PERGAMON

Social Science & Medicine 55 (2002) 1663–1669

SOCIAL SCIENCE & MEDICINE

www.elsevier.com/locate/socscimed

High-frequency death certifiers in Taiwan: a sociocultural product

Tsung-Hsueh Lu[a], Craig R. Janes[b], Meng-Chih Lee[c], Ming-Chih Chou[c], Tai-Ping Shih[d,*]

[a] *Department of Public Health, Chung Shan Medical University, 110, Section 1, Chien Kuo North Road, Taichung 402, Taiwan*
[b] *Department of Anthropology, Campus Box 103, University of Colorado at Denver, P.O. Box 173364, Denver, CO 80217-3364, USA*
[c] *Department of Family Medicine, Chung Shan Medical University, 110, Section 1, Chien Kuo North Road, Taichung 402, Taiwan*
[d] *Department of Forensic Medicine, Criminal Investigation Bureau, National Police Administration, 5, Lane 553, Section 4, Chung Shau East Road, Taipei 105, Taiwan*

Abstract

Accurate death certification is essential to high-quality mortality statistics. Physicians who certify disproportionately large numbers of deaths can significantly affect the validity of the resultant mortality data. In Taiwan in 1994, 110 death certifiers issued more than 100 death certificates each; and nine of these high-frequency certifiers issued more than 500 death certificates. We explore the cultural, political, economic, historical, and social contexts of high-frequency death certification in Taiwan. Because of the traditional belief in Taiwan that one must die at home for the soul to be incorporated into the collective ancestral tablet of the household, many families bring their loved ones home from the hospital just before death. Hospital physicians cannot legally issue a death certificate in these cases because they did not witness the dying process. Although the government introduced an administrative certification system to handle these outside-hospital deaths, the great demands of this system have attracted many 'special exam' doctors (doctors with no formal medical degree) to adopt death certification as a full-time business. In this context, it is not surprising that 'routinization' of death certification (J. Health Soc. Behav. 32 (1991) 273) has led to low-quality reporting among these certifiers. We argue that attempts to improve the quality of mortality statistics should take into account the unique sociocultural contexts of different countries.

Keywords: Death certificates; Vital statistics; Cultural construction of death certification; Taiwan

Introduction

Mortality statistics are the most widely used data to assess the health status of a country and to compare the public health status of one country with another. Ensuring the uniformity and quality of mortality statistics in all countries is therefore of utmost concern to the World Health Organization (World Health Organization, 1977). Death certificates are the building blocks of mortality statistics. If certifying physicians do not complete death certificates correctly, the data derived from them are questionable. Lack of formal education and training of physicians in completing death certificates has been cited as the main reason for low-quality mortality data (Comstock & Markush, 1986; Messite & Stellman, 1996).

Because most physicians are likely to certify only a small number of deaths, the National Committee on Vital and Health Statistics (1991) of the United States has recommended that educational efforts should be aimed at educating those physicians and institutions most likely to be pronouncing and certifying death. However, only a few studies have discussed the problems of error that might arise if a small proportion of physicians certify a disproportionately large percentage

*Corresponding author. fax: +886-4-222-95768.
E-mail address: robertlu@ms1.hinet.net (T.-P. Shih).

0277-9536/02/$ - see front matter
PII: S0277-9536(01)00298-2

of death certificates in a region (Cochrane & Moore, 1981; Bloor, 1991; Hanzlick, 1993).

In order to improve the quality of cause of death statistics in Taiwan, the Department of Health of Taiwan initiated a program to evaluate the validity of cause of death certification and coding (Lu, Lee, & Chou, 2000; Lu et al., 2001). One of the objectives of this program was to identify the high-frequency death certifiers as target for future education and scrutiny. Most published studies of vital registration fail to describe the registration practices within their local cultural, political–economic, and historical contexts (Jewkes & Wood, 1998). In this study, we describe the unique phenomenon of high-frequency death certifiers in Taiwan and argue that the attempts to improve the quality of cause of death statistics should take into account the cultural context of death certification in different societies.

