

# The Completeness of Death Registration in Thailand: Evidence from Demographic Surveillance System of the Kanchanaburi Project

Pramote Prasartkul and Patama Vapattanawong

## **Abstract**

This study aims to assess the quality of mortality data from the registration system of Thailand. The study takes advantage of the Kanchanaburi Project by comparing the deaths found in the annual censuses to those recorded in the civil registration system in order to measure the level of under-registration. The age and sex pattern of death registration found in this study might be useful information in adjusting the data from this source. Moreover, this study also pointed out a possible gap between the multiple steps of death registration, from notifying the death to officially registering it. This finding suggested a hypothesis to be further tested.

## **Introduction**

The vital registration system is a very significant source of population data in Thailand. The birth and death registration has been implemented in this country since 1917. According to the civil registration law of 1991, births must be registered within 15 days after delivery and deaths within 24 hours of being witnessed. The Ministry of Interior has been compiling the number of births and deaths and reporting to the public annually.

In 1995, a programme to computerize the vital registration of Thailand was accomplished. A 13-digit identification number was assigned to each Thai citizen. Data on births and deaths registered at registrar offices all over the country are entered into a central computer at the Office of Registration Administration of the Ministry of Interior. The computerization of vital registration allows more effective processing of population data in this country. The tabulation of deaths by age, sex, cause and administrative area can be more conveniently done. This source of mortality data, therefore, has

become increasingly significant in computing various demographic and health indicators.

The quality of death registration data should be examined before the data are used, however. The first question to be asked is regarding the completeness of this data source. Estimates of the degree of completeness would help us to adjust the mortality level closer to the real level. Another question about the basic quality of the death registration data is the correctness of the data on various characteristics of the deceased persons, such as age, sex, place of residence, place of death and most importantly, the cause of death. If the mortality data from the vital registration system of Thailand were of high quality, both in terms of completeness and correctness, this data source would be tremendously valuable to policy and program planning concerning the health and quality of life of the Thai people.

This study aimed to investigate the quality of death data from the civil registration system of Thailand. The quality to be assessed here was focused only on the completeness of the death registration. The objectives of this study were to know the degree of completeness of death registration in Thailand, the age and sex patterns of death under-registration and possible reasons why the registration is incomplete.

### Completeness of Death Registration Resulted from the Survey of Population Change

The Survey of Population Change (SPC) explicitly specifies the evaluation of the completeness of birth and death registration in Thailand among its main objectives. The SPC is conducted by the National Statistical Office (NSO) every 10 years, at about the mid-period between the two censuses. There have been four SPCs, in 1964–66, 1974–66, 1985–86 and 1995–96. The NSO is planning to launch the next SPC in 2005–06.

The SPC is a national survey with a large sample size. For example, the 1985–86 SPC included about 65,000 households (304,600 persons) and the 1995–96 SPC about 87,600 households (283,100 persons). The SPC is a longitudinal survey, lasting one to one and a half years. For example, the 1995–96 SPC consisted of five rounds, with a three-month interval between each round. The first round was the base population enumeration. In the other rounds, the enumerated households were interviewed only for vital events such as births, deaths and some changes of characteristics that occurred during the previous three months.

The Chandrasekaran-Deming formula was used to estimate the total number of births and deaths in the first three SPCs (Sekar and Deming 1949). Births and deaths from the household sample survey and official registration records were compared case by case to determine whether they were recorded in both sources of data, or recorded in only one source. By this matching procedure, the percent completeness of birth and death registration could be derived. However, this method was not used in the latest SPC of 1995–96. It appears from the questions used in this survey that the completeness of vital registration was computed from positive answers to a single question on whether those events were reported to the registrars. The degree of completeness of death registration reported by the SPCs is shown in Table 1.

Table 1. Percent completeness of death registration derived from the SPC

Year of survey	Total	Male	Female
1964–67	a	65.2	60.0
1974–75	59.4	57.9	61.4
1985–86	75.7	75.0	76.5
1995–96	94.8	94.8	94.9

a. The percent in that particular category is not shown in the SPC report.

