185	21.1
Nephritis, nephrotic syndrome and nephrosis	10,587	16.9
Disease of liver and pancreas	8,025	12.8
Tuberculosis, all forms	6,751	10.8
Suicide	4,905	7.8
Hypertension and cerebrovascular disease	3,213	5.1
Dengue haemorrhagic fever	264	0.4
Others	220,138	351.9

Source: Public Health Statistics, Ministry of Public Health, Thailand, 2004

**Tab. 1:** Number of deaths and death rates per 100,000 population classified by leading causes of death in 2002

Years	Number	Rates	Economic Situations
1988	5,428	10.0	Economic Recovery
1989	6,617	11.9	Economic Recovery
1990	8,335	14.8	Economic Recovery
1991	10,155	17.9	Economic Recovery
1992	11,044	19.2	Economic Recovery
1993	12,321	21.2	Bubble Economy
1994	13,367	22.8	Bubble Economy
1995	14,479	24.4	Bubble Economy
1996	16,268	27.2	Bubble Economy
1997	12,832	21.2	Economic Crisis
1998	7,839	12.8	Economic Crisis
1999	11,315	18.4	Economic Recovery
2000	12,936	20.9	Economic Recovery
2001	12,722	20.5	Economic Recovery
2002	13,354	21.3	Economic Recovery

Source: Public Health Statistics, Ministry of Public Health, Thailand, 2004

**Tab. 2:** Number of deaths and death rates per 100,000 population from traffic accidents

Regions	1998		2002	
	Number	Rates	Number	Rates
Bangkok Metropolis	158	2.8	300	5.2
Central	2,676	18.9	5,054	34.3
North	1,705	14.1	2,523	20.8
North East	2,049	9.7	3,695	17.1
South	1,251	15.6	1,782	21.3

Source: Public Health Statistics, Ministry of Public Health, Thailand, 2004

**Tab. 3:** Number of deaths and death rates per 100,000 population from traffic accidents classified by regions in 1998 and 2002

Data compiled by the Royal Thai Police office was a major official data reporting the number of deaths and the levels of injury on traffic accidents in Thailand. It was showed that about 31 percent of

total traffic accidents in Thailand occurred in Bangkok Metropolis in 2002, but most of them were mild injuries. Contrary to this, the Central region had the highest number of deaths and serious injuries in 2002. About 29 and 32 percent of deaths and serious injuries took place in the Central region in 2002. The North Eastern was the secondary region with high numbers of deaths and serious injury in 2002 (table 4).

High levels of vehicle per capita in Bangkok Metropolis probably was the major cause of the higher number of mild injuries in Bangkok Metropolis, but lower number of deaths. Contrary to this the Central region, where a high speed movement of traffic prevails, was the secondary ranked in vehicle per capita both in private car and motorcycle. There as a high number of serious injuries and deaths in this region (table 5). Road traffic crashes occurred more frequently in the urban areas than in the rural areas, however, urban crashes were mild injuries, but rural crashes tended to be more severe. Moreover, the more economically developed the areas are, the higher rates of deaths and injury from road traffic crashes [2-4], [6-8] occur.

Men aged 15–29 years old had higher numbers of deaths than men in other age groups and women,

ReRegions	Death	Serious Injury	Mild Injury	Total
Bangkok Metropolis	13.2	13.7	40.4	30.6
North	18.9	21.7	16.7	18.1
North East	26.9	20.1	12.3	16.2
South	12.2	12.7	12.2	12.3
Central	28.8	31.8	18.5	22.8
Total	100.0	100.0	100.0	100.0
Number	13,116	16,806	52,507	82,429

Source: Criminal Statistics, The Royal Thai Police Office, Thailand, 2003

**Tab. 4:** Percentage distribution of traffic accidents classified by regions in 2002

Regions	Types of Vehicle	
	Motorcycle	Private car <sup>c</sup>
Bangkok Metropolis	0.41	0.49
North	0.30	0.08
North East	0.19	0.04
South	0.33	0.07
Central	0.35	0.14
Whole Kingdom	0.26	0.11

