Chapter 5

Conclusion and Discussion

This chapter we conclude and discuss the results from earlier chapters. In addition, the complication of research and further study are also described.

This study aimed to identify patterns of road traffic accident deaths in southern Thailand from 1996 to 2006 and fit the statistical modeling for estimating mortality rates. We using mortality data based on deaths certificate from vital registration database. The data were obtained from the Bureau of Health Policy and Strategy, Ministry of Public Health Thailand.

5.1 Conclusion

We summarized the number of deaths according to year, province, age and road user, each factor was classified by gender and graphed mortality rates by age each year. We compared rates and YLL with Japan in 2006 and calculated excess deaths then compared with Japan and other regions of Thailand.

We fitted Poisson regression model and calculated confidence intervals by applying sum contrast for comparing the adjusted mortality rates by each factor with the overall average of mortality rates. In addition, we used these contrasts for create schematic maps of province.

The average proportion of road traffic accident deaths for “all causes of deaths” in southern Thailand were 5.7% and 2.7% for males and females, respectively. Males and Females aged 15-19 had the highest proportion which represented 29.0% and 18.4%. Road traffic accident mortality rates in southern Thailand were higher than

those of Japan and male younger age group (15-24 years) had the highest rate. The male rates were higher than females and had rates that were more than three times those of the females. The overall average mortality rates for males and females being 0.31 and 0.08 per 1000 population, respectively. In addition, males aged among 15-24 had the highest YLL with an average 19 years lost per 1000 population.

For excess deaths in Southern Thailand over Japan, most of males and females had excess deaths. Males had the largest excess deaths among younger age group. Additionally, excess deaths between south and other regions of Thailand, males south had peaked excess deaths at aged 15-19, females had excess deaths among age groups 15 years and older but it was not large.

The results from models shown that, mortality rate among age group 15-19 had the highest rate for males with a rate of 0.56 and the mortality rate was highest at age group 60 – 64 for females. The mortality rate was highest in 1996 with a rate of 0.44 for males and 0.11 for females and lowest in 1998 with rates being 0.22 and 0.06 for males and females, respectively. For province, Phunga had the highest mortality rate for males and Surat Thani for females with rates being 0.42 and 0.11.

The schematic maps were created from 95% confidence intervals show that Chumporn, Surat Thani, Phuket, Krabi and Phattalung had mortality rates significantly higher than the overall mortality rate in both genders, Phunga and Songkhla had higher mortality rate than the overall mortality rate for males, with exception for females.

5.2 Discussion

It has been shown that, road traffic accident mortality rates were higher for males than those of females and male mortality rates were highest among teenagers (15-19 years) and represented 29% of the death due to road traffic accident for “all causes of death”. There were previous studies supported these findings. A review of Odero *et al.* (1997) revealed that road traffic deaths in developing countries were predominance of males over females, adolescents and young adults over other age groups. Wong *et al.* (2002) reported that 82.3% of road traffic accident deaths that occurred in Singapore were males. Suriyawongpaisal and Kanchanasut (2003) exposed that 70% of people injured or killed due to traffic crashes that were occurred in Thailand were aged 10-39. Men were at four to five times risk of death and injury than women.

The present study exposed that there were huge health inequality and high burden due to road traffic accident death among males southern Thailand, particularly younger age group with represented a high disproportional shape of burden of mortality compared with Japan but females were not quite different. Moreover male age group 15-19 and older than 55 years had excess deaths due to road traffic crashed death compared with other regions of Thailand.

Road traffic accident deaths in southern Thailand may be associated with the economical situation that had been occurred in Thailand. It had high mortality when bubble economic occurred (1992-1996) and low at economic crisis (1997-2000). This finding is supported by previous studies (Beeck *et al*., 2002; Suriyawongpaisal and Kanchanasut, 2003; Neumayer, 2004; Gerdtham and Ruhm, 2006). They reported that road traffic mortality was increased followed by economic growth.

The schematic maps were presented that Chumporn, Surat Thani, Phuket, Krabi and Phattalung had higher mortality rates than the average rates, SongKhla and Phunga had higher mortality rates than the average rate for males. Several studies reported that economic growth and unplanned urbanization were the important factors that increase risk of the area from road traffic accidents death (Moore *et al*., 2003; Campbell and Campbell, 2007; Torre *et al.* 2007). Our result was supported with these studies. However these results maybe inaccurate due to using "place of residence" as province factor for fitting models. A study of Lu *et al.* (2000) exposed that place of residence is not proper for identify area-specific environmental risk factor for road traffic accidents because many risked people spend most of their times outside the resident area for study or work, leading to inaccurate measuring risk. They suggested that "place of occurrence" would be more accurate than "place of residence". Unfortunately, the data from death certificates are not included this variable.

Moreover, Poisson regression was appropriate for estimating road traffic accident mortality rates. Our models fitted with the data well due to having more enough sample size. However, there were observed values that models cannot be fitted well, particularly zero values. It was occurred because having too many categories in the determinants.

5.3 Limitations and future study

Present study analyzed road traffic accident deaths in southern Thailand based on epidemiological point of view. We calculated mortality rates by using population as denominator. However, numerous studies were calculated death rates by using others

denominator such as number of registered vehicles, number of drivers and vehicle-mile of travel that may help us for getting additional information.

Furthermore, another potential limitation of our study was the accuracy of the data that could have underreported the real number of deaths and out of date for two years. Under-reporting and incomplete recording of road crash database were common in low- and middle-income counties (Odero *et al.*, 1997). Tangcharoensathien *et al.* (2006) reported that, Thailand mortality statistics were high completeness of registry but low accuracy of causes of deaths. However, the result from verbal autopsy (VA) survey showed that death resulting from road traffic accidents had the highest accurate compared to other causes of deaths.

Additionally, our models can only predict mortality rates due to road traffic accident from 1996-2006 periods. For examining the magnitude of the mortality in the future, the further analysis such as Lee-Carter model (Lee and Carter, 1992) is needed to forecast the mortality rates from road traffic accident as well as the time series analysis.