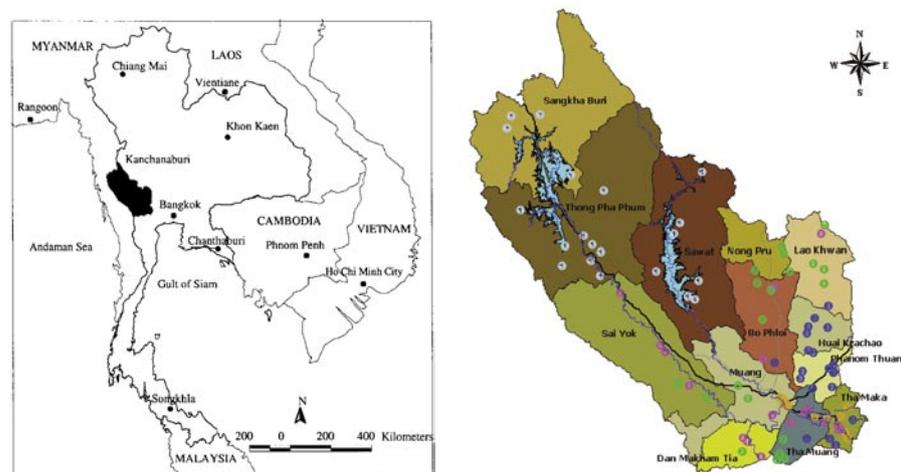
During 1960s and 1970s, only about 60% of the deaths among Thai population were registered. The percent completeness increased to 76 in the mid-1980s. The 95% completeness found in the 1995–96 SPC was questionably high due to the different method used. Thus, the completeness of data from the vital registration system remains a significant issue needing further exploration.

### Evaluation of Death Registration by Using Data of the Kanchanaburi Project

Kanchanaburi is one among 76 provinces of Thailand. The provincial city is about 130 kilometres west of Bangkok. The province shares its west border with Tavoy and Moulmein on the Andaman Sea of Myanmar. Two major ethnic minorities, the Mon and Karen, reside along this international border, especially on the Myanmar side. The area of about 19,500 square kilometres makes Kanchanaburi the second largest province after Chiangmai. The province is administratively divided into 13 districts, 98 *tambon* or sub-districts and 915 villages. The population was approximately 795,000 in the year 2003. Two border districts in the north, Thong Pha Phoum and Sangkhlaburi, are mountainous areas where a large proportion of ethnic Mon and Karen live.

The Institute for Population and Social Research (IPSR) at Mahidol University operates a “demographic surveillance system (DSS)” in Kanchanaburi Province known as the “Kanchanaburi Project.” The areas of Kanchanaburi were categorized according to the main occupation of the population and land use patterns into five strata, namely: (1) urban/semi-urban (industrialized), (2) rice producing, (3) plantation, (4) upland area and (5) mixed economy. Using a stratified systematic sample design, 86 rural villages and 14 census blocks scattering in all 13 districts of Kanchanaburi were selected to be the field study areas. The project had been following the population changes in the study areas since 2000. The population under surveillance is approximately 53,800 persons in 12,400 households.

Figure 1. Map of Thailand showing Kanchanaburi province (left) and the subject villages of Kanchanaburi Project (right)



Censuses in all selected villages and urban blocks have been conducted annually in July, starting in the year 2000 onward. Data at individual, household and community level were collected by means of interviewing. All people aged 15 years and over in project villages were interviewed. The data collected related to births, deaths and migration, as well as to socio-economic characteristics and health and environmental aspects.

Respondents were asked if any member of the household had died during the year prior to the survey. If any deceased person was found, information about the death such as date of death,

cause of death and whether the death had been registered was asked. The four annual surveys of Kanchanaburi Project found a total of 1,226 deaths, as shown in Table 2.