Background Information

The cultural context: "It is better to die at home"

Approximately 33% of the deaths that occur each year in Taiwan are in a hospital or other medical institution (Department of Health, 1998), which is quite low when compared to other countries, e.g., 60% in the United States, 66% in England and Wales, 67% in Japan, and 75% in Australia (World Health Organization, 1997). The low rate is not due to poor access to medical care. Taiwan launched the comprehensive National Universal Insurance Program in 1994, and almost all Taiwan residents have access to medical care, including hospitalization. Most people will go to a hospital for treatment, nevertheless, when the patient's condition is critical, the family usually brings him or her back home to die. In 58% of deaths that occurred in 1997, the place of death was in the home (Department of Health, 1998). One possible explanation for this phenomenon is the traditional belief that it is better to die at home.

Why is it better to die at home? According to Chinese eschatology, there is a threefold division of the soul: the *p'o,* the earthly *yin* soul, which goes into the grave with the body; the *hun* or *yang* soul, or spirit, which goes into the ancestral tablet for worship; and the *kue,* or ghost, which goes to the underworld (Watson, 1988; Cohen, 1988; Chang, 1993). One important function of funeral rites is to incorporate the soul of the deceased into the collective ancestral tablet of the household, the so-called domestic tablet. If the death occurs outside the home or the funeral rites are inappropriate, the soul cannot be incorporated into the domestic tablet, and will become and an *o-kui* (hungry ghost); an *io-hun* (wondering ghost); or a *ku-hun* (an orphaned, lonely, or solitary ghost)—the situation the families least want to see (Cohen, 1988; Chang, 1993). Families are thus anxious to bring dying family members home.

Unfortunately, there are no systematic quantitative studies of such beliefs that reveal how widespread they are among Taiwanese in different areas or among different socioeconomic groups. If rural or lower/middle class people, indigenous Taiwanese, etc., are more likely to espouse these beliefs, it would mean a skewing of death statistics among more "traditional" people. Further research is needed to answer this question more fully.

Political context: administrative certification for non-hospital deaths

According to the *Physician Law* in Taiwan (Department of Health, 1995), only the physician who personally witnesses a death can issue a death certificate. Most attending physicians who care for dying patients in the hospital thus do not witness the process of dying at home, and so will not issue a death certificate. Distressed families have complained to the government about this regulation since the *Physician Law* was enacted. To allow the family to finish the funeral affairs smoothly, the government agreed to authorize medical officials in district health offices to issue an administrative certification for the deceased when no physician witnesses the death (The Taiwan High Court, 1996). The medical official (usually accompanied by the local police) goes to the home of the deceased to inspect the corpse in order to rule out the possibility of death due to external causes. If the medical official suspects the death might be due to external causes, he or she refers the deceased to the forensic pathologist for autopsy. Otherwise, a certificate is issued that reflects the medical officials' presumption of the cause of death.

Because of the high percentage of individuals (58% in 1997) who die at home in Taiwan (Department of Health, 1998), the number of administrative certifications is substantial. Given the high demand for administrative certification, district medical officers often cannot afford to undertake the increased workload such certification demand requires. Moreover, families sometimes ask for the certification to be completed at inconvenient times, such as on the weekend or late in the evening. Under these circumstances, district medical officers may authorize contracted physicians or pathologists in the hospital to share the workload of administrative certification. Nevertheless, the number of the authorized physicians is still not great enough to meet the demand. Thus, many doctors have become involved in death certification as a business.

Economic context: death certification as a high-profit business

Issuing a death certificate has become one of the many services offered by funeral undertakers. Funeral companies usually have contracts with several doctors who can issue death certificates at any time. Many of these contracted doctors are full-time death certifiers, who see no live patients—only the deceased.