Source: a Land Transport Department, Ministry of Transport, Thailand, 2004  
b Department of Local Administration, Ministry of Interior, Thailand, 2004  
c Private cars are personal sedans and pick-up

**Tab. 5:** Vehicle per capita (vehicle per population b) classified by regions in 2002

both in 1998 and 2002 (table 6). Besides, numbers of deaths, data compiled by the Royal Thai Police Office, showed that men had higher numbers of serious and mild injuries than women in 2002 (table 7). Recent studies confirmed that young adult men had a high risk to be involved in traffic accidents. Young working age males are the traditional breadwinners of nuclear families. The loss or disability of the family member who provides the primary economic support leads to negative impacts on their family [2-4], [6-7], [9-12]. Interestingly, numbers of deaths were high in April and January, both in 1998 and 2002 the because there were large amounts of long weekend days in those months (table 8). For example, the Thai traditional new year is in April, an ordinary new year in January and the Chinese new year as well. The more weekend days, the higher is number of traffic accidents in Thailand [8].

In terms of transport mode, the private car was the most frequent transport mode involved in traffic accidents followed by motorcycle. The private car and motorcycle were about nearly 80 percent of traffic accidents in transport mode, both in 1998 and 2002. However, the percentage of traffic accidents caused by motorcycle increased from 30 to 36 percent between 1998 and 2002, while the percentage of private cars involved in traffic accidents decreased from 48 percent to 43 percent

Age Groups	1998			2002		
	Total	Men	Women	Total	Men	Women
0 - 14	563	356	207	829	529	300
15 - 29	3,280	2,829	451	5,534	4,712	822
30 - 44	2,194	1,821	373	3,712	3,053	659
45 - 59	1,107	875	232	2,076	1,598	478
60 +	691	489	202	1,199	878	321

Source: Public Health Statistics, Ministry of Public Health, Thailand, 2004

**Tab. 6:** Number of deaths from traffic accidents classified by age groups and gender in 1998 and 2002

Deaths and Injuries	Gender	Number
Deaths	Men	10,405
	Women	2,711
Serious Injury	Men	12,316
	Women	4,490
Mild Injury	Men	36,747
	Women	15,760
Total	Men	59,468
	Women	22,961

Source: Criminal Statistics, The Royal Thai Police Office, Thailand, 2003

**Tab. 7:** Number of deaths and injuries from traffic accident in 2002 classified by gender

between 1998 and 2002 (table 9). In Vietnam, China, Kenya and Colombia, where the population density is high, most urbanized and economically active, motorcycle and private car were the major causes of road traffic crashes [2-4], [7], [10]. When income increased, motorcycle, pick-up and sedan were the most popular private vehicles for Thai people to purchase, because it is not only a

Month	Number of Deaths		Death Rates	
	1998	2002	1998	2002
January	866	1,209	16.7	22.8
February	656	1,203	13.9	25.0
March	705	1,142	13.6	21.5
April	815	1,284	16.3	25.0
May	648	1,038	12.5	19.6
June	533	1,052	10.6	20.5
July	528	1,013	10.2	19.1
August	590	1,080	11.4	20.4
September	519	994	10.4	19.4
October	655	1,153	12.6	21.7
November	645	1,137	12.9	22.2
December	679	1,049	13.1	19.8
Total	7,839	13,354	12.8	21.3

Source: Public Health Statistics, Ministry of Public Health, Thailand, 2004

**Tab. 8:** Number of deaths and death rates from traffic accidents classified by month in 1998 and 2002

Mode of Transport	1998	2002
Pedestrian	3.0	3.0
Non-motorized	1.5	2.1
Motorcycle	30.2	35.7
Private Car	47.7	43.4
Van and Bus	5.4	4.7
Truck	5.9	5.1
Other	6.4	5.9
Total	100.0	100.0
Number of Cases	123,750	150,600