**Table 2. Number of deaths found in the Kanchanaburi Project**

Census round	Period coverage	Number of deaths found
2000 Survey	1 July 1999–30 June 2000	407
2001 Survey	1 July 2000–30 June 2001	265
2002 Survey	1 July 2001–30 June 2002	251
2003 Survey	1 July 2002–30 June 2003	303
<b>All rounds</b>	<b>1 July 1999–30 June 2003</b>	<b>1,226</b>

The deaths found in the censuses were compared with those from the civil registration records. Since an individual identification number was not possible to be asked in the interview survey due to an ethical regulation on personal confidentiality, the matching of the deaths from the two sources could be made only by names of deceased persons. In the annual censuses, the first and last names of deceased members of the households were recorded. These names were matched with those in the official registration records to be discussed later in this paper.

### Death Registration Process in Thailand

In Thailand, it is required by law that every death be registered. The organization responsible for compiling the vital data is the Office of Registration Administration (ORA) in the Department of Provincial Administration (formerly called the Department of Local Administration), Ministry of Interior. The registrars are at the district and municipality offices in about 1,100 districts all over Thailand. When a death is registered at the local registrar office, two copies of that record are sent out by electronic means; one to the central registration centre and the other to the Ministry of Public Health. The ORA processes the records of death, as well as of birth, before reporting to the public annually. Only the total numbers of death for the whole kingdom and by province are reported. The copies of death records that are sent to the Ministry of Health are processed to calculate statistics on cause of death, to be reported as health statistics. Computerization since 1995 means that the data can be conveniently tabulated by age and sex and administrative area.

The law states that a person who witnesses a death must report to a government officer within 24 hours. To simplify the process of death registration in Thailand, deaths are classified into three types: (1) deaths occurring in hospital; (2) deaths of natural causes occurring at home; and (3) deaths of unnatural causes. These three types of deaths involve different steps of registration.

- (1) *Deaths occurring in hospital.* A physician specifies the cause of death and issues a “Tor Ror 4/1” or “death certifying form.” The deceased person’s relatives use this form as evidence to register the death at the district or municipality office in the district or municipality where the deceased had his legal residence. The registrar then issues the “*death certificate*” for that death.
- (2) *Deaths of natural causes occurring at home.* “Natural causes” refers to illness or disease. In the case of a death of natural causes occurring at home outside a municipal area, the deceased person’s relative reports the death to an “assistant local registrar,” such as a village headman, who specifies the cause of death and issues a “Tor Ror 4” or “death notification form.” The relative uses this form as evidence to register the death at the district office of the deceased. In the case of natural death occurring at home in a municipal area, the death is reported to a policeman, who issues a copy of “record to file,” which is used as evidence at the municipality office to obtain the “death certificate.”

(3) *Deaths of unnatural causes.* “Unnatural causes” of death include external causes such as suicide, homicide, accident, drowning, animal attack and natural disaster. In this case, a person who was with the deceased or who saw the dead body must report to a local administrative officer or police office who will be accompanied by a physician to do an autopsy to specify the cause of death. The “record to file” and the result of medical autopsy are used as evidences at the district or municipality of the deceased to obtain the “death certificate.” This category also includes people who died of illness, but who died outside their homes.

It can be seen that the process of death registration in Thailand involves multiple steps. The first step is to notify an authorized person – village headman, local administrative officer, policeman or health personnel – of the death. That notification, either in the form of village headman’s death notification form, hospital death certifying form, police record to file or physician’s autopsy result, is used to validate that death in the next step of death registration. When people register the death at the district or municipality office, they receive the “death certificate.” After the completion of registration at this second step, the name of the deceased person is removed from the household roster and data on that death are entered into the registration system.

### **The Matching between Deaths from Registration and those Found in the Surveys**

The method used in this study to assess the completeness of death registration is to compare the deaths found in the survey with those recorded in the registration system. Thus, we need the registered deaths in Kanchanaburi during the same time period as the survey. Data on the deaths of Kanchanaburi residents covering the five-year period from January 1, 1999, through December 31, 2003, were provided to us by the Office of Registration Administration, Ministry of Interior. The time period of the registration data was six months before and six months after the period of deaths in the census survey (July 1, 1999, through June 30, 2003). This was to insure that the period of death registration would cover all deaths from the survey.