According to Taiwanese beliefs, the timing of funeral rites is critical, and it is not uncommon for families to request that the death certificate be issued at midnight. The price for such certification is, of course, much higher. In some cases, the deceased has already been prepared for burial with cosmetics and a funeral suit, or the coffin has been sealed prior to inspection. In such cases, the families would also pay a higher price to the certifier for not making a detailed inspection of the corpse. According to an investigation by one of the authors (Shih, 1997) who is presently the chief police surgeon for the Department of Forensic Medicine, Criminal Investigation Bureau, National Police Administration, some certifiers charge disproportionately high prices for issuing death certificates when a non-natural death (i.e., accidental death, suicide, or homicide) is suspected, and ask the families to cremate the corpse immediately after the death certificate is issued. Issuing such death certificates has become a lucrative business for full-time certifiers.

Historical context: 'special exam' doctors as the reserve corps

At the end of World War II, President Chiang-Kai-Shek withdrew his forces from mainland China to Taiwan, together with about two million followers. Most of the military-trained doctors who had accompanied him, and who had not received formal medical school training, were given the opportunity to take a special examination in order to obtain a license to practice medicine. Baker and Perlman (1967) classified these doctors as Grade-B doctors, in contrast to the Grade-A doctors who received seven years of training in medical school. These Grade-B doctors were derogatorily referred to by medical school-graduated doctors as 'special exam' doctors. From the 1960s to the 1980s, most Grade-A doctors practiced in cities, while most 'special exam' doctors practiced in rural areas. However, by the 1990s, an increasing number of Grade-A doctors had shifted their practices to rural areas (Chiang, 1999). The 'special exam' doctors faced increasing competition for patients and thus turned to death certification as an income-earning strategy. Many have become full-time death certifiers.

Methods

Identifying the high-frequency death certifiers

There were 111,927 death certificates issued during the year 1994 in Taiwan. A centralized registry of death certificates is maintained in the Office of Statistics, Department of Health, Provincial Government of Taiwan. It is from this database that we derived information on death certifiers and death certification practices. We used the name and license number of the certifying physician recorded on the death certificate to compute the frequency of certifications per certifier a year. Due to the illegibility of some of the signatures, there were 7961 certificates for which name and the license number could not be identified. A total of 103,966 death certificates were used to calculate the frequency of certifications.

High-frequency death certifiers were defined as those certifiers who certificated more than 100 death certificates a year and the low-frequency death certifiers were those certifiers who certificated only one death certificate a year.

Characteristics of high-frequency death certifiers

To examine the characteristics of the high-frequency death certifiers, we further compared the characteristics of the high-frequency death certifiers and low-frequency death certifiers. The name of the certifier was used to link the *Directory of Physicians in Taiwan* (JMAROC, 1995) to obtain the information on physician's age, specialty, type of practice, and training background. This is publicly available and accessible information.

In some hospitals the cause of death section of the death certificate was completed by the attending physician, however, the signing authority was the superintendent of the hospital. Because in this study we wished to examine the personal characteristics of certifiers, we deleted these death certificates from our comparative analysis. Forensic physicians—those who supervise autopsies in cases where external causes of death are suspected—were also excluded from the analysis. After these exclusions, there were 59 certifiers in the high-frequency group for comparison with the low-frequency group. A random sample of 261 certifiers from low-frequency death certifiers was used for comparison.

Errors in cause of death certification

To compare the error rates in cause of death certification between high-frequency group with low-frequency group, a proportional sampling of 294 death certificates from 18,470 death certificates issued by 59 high-frequency certifiers and 261death certificates from

low-frequency death certifiers were used for evaluation. The types of error in cause of death certification were evaluated by the first author (THL). A detailed discussion regarding the classification of errors in death certification has been presented in previous publications (Lu et al., 1998; Lu et al., 2001). In brief, errors are classified as follows: *major error* 1 occurs when only the mechanism(s) of death (or mode of dying) is given; *major error* 2 occurs when multiple causal sequences are given in part I of the cause of death specification; *minor error* 1 occurs when a single causal sequence is given but is not specific enough; and *minor error* 2 occurs when a single causal sequence is given but the order is judged to be medically incorrect.