Source: Criminal Statistics, The Royal Thai Police Office, Thailand, 2003

**Tab. 9:** Percentage distribution of traffic accidents in Thailand classified by transport mode in 1998 and 2002

Types of Factor	Bangkok	North	North East	Central	South	Whole Kingdom
Human Factor	97.9	95.4	96.6	97.5	97.4	97.4
Speeding	24.5	33.9	43.9	39.7	36.0	30.6
Improper passing	40.0	24.3	30.0	34.4	35.8	36.2
Disregarding of traffic signals	18.4	23.6	11.6	14.8	18.5	17.7
Drunk driving	4.0	6.4	6.2	2.7	2.4	4.1
Other Human Factors	11.0	7.4	4.9	5.8	4.8	8.7
Non Human Factor	2.1	4.6	3.4	2.5	2.6	2.6
Vehicle factor	1.9	3.6	2.7	2.2	1.5	2.2
Other Non human factors	0.2	0.9	0.7	0.3	1.1	0.4
Total Percent	100.0	100.0	100.0	100.0	100.0	100.0
Identified Causes	38,460	7,203	6,685	10,354	5,498	68,200
Non identified Causes	4,563	4,793	829	3,862	1,831	15,878
Total Traffic Accidents	43,023	11,996	7,514	14,216	7,329	84,078

Source: Criminal Statistics, The Royal Thai Police Office, Thailand 2003

**Tab. 11:** Percentage distribution of identified causes of traffic accidents in Thailand classified by regions in 2002

vehicle, but it reflects the social classes in Thai society [1].

Table 10 shows that in 2000 the about 51 percent of traffic accidents took place on the straight way and about 22 percent of traffic accidents took place on junction. Nearly 9 percent of traffic accidents took place on the bridges and curves. This means that improving transport facilities such as traffic signal, quality of road and bridge are the importance measures to reduce incidents of road traffic crashes in Thailand. However, most roads in developing countries are poor and have been built for the different types of road users. Multi-purposes roads tend to have high traffic accident rates. Better road designs, which seek to segregate the slow moving, non-motorized transport from the fast moving motorized transport, will improve road safety in developing countries [13].

Table 11 shows that in 2002 about 97 percent of road traffic crashes in Thailand were caused by many aspects of human factors. Speeding or driving over speed limitation (90 kilometer per

Types of Places of Traffic Accidents	2000
Straight Way	50.8
Curves	8.3
Narrow lane	3.1
Bridge	9.0
Junction	21.6
U-turn	0.6
Entrance-Exit	4.1
Other	2.6
Total	100.0
Number of Crashes	73,737

Source: Criminal Statistics, The Royal Thai Police Office, Thailand, 2003

**Tab. 10:** Percentage distribution on places of traffic accidents in Thailand in 2000

hour), improper passing and disregarding of traffic signal were the major causes of road traffic crashes in Thailand, while about only 3 percent caused by non-human factors such as vehicle factor. In addition, Thailand injury surveillance report (2000) indicated that human factors were the deepest rooted causes of road traffic crashes, which were drunk driving and disregarding of safety equipment such as helmet, seat-belt and a low quality of safety equipment used. Recent studies indicated that drunk driving, driver fatigue and the use of cell phone also were the most important human factors causing a driver to commit an error while driving [5], [14]. The higher rates of road traffic crashes causes by human factors reflect an inefficiency of traffic regulation enforcement and the attitude on road safety for Thai travelers.

Only official data of the Royal Thai Police Office reported that after the period of economic crisis in 1997, the direct financial losses increased from 34.5 million US dollars in 1998 to 37.4 million US dollars in 2002. The direct financial losses were reported the highest in Bangkok Metropolis, however, the percentage dropped from 43.8 percent to 40.4 percent in 1998 and 2002, respectively. Not only Bangkok Metropolis was decreased proportionally to the direct financial losses, but also this, the North East and South as well. Contrary to the direct financial losses in the Central region increased rapidly from 16.8 percent to 23.1 percent between 1998 and 2002, respectively, while the North slightly increased in the direct financial losses from 11.3 to 12.8 percent between 1998 and 2002, respectively (table12). However, this figure was underestimated, because comprehensive figures are not available in Thailand nowadays.