The number of deaths in Kanchanaburi was about 5,000 per year, which constituted approximately 25,000 cases over five years. The data included in each individual record were (1) address, (2) 13-digit identification number, (3) name of the deceased person (title, first name, last name), (4) birth date, (5) age, (6) nationality, (7) father’s and mother’s first name, (8) date of death and (9) cause of death. Since an ID number of a person could not be acquired in the survey, one possible reference for matching was the name of the deceased person recorded in the registration and in the survey data.

It should be noted that some features of the Thai language make it difficult to match names. In the Thai script, there are 44 consonants, 21 vowel sounds and four tonal marks. The same sound can be spelled several ways. The same name, if spelled with only one different alphabet or vowel, would be a different name according to the computer. Moreover, Thai people always use a real or official name and a nickname or short name.

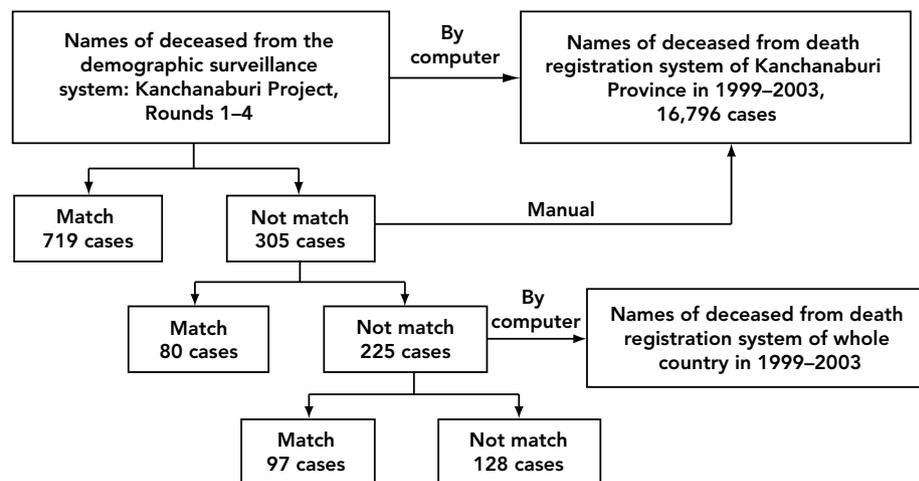
As mentioned earlier, there are many people from ethnic minorities living in the two northern districts of Thong Pha Phoum and Sangkhlaburi. The names of ethnic Karen, Mon and Burmese are even harder to spell correctly. The interviewers wrote down the names of deceased persons in the questionnaires according to what they heard. Moreover, they did not know whether these names were the same as the names used to register. To avoid the resulting problems in the matching process, deaths in these two districts were excluded from the study. There were 202 deaths in the two districts and 1,024 deaths in the other 11 districts of Kanchanaburi left in this study.

The procedure for matching deceased persons’ names in the survey of Kanchanaburi Project with those in the death register involved the following steps.

(1) First and last names of deceased persons were matched by using a computer program. Altogether 719 names from the total 1,024 deaths, or about 70%, were perfectly matched.

- (2) The names that could not be matched by computer were manually checked. The names of deceased persons who had resided in the survey villages from the registration were compared to the unmatched names from (1). This process uncovered some cases where last names matched, but first names did not. Some names were spelled differently. This step increased the number of matched cases to 799, or 78% of the total.
- (3) The 225 names of the deceased persons from the survey that were still not found in the death register for Kanchanaburi were sent to the ORA to check their status in the central registration system. The names as recorded in the survey were still used for this step. Therefore, there are many possible reasons for the names not to be found in the registration, such as different spellings, names reported being different from those registered, or the deceased persons being aliens. The results of this step were as follows: (a) 97 cases where death records were found; (b) 17 cases where several people had the same name, and some were still alive, so that it could not be concluded that the death was registered; (c) 83 names were not found in the central registration system; and (d) 28 people reported dead were found to still be alive.