Interview of high-frequency certifiers

Several death certifiers were identified who issued more than 1000 death certificates each in 1994. The addresses and telephone numbers of these certifiers were taken from the *Directory of Physicians in Taiwan* (JMAROC, 1995). After obtaining informed consent through a telephone contact, the first author (THL) interviewed these high-frequency death certifiers in July, 1999. The interviews were informal and semi-structured. Topics covered in interviews included reasons why the respondent had such high volume of certifications, problems they faced during the certifications, and the kinds of diagnostic terms they most commonly used.

Results

Of 103,966 death certificates on which the signature of the certifier was recognizable, the distribution of certifications per certifier was highly skewed (Table 1). Among 16,357 certifiers who issued at least one death certificate in 1994, 110 of them issued more than 100 death certificates and 7755 of them issued only one death certificate. One hundred and ten certifiers issued more than 100 death certificates a year in 1994. Although these physicians comprise just 0.7% (110/16,357) of all certifiers in that year, they issued 27.7% (28,832/103,966) of all the death certificates. Nine of these high-frequency certifiers issued more than 500 death certificates. These high-frequency death certifiers thus have great influence on the overall quality of mortality statistics in Taiwan.

Detailed comparisons of characteristics and quality of death certification between the high-frequency certifiers and low-frequency certifiers have been previously reported (in Chinese) (Lu et al., 1998). Briefly, the high-frequency certifiers were older (38% were over age 55 compared to 19% of the low-frequency certifiers); they were more likely to be Grade-B doctors (34% vs. 16%), and practiced in non-teaching hospitals or clinics (61% vs. 37%). The high-frequency certifiers were also judged to make more errors in death certification when compared to the low-frequency certifiers. The percentage of death certificates that were judged to be correctly completed was 56% in high-frequency certifiers and 69% in low-frequency certifiers (Lu et al., 1998).

In this study, we interviewed several of the high-frequency certifiers. All are 'special exam' doctors, and all felt they were driven into this occupational niche by competition. One certifier said, "I saw fewer and fewer patients when more and more medical school graduated physicians began practicing in this town. Thus, I had more time to go out for administrative certification. Those young physicians have no time and do not like to go to the home of the deceased for certification. So, I have my own market."

According to information obtained during the interview, the price for issuing a death certificate was around US$70 in 1999. The price was much higher than regular hospital death certification, which was only US$10 at the time.

In answering how they could write the cause of death diagnoses if they did not care for the deceased personally, all the certifiers interviewed said they simply wrote down the diagnosis determined by the family. One certifier said, "Sometimes the discharge note of the

Table 1
Number of death certifications per certifier in Taiwan, 1994

Number of death certificates issued per certifier in 1994	Number of certifiers	%	Total number of certifications	%
1	7755	47.41	7755	7.46
2–10	6826	41.72	27,343	26.29
11–30	1309	8.01	22,493	21.63
31–100	357	2.18	17,579	16.91
101–500	101	0.62	21,059	20.36
501–1000	6	0.04	3988	3.84
1000+	3	0.02	3749	3.51
Total	16,357	100.00	103,966	100.00

deceased is provided by the physician in the hospital, and I just copy the diagnosis. I sometimes even write down the chart number of the deceased in that hospital for responsibility.'' Another certifier stated, ''I usually write three non-controversial diagnoses in turn: cardiopulmonary failure, heart arrest, and senility. I do not think anyone will dare to challenge my diagnoses. After all, a death certificate is just a legal document required for burial. Why worry so much about the real cause of death?''

