

Evaluating national cause-of-death statistics: principles and application to the case of China

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Abstract Mortality statistics systems provide basic information on the levels and causes of mortality in populations. Only a third of the world's countries have complete civil registration systems that yield adequate cause-specific mortality data for health policy-making and monitoring. This paper describes the development of a set of criteria for evaluating the quality of national mortality statistics and applies them to China as an example. The criteria cover a range of structural, statistical and technical aspects of national mortality data. Little is known about cause-of-death data in China, which is home to roughly one-fifth of the world's population. These criteria were used to evaluate the utility of data from two mortality statistics systems in use in China, namely the Ministry of Health-Vital Registration (MOH-VR) system and the Disease Surveillance Point (DSP) system. We concluded that mortality registration was incomplete in both. No statistics were available for geographical subdivisions of the country to inform resource allocation or for the monitoring of health programmes. Compilation and publication of statistics is irregular in the case of the DSP, and they are not made publicly available at all by the MOH-VR. More research is required to measure the content validity of cause-of-death attribution in the two systems, especially due to the use of verbal autopsy methods in rural areas. This framework of criteria-based evaluation is recommended for the evaluation of national mortality data in developing countries to determine their utility and to guide efforts to improve their value for guiding policy.

Keywords Mortality; Cause of death; Statistics/standards; Data collection/standards; Models, Statistical; Evaluation studies; China (source: MeSH, NLM).

Mots clés Mortalité; Cause décès; Statistique/normes; Collecte données/normes; Modèle statistique; Etude évaluation; Chine (source: MeSH, INSERM).

Palabras clave Mortalidad; Causa de muerte; Estadística/normas; Recolección de datos/normas; Modelos estadísticos; Estudios de evaluación; China (fuente: DeCS, BIREME).

الكلمات المفتاحية: الوفيات، سبب الموت، إحصائيات، معايير الإحصائيات، جمع المعطيات، نماذج إحصائية، دراسة تقييم، الصين (المصدر: رؤوس الموضوعات الطبية، المكتب الإقليمي لشرق المتوسط).

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Voir page 624 le résumé en français. En la página 624 figura un resumen en español.

يمكن الاطلاع على الملخص بالعربية في صفحة 625.

Introduction

Cause-of-death statistics are basic outputs of health information systems and are fundamental to health development strategies. Civil registration systems are the main source of such information and are most useful when both coverage and medical certification are high.

Although many countries invest considerable resources in the establishment and maintenance of systems to monitor the levels, patterns and causes of mortality, currently there is no accepted framework for assessing the quality of this information. Several factors are likely to influence the usability of such information. Ruzicka & Lopez (1) initially proposed five criteria for evaluating quality with respect to data reported to WHO. Subsequently, Mahapatra & Rao (2) applied these criteria to mortality registration systems in India, and proposed four additional components for assessing the usability of cause-of-death information to guide health policy.

The aim of this paper is to position these criteria within an overall framework that others might find useful when

evaluating cause-of-death information. The application of this framework is illustrated using China as an example, in part because there are competing systems for reporting mortality statistics in that country, but also because information about the quality of data in China is of interest for global descriptive analyses of health conditions.

For each criterion, a subjective rating of data quality was made using a three-tiered scale:

1. satisfactory;
2. unsatisfactory; or
3. unknown.

Note that the ratings assigned reflect the judgement of the authors, based on a review of available evidence for the indicators. It should be noted that these criteria are intended to assist in the evaluation of data emanating from vital registration systems, and not of the systems themselves. System evaluation requires a wholly different set of criteria related to staffing, operational procedures, efficiency and comprehension by government and

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policy-makers (3). Although these are important issues, they are beyond the scope of this paper.

Conceptual framework

Given that cause-of-death statistics are used to guide important decisions regarding health policy and research, it is essential that the criteria for evaluating their utility are able to identify potential sources of misinformation. Identification of errors and biases in the data will increase confidence in using the statistics. Similarly, knowledge that data-collection methods are consistent across time and place (for subnational analyses) is essential to assess policy utility. These and related considerations provide the basis of the framework we propose.

A useful starting point is to focus on *generalizability*, i.e. how representative are the statistics with respect to the population(s) of interest? We propose two criteria to assess generalizability.

- *Coverage*. To what proportion(s) or sectors of the population do the data refer? Coverage may include urban/rural, geographical or