Figure 2. Results of matching between deaths from registration and deaths found in Kanchanaburi Project



From the above matching steps, the deaths from the two sources that could be matched accounted for 896 cases or 87.5% of the total reported in the surveys. Among the remaining 128 names of deceased persons from the surveys, there was no evidence to prove that they had been registered. At this point, we assumed that these 128 deaths, or 12.5% of the total, were not registered.

The status of death registration, distributed according to age and sex, is shown in Tables 3 and 4. The completeness of death registration in Kanchanaburi Project was 87.5%. The percent completeness of male deaths, 88.0, was slightly higher than that of females, 86.7.

Among the deaths of both sexes, the proportions of under-registration were distributed evenly among adults aged 15 years and over. The percent of deaths that were not registered was highest among the youngest age group, under five years, at 20.8%. The lowest proportion of unregistered deaths (5.9%) was in the 5–14 age group. It should be noted here that the registration status of infant deaths, especially neonatal deaths, cannot be adequately addressed in this study because of the small number of deaths. The percentage distributions of deaths registered and unregistered by age and sex shown here were among population age one year and over.

Table 3. Number of deaths from Kanchanaburi Survey that were registered, by age and sex

Age	Male		Female		Both sexes	
	Registered	Not registered	Registered	Not registered	Registered	Not registered
<5	14	1	5	4	19	5
5-14	12	0	4	1	16	1
15-24	27	6	15	0	42	6
25-34	70	14	35	6	105	20
35-44	67	10	26	3	93	13
45-54	57	11	34	3	91	14
55-64	87	12	41	10	128	22
65-74	101	9	67	8	168	17
75-84	76	6	73	8	149	14
85+	32	5	53	11	85	16
<b>All ages</b>	<b>543</b>	<b>74</b>	<b>353</b>	<b>54</b>	<b>896</b>	<b>128</b>

### Causes of Under-Registration

In 1966, the National Statistical Office conducted a supplementary survey after the SPC to collect the data on the causes of under-registration of vital events in Thailand (NSO 1969a). This sample survey asked about the knowledge of, attitude toward, and practice concerning official registration of births and deaths. At that time, the completeness of death registration was still very low, at about 60%. The main causes of death under-registration were lack of knowledge and lack of incentives to register, due to low penalties. Unfortunately, the national surveys on causes of under-registration of vital events have not been conducted since then.

Prohmmo and Guest (1996) studied factors determining people's decision to register deaths. The study attempted to assess people's ideas about the registration of deaths. Qualitative data were collected from two villages in Khon Khaen Province in the Northeastern Region of Thailand. This study found that, in the villagers' opinion, steps in death registration were redundant and should be reduced to a minimum. People believed that death registration was necessary only in some matters, such as those concerning the reimbursement of cremation funds, inheritance and life insurance. Registration of deaths among children, especially during infancy, which did not serve legal or administrative purposes, was not seen to be necessary.

The under-registration of infant deaths is widely believed to be high in Thailand. The infant mortality rate computed from registration data had been less than 10 per 1,000 live births per year for several decades. In fact, it seems reasonable for people not to register deaths of infants whose births were not yet registered. Thus, registration is not a reliable source of mortality data for this very young age group.