The certifier who often used ill-defined diagnoses was asked by the author, ''Do you not receive queries from the registration office on the ill-defined causes of death?'' He answered, ''Of course, I do. I can give them the specific diagnoses they want. I usually rewrite the ill-defined diagnoses as cerebrovascular disease or ischemic heart disease. I believe that in elderly people you definitely could find pathologic changes in the cerebral or coronary arteries in the autopsy. I certainly will not be wrong.''

One certifier said, ''Sometimes I do know a true but controversial diagnosis; some would embarrass the families, some would need autopsy for verification. I let these pass without further inquiries to the families, and write common natural disease diagnoses.''

What kind of problems did the interviewed certifiers often meet during their certification routine? Having been called out at inconvenient times was the most common complaint. The second complaint was that in many cases the certifier was invited to the home for certification but found that the deceased already been prepared for burial (cosmetics applied and dressed in a funeral suit), and it was thus inappropriate for the certifier to have a detailed inspection of the corpse. On some occasions, because of beliefs about fortune and auspicious burial times, the coffin was even sealed before the death certificate was issued. All interviewed certifiers stated that they respect the traditional custom of the family and will not insist on a detailed inspection of the body. As one certifier said, ''Let the bygones be bygones, I am the physician who cares for the family of the deceased.''

Discussion

The social and cultural construction of mortality statistics

Although the phenomenon of high-frequency death certifiers has been noted by some scholars (Cochrane & Moore, 1981; Bloor, 1991; Hanzlick, 1993), none of them reported finding certifiers who certified nearly as many deaths as we found to be the case in Taiwan, i.e., issuing more than a 1000 death certificates each per year. Although the Taiwan situation may be extreme by international standards, we believe that in every country cultural beliefs about death, combined with the social and economic realities of death certification, will affect the validity of mortality data. This will be the case particularly in those countries where death certification systems are poorly developed and monitored.

The system of administrative certification is not unique to Taiwan. In Scotland, when the general practitioner (GP) or the deputizing doctor is unable or unwilling to sign the certificate, the police surgeon (usually a GP) is called in. If the circumstances of the death seem unambiguous, the police surgeon may sign the certificate; frequently, however, the police surgeon decides that the body must be sent to the morgue for the forensic pathologist's opinion (Bloor, 1991).

In rural South Africa, where doctors are scarce, families have to pay the undertaker to remove the body, or transport it considerable distances to the nearest doctor. The doctor might refuse to certify the death if the deceased was not known to her or him, in which case the relatives would have to take the body to the police mortuary in the nearest town, where the police officer would issue a certificate (Jewkes & Wood, 1998).

The routinization of death certification

Bloor (1991) interviewed doctors who wrote large numbers of certificates in a Scottish city and found that the completion of death certificates was a very 'minor office': for most certifying doctors, death certification was an unsupervised, unreported, and, to outsiders, invisible activity. The situation is similar in Taiwan. The phenomenon of high-frequency death certifiers has persisted for years and has rarely come to the attention of medical or public health authorities.

Bloor (1991) also argued that these doctors were conducting their certifications in Schutz's 'world of routine activities' (Schutz, 1970). According to Schutz (1970), there is a change in the cognitive process when a person is faced repeatedly with the same set of stimuli. In theorizing about their certification routines, one certifier stated, ''I am performing a philanthropic service. I am solving a social problem. I am caring for the families of the deceased. This is not an easy job; you sometimes have to go to a very remote place for certification, or be called out at midnight or in bad weather and have to deal with distressed families. No wonder the younger physicians don't like to do this job. However, I have achieved more now than before, when I saw live patients. I am proud of being a full-time death certifier.''