In 1995, it was estimated that the indirect costs of road traffic crashes in Thailand were about 600

Regions	1998	2002
Bangkok Metropolis	43.8	40.4
North	11.3	12.8
North East	15.1	12.7
South	13.0	11.1
Central	16.8	23.1
Total	100.0	100.0
Whole Kingdom	34,491,846	37,373,420

Source: Criminal Statistic, The Royal Thai Police Office, 2003  
<sup>a</sup> Currency rate: 40 Baht per US Dollar, approximately

**Tab. 12:** Percentage distribution of direct financial losses from traffic accidents in Thailand in 1998 and 2002 classified by regions (US Dollar)<sup>a</sup>

million US dollars, including the probability of injury, disabled person and family care and the loss of income. When adding up the direct costs of road traffic crashes, which were the costs of health care and damage of property, they amounted on about 1,600 million US dollars in 1995. This figure equivalent to about 23 percent of total health expenditure or about nearly 1 percent of Thailand's GDP in 1995 [15]. In Vietnam, it is estimated that the costs of road accidents was at least 2 percent of GDP in 2002 [3]. In 1995 the estimated annual economic cost of road traffic injuries in Kenya, which included health care costs, administrative expense, vehicle and property damage, were about 343 million US dollars or about 5.5 percent of the GNP [10].

## Discussion

This study reviewed the patterns of traffic accidents in Thailand from secondary data compiled by various government agencies. It indicated that traffic accidents were increased rapidly in all regions of Thailand after the period of economic crisis in 1997. Nowadays, the number of road traffic crashes increased nearly as strong as in the period of bubble economy in the early of 1990s. Traffic accidents in Thailand varied upon the economic situation, higher per capita income, higher number of road traffic crashes. Increased income leads to an increasing in vehicle ownership, both private car and motorcycle. Rapid increase of road traffic crashes took place not only in Bangkok Metropolis, but also in other regions of Thailand, particularly the Central region, the secondary ranked on vehicle per capita. Deaths, death rates and serious injuries increased more rapidly in the Central region rather than in the rest of Thailand.

Drunk driving, violation of traffic regulation and disregarding of safety equipment usage such as helmets and seat-belt were the major causes of road traffic crashes in Thailand [2,8,16-18]. However, the identification of causes of road traffic accidents needed to be improved urgently. The weakness of legal enforcement by government officers, particularly the police officers, was a major obstacle to overcome the road traffic injury problems in Thailand, for example, an unclear policy guidance, lack of budgetary and training, broader personal interpretation and non-systematic on monitoring and evaluation, etc [2], [8], [16-18].

Appropriate organization and management of resources, which are human, financial, information and technological resources, will lead to desirable outcomes on road safety policy. In addition the development of accuracy information and maintenance systems is the most important for policy formulation, monitoring and evaluation. The current government created many campaigns to reduce traffic accidents such as the Anti Drunk Driving , Helmet and Seat-belt Using Promotion and Public Awareness of traffic accident, etc. However, the discontinuance of those campaigns and the weakness of institutional structure and the inappropriate policy process, lead to the undesirable outcomes to reduce road traffic crashes in the short run [2], [8], [16-18].

Encouraging civil society and the public participation should take into account the road safety policy, defining the problems, identifying solutions and advocating of policy decisions and implementation. The process of multiparty movements needs to be based on research based approaches to provide reliable information, methodologies and evidences. A broad coalition of stakeholders is needed to catalyze a comprehensive road safety policy formulation and actions. In addition, urban design and road segregation, which were popular to promote road traffic programs in Western societies, but less in developing countries, especially in Thailand, have to be put forward [1], [13]. Therefore, urban planning policy plays one of the substantive roles to succeed in road safety policy.

## Conclusion

Traffic accidents became a major cause of death in Thailand. The trends of road traffic crashes increased rapidly following the Thai's economic performances during the period of economic recovery. Though the current government created a lot of road safety programs to reduce number of deaths and injuries from traffic accidents, however, inefficiency of law enforcement, discontinuance of prevention programs, the weakness of institutional structure and insufficient resources allocation were the major obstacles to desirable outcomes of road safety policy. Research based information, a broad coalition of stakeholders and urban planning policy needed a to incorporate for a desirable road safety policy formulation and actions.

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