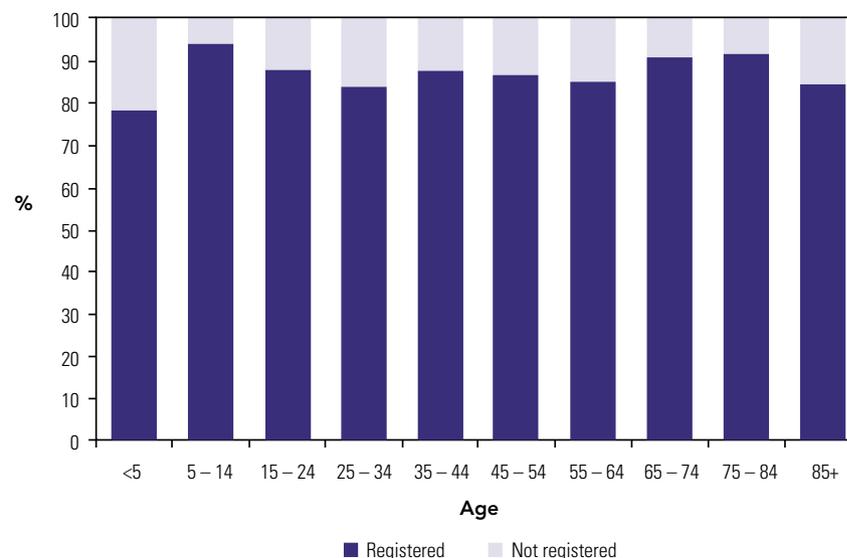
In the Kanchanaburi Survey, the question "whether the death was registered or not" was asked. Among 1,024 deaths in the four-year period, 1,008 cases or 98.4% had positive responses. There was a gap between the answers indicating that the deaths were already registered (98.4%) and those completely registered (87.5%). The difference of 10.9% might represent the gap between the two stages of registration. It was possible that most people completed the first step, which involved such actions as notifying the village headman or a policeman of the death, or receiving the death

certificate form from the hospital. It was also possible that they did not take the further action of registration at the district or municipality office. People did not register the death or ended the registration process just at the first step either because of misunderstanding, inconvenience, lack of incentive or other reasons. Whatever the reason was, those deaths did not enter into the registration system and decreased the completeness of mortality data in Thailand.

**Table 4. Percentage distribution of deaths from Kanchanaburi Survey that were registered by age and sex**

Age	Male		Female		Both sexes	
	Registered	Not registered	Registered	Not registered	Registered	Not registered
<5	93.3	6.7	55.6	44.4	79.2	20.8
5-14	100.0	0.0	80.0	20.0	94.1	5.9
15-24	81.8	18.2	100.0	0.0	87.5	12.5
25-34	83.3	16.7	85.4	14.6	84.0	16.0
35-44	87.0	13.0	89.7	10.3	87.7	12.3
45-54	83.8	16.2	91.9	8.1	86.7	13.3
55-64	87.9	12.1	80.4	19.6	85.3	14.7
65-74	91.8	8.2	89.3	10.7	90.8	9.2
75-84	92.7	7.3	90.1	9.9	91.4	8.6
85+	86.5	13.5	82.8	17.2	84.2	15.8
<b>All ages</b>	<b>88.0</b>	<b>12.0</b>	<b>86.7</b>	<b>13.3</b>	<b>87.5</b>	<b>12.5</b>

**Figure 3. Percentage distribution of deaths from Kanchanaburi Survey that were registered by age and sex**



## Conclusion

This study aims to assess the quality of mortality data from the registration system of Thailand. The study takes advantage of the Kanchanaburi Project by comparing the deaths found in the annual censuses to those recorded in the civil registration system. The names of deceased persons from the two data sources were matched in order to measure the level of under-registration. Although the study was limited to specific areas in a province in the Central Region, the comparison of data from these two sources yielded some ideas on level of completeness of death registration for the whole country. The quality of mortality data might be different from one administrative area or region to another, but those differentials should be issues for further investigation.

The study also analyzed the completeness of death registration by age and sex. The age and sex pattern of death registration found in this study might be useful information in adjusting the data from this source. The mortality data by age and sex essential for calculating age-sex specific death rates and constructing life tables are increasingly needed in the study of burden of diseases. The data from the existing registration system should be used after adjustment by correction factors derived from studies such as this one.

This study also pointed out a possible gap between the multiple steps of death registration, from notifying the death to officially registering it. This finding suggested a hypothesis to be further tested. At the same time, there should be some strategies to improve the quality of death registration data, such as to reduce multiple steps of registration to one single data entry, to facilitate the registration process or to disseminate knowledge about vital registration to the public. The improved quality of mortality data would help in more effective formulation of policies and programs concerning people's health and quality of life.

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## About the Authors

Pramote Prasartkul, Ph.D., Professor of Demography.  
Patama Vapattanawong, Ph.D., Lecturer.