Implications for the quality of mortality statistics

Because those who provide administrative certification do not personally treat and care for the deceased, most of the cause of death diagnoses were derived from

statements made by family members, or were based on discharge notes of the hospital. If the families did not know the cause of death, or there were no discharge notes available, the high-frequency certifiers would usually give vague diagnoses, e.g., cardiopulmonary failure, heart arrest, and senility. It is for this reason that high-frequency certifiers commit more errors (i.e., only the mechanism of death was given or unspecific diagnosis was given) in death certification than low-frequency certifiers. Studies in South Africa also showed that most death certificates issued by police officers listed ill-defined causes of death (van der Merwe, Yach, & Metcalf, 1991; Lerer, 1993). Such practices certainly affect the quality of mortality data.

Although there are occasional queries from the registration office to high-frequency certifiers regarding diagnoses, such inquiries focus primarily on the clarity of statements made on the death certificate itself rather than validating the accuracy of the death diagnoses (National Center for Health Statistics, 1985; Hopkins, Grant-Worley, & Bollinger, 1989; Department of Health, 1994; Hanzlick, 1996). After being queried several times by the vital statistics office of the Department of Health regarding ill-defined diagnoses, one interviewed certifier said he began to provide more specific diagnoses, such as cerebrovascular disease or ischemic heart disease, in order to avoid future queries. He, of course, did not have the medical evidence necessary to make these diagnoses.

Some scholars suggest that more formal education and training on death certification will improve the quality of cause of death statistics (Comstock & Markush, 1986; Messite & Stellman, 1996). However, the interview information in our study suggest that education alone would be insufficient to solve the problem. In Taiwan, errors in death certification do not necessarily result from lack of knowledge. Our study suggests that certifiers already know the correct methods for certifying death, but may sometimes write ill-defined or unspecific diagnoses for various reasons. Similarly, studies in the UK revealed that many physicians would not record stigmatized diseases or causes of death such as suicide and alcoholism on death certificates (Gau & Diehl, 1982; Maudsley & Williams, 1993).

We therefore argue that any attempts at improving the quality or interpretation of mortality statistics should always take into account the sociocultural, political–economic, and historical factors that lie behind and/or constrain physician behavior in death certification. In order to improve the quality of cause of death statistics and to avoid the ignorance of unnatural deaths—some of them might in fact be criminal cases—health and forensic authorities should reevaluate the system of administrative certification in Taiwan. Medical examiners who are more qualified, or coroners, are needed to certify those who died at home.

References

Baker, T. D., & Perlman, M. (1967). *Health manpower in a developing economy: Taiwan, a case study in planning*. Baltimore: The Johns Hopkins Press.

Bloor, M. (1991). A minor office: The variable and socially constructed character of death certification in a Scottish City. *Journal of Health and Social Behavior*, *32*, 273–287.

Chang, S. (1993). Concept of *hun-p'o* in Taiwanese Han. In Y. K. Huang (Ed.), *The concept of the person, meaning and society*. Taipei: Institute of Ethnology, Academia Sinica (in Chinese).

Chiang, T. L. (1999). Chapter 3: Physician manpower policy in Taiwan. In T. L. Chiang (Ed.), *Health care policy: Taiwan's experience*. Taipei: Chui Liou Publisher (in Chinese).

Cochrane, A.L., & Moore, F., 1981. Death certification from the epidemiological point of view. *Lancet ii*, 742-743.

Cohen, M. L. (1988). Souls and salvation: Conflicting themes in Chinese popular religion. In J. J. Watson, & E. S. Rawski (Eds.), *Death ritual in late Imperial and modern China*. Berkeley: University of California Press.

Comstock, G. W., & Markush, R. E. (1986). Further comments on problems in death certification. *American Journal of Epidemiology*, *124*, 180–181.

Department of Health (1994). *The manual of cause-of-death statistics*. Department of Health, Executive Yuan, Taipei (in Chinese)

Department of Health (1995). *The physician law*. Department of Health, Executive Yuan, Taipei (in Chinese)

Department of Health (1998). *1997 Republic of China health and vital statistics*. Department of Health, Executive Yuan, Taipei.

Gau, D. W., & Diehl, A. K. (1982). Disagreement among general practitioners regarding cause of death. *British Journal of Medicine*, *284*, 239–241.

