Chapter 5

Conclusions and Discussion

This chapter includes the summary of findings, discussions, limitations and suggestions for future studies.

5.1 Summary of findings

During 2000 to 2009, there were 84,227 deaths recorded in the Thai DR database. The all-cause annual average death rates per 100,000 population (children <5 years of age) was 177.9. From preliminary analysis, the all-cause death rates in boy was 195.9 per 100,000 population and in girl was 159.3 per 100,000 population. The highest death rates was 199.8 per 100,000 in 2001, whereas the lowest death rates was found in 2009 (169.3 per 100,000 population). For Public Health Area, the highest death rates was found PHA12 (236.4 per 100,000 population) in the lower South and lowest in PHA5 (143.0 per 100,000 population) in the Northeast.

Gender, year, and PHA are statistically significant associated with the all-cause death rate. The adjusted all-cause death rates in boy were higher than that in girl. The death rates in both gender had a decreasing trend and the death rates for boy is much higher than for girls. In 2001, the death rates was higher than the average. The adjusted all-cause death rates varied among PHA. In the central region (PHA2, PHA3, and PHA4) and the lower South (PHA12), the all-cause death rates were higher than the average, whereas the death rates in the Northeast (PHA5, PHA6, and PHA7), the upper South (PHA11) and Bangkok (PHA13) were lower than the average. The highest death rates was found in PHA12.

For the analysis of under-five mortality by cause, the causes of death were categorized into three cause groups (perinatal originating conditions, congenital malformations, and all other causes). To allocate causes of death in the DR data into more credible causes, we separately fitted logistic regression models to three cause group outcomes for under-five deaths in the 2005 VA data. The estimated probabilities of cause specific groups (perinatal originating conditions, congenital malformations, and all other causes) were applied to the DR data in each year from 2000-2009. By doing this, we assume that patterns of under-five deaths are the same for years before and after 2005. As a result the estimated numbers of death for each cause were obtained. Then we rescaled the results to ensure that the total numbers of deaths estimated for each group matched those reported deaths from 2000-2009.

The annual average death rates was 58.4 per 100,000 population for perinatal originating conditions, 39.1 for congenital malformations, and 78.2 for other. Our investigation focused on perinatal originating conditions. From preliminary analysis, the perinatal originating conditions annual death rates were higher in boys (71.4 per 100,000 population) than in girls (44.7 per 100,000 population). The highest death rate (70.4 per 100,000 population) was found in 2005, whereas the lowest death rate (41.2 per 100,000 population) was found in 2000. The highest death rates (76.8 per 100,000 population) occurred in PHA12 and lowest death rate (38.4 per 100,000 population) occurred in PHA11.

Gender, year, and PHA are statistically significant associated with perinatal originating conditions death rate. The adjusted perinatal originating conditions annual death rate in boys was higher than that in girls and both had an increasing trend. The death rates for boy is much higher than for girls. The death rates in 2005, 2006, 2007,

2008, and 2009 were higher than the average. These adjusted perinatal originating conditions death rate varied among PHA. The death rates in the Central region (PHA2, PHA3, and PHA4) and the lower South (PHA12) were higher than the average whereas the death rates in the Northeast (PHA5), the North (PHA10) and the upper South (PHA11) were lower than the average. The highest death rates was found in the lower South (PHA12).

5.2 Discussion

The death rates of children under-five years for boys were higher than that for girls. This is commonly occurred in several studies including by Odton (2010), Nojomi et al (2009) and Rukumnuaykit (2006). This is possible because girls have a biological advantage against many causes of death that may be reduced, if they are lacking in access to resources. India and China are the only countries where both under-five mortality were estimated to be higher for girls than for boys (Sawyer, 2012).