Hanzlick, R. (1993). Characteristics of death certifiers and institutions where death is pronounced—Fulton County, Georgia, 1991. *Mortality and Mobility Weekly Report*, *42*, 683–684.

Hanzlick, R. (1996). The relevance of queries and coding procedures to the writing of cause-of-death statements. *American Journal of Forensic and Medical Pathology*, *17*, 319–323.

Hopkins, D. D., Grant-Worley, J. A., & Bollinger, T. L. (1989). Survey of cause-of-death query criteria used by state vital statistic programs in the US and the efficacy of the criteria used by the Oregon Vital Statistics Program. *American Journal of Public Health*, *79*, 570–574.

Jewkes, R., & Wood, K. (1998). Competing discourses of vital registration and personhood: Perspectives from rural South Africa. *Social Science and Medicine*, *46*, 1043–1056.

JMAROC, The Joint Medical Association of Republic of China, 1995. *Directory of physicians in Taiwan*. Taipei: Joint Medical Association of Republic of China.

Lerer, L. B. (1993). Improving mortality data in South Africa: Review of next of kin statements to determine cause of death in police certification. *Journal of Epidemiology and Community Health*, *47*, 248–250.

Lu, T. H., Lee, M. C., & Chou, M. C. (2000). Accuracy of cause of death coding in Taiwan: Types of miscoding and effects

on mortality statistics. *International Journal of Epidemiology*, *29*, 336–343.

Lu, T. H., Shih, T. P., Lai, H. S., Lee, L. S., Lee, M. C., & Chou, M. C. (1998). Evaluating the validity of cause-of-death statistics in Taiwan (II): Characteristics of high frequency death certificates certifers. *Chinese Journal of Public Health (Taipei)*, *16*, 273–279 (in Chinese).

Lu, T. H., Shou, W. Y., Shih, T. P., Lee, M. C., Chou, M. C., & Lin, C. K. (2001). Factors associated with errors in death certificate completion: A national study in Taiwan. *Journal of Clinical Epidemiology*, *54*, 232–238.

Maudsley, G., & Williams, E. M. I. (1993). Death certification by house officers and general practitioners—practice and performance. *Journal of Public Health Medicine*, *15*, 192–201.

Messite, J., & Stellman, S. D. (1996). Accuracy of death certificate completion: The need for formalized physician training. *Journal of the American Medical Association*, *275*, 794–796.

The National Center for Health Statistics (1985). *Instruction manual part 20: Cause-of-death querying*. US Department of Health and Human Services, Public Health Service, Hyattsville.

The National Committee on Vital and Health Statistics (1991). *Report of the Second Workshop on Improving Cause-of-Death Statistics*. US Department of Health and Human Services, Public Health Service, Hyattsville.

The Taiwan High Court (1996). *Prosecutor's Manual of Medical Examination*. Prosecutor's Office, Taiwan High Court, Taichung. (in Chinese)

Schutz, A., 1970. In R. Zaner (Ed.), *Reflections on the problem of relevance*. New Haven: Yale University Press.

Shih, T.P., 1997. *Management of Deaths*. Department of Pathology, Veterans General Hospital–Taichung, Taichung.

Van der Merwe, S., Yach, D., & Metcalf, C. A. (1991). Peering into the black hole—the quality of black mortality data in Port Elizabeth and the rest of South Africa. *South African Medical Journal*, *79*, 419–422.

Watson, R. S. (1988). Remembering the dead: Graves and politics in southeastern china. In J. J. Watson, & E. S. Rawski (Eds.), *Death ritual in late Imperial and modern China*. Berkeley: University of California Press.

World Health Organization (1977). *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death*, Ninth Revision. Vol. 1, World Health Organization, Geneva, pp.701–730.

World Health Organization (1997). *1996 World Health Statistics Annual*. World Health Organization, Geneva.