The trend of all-cause death rates among children under-five years from 2000 to 2009 was declined. The decreasing trends of under-five mortality have been documented (Murray et al, 2007; Lozano et al, 2011; Wang et al, 2011 and Vapattanawong et al, 2007). Reductions in under-five mortality in Thailand between 1990 and 2000 censuses have been reported in the previous study (Vapattanawong et al, 2007). This improvement can be partly explained by the combination of improved capacity and financial accessibility of population leading to increased health-care use and intervention coverage. During this period, the economic growth and proportion of the population living in poverty decreased have been documented (Supakankunti, 2000;

Noree et al, 2005 and Tangcharoensathien et al, 2000). Household economic status improvement is partly contributed to decreasing mortality as well.

The high all-cause death rate was found in 2001 because Thai government introduced universal health-care coverage scheme in 2001. It helps reducing unregistered deaths in the DR database.

Children under-five death rates were higher than average in the central (PHA2, PHA3, and PHA4) and southern (PHA12) regions. The high rates in PHA12 was well supported by the previous studies conducted by Vapattanawong (2009) and Vapattanawong et al (2007), who reported provincial variation in under-five mortality in Thailand. They analyzed provincial data from Thailand Multiple Indicator Cluster Survey and found that the high rates were in Narathiwat, Yala, Pattani, and Trang. These provinces are in the PHA12 where the highest morality rates were observed. Moreover, among seven provinces in PHA12, Songkhla is the only province that family monthly income of population was higher than average of the country. The relations between under-five mortality and poverty have been documented (Houweling et al, 2010 and O' Hare et al, 2013). Household economic status is partly contributed to decreasing mortality (Houweling et al, 2010).

As well as in PHA4 in the central, Nakhon Pathom is the only province that family monthly income was higher than average of the country. None of the province in PHA2 have family monthly income higher than average of the country. Samut Prakan, Chon Buri, Rayong, and Chanthaburi provinces in PHA3 have mortality income higher than average of the country. Hence, prevention policy should be targeted to these areas.

The leading causes of under-five death reported from the DR data were perinatal originating conditions (29.4%), congenital malformations (11.2%), and ill-defined (19.9%). High percentage of ill-defined reflects the misclassification of cause of death (Mathers et al, 2005; Rukumnuaykit, 2006; Prasartkul and Vapattanawong, 2006). Therefore, causes of death in the DR data were reallocated using logistic regression models based on the 2005 VA data. The VA-estimated numbers of deaths by causes were used to estimate perinatal originating conditions death rates.

The utility of the mortality data still has huge limitations. Death certificate data in Thailand need to be improved in order to increase the utilization of these data for the policy makers to make decision in public health planning.

5.3 Limitations and future study

The present study analyzes under-five years death rates in Thailand based on data available from death registration database. The death registration in Thailand is known to be incomplete and consisting of high percentage of ill-defined cause (Mather et al, 2005; Polprasert and Porapkkham, 2005; Rao et al, 2010; Tangcharoensathien et al, 2006). Ill-defined cause reflects the misclassification of causes of death and leads to less accurate mortality statistics. However, the unregistered death is beyond scope of this thesis. The misclassification of the causes of deaths was reallocated using analysis of the 2005 VA data. However, there are several limitations in this study. Firstly, under-five death rates were calculated based on death certificate in DR database which may be under reported. It has resulted in under estimated under-five mortality. Secondly, our analysis uses the mortality rate per population rather than per live birth. Therefore, it is difficult to compare the rates

with other studies. A final limitation is due to limitations of the VA survey design that may affects results in analysis of perinatal originating conditions. Moreover, we assumed that the patterns of perinatal originating conditions are the same for in years before and after 2005, while the numbers of deaths observed decreased in the recent year.

Despite their limitations, data from VA provided an opportunity to reallocate cause of death into more credible categories. The all-cause deaths in the DR database and VA assessed deaths were sufficient to allow us to investigate patterns and trends of all-cause and perinatal originating conditions in under-five mortality.

Further research should be focusing on validation of registration deaths by using the verbal autopsy data and conduct a study in a small area such as sub-district to estimate unregistered deaths. Moreover, research on methods to estimate under report should be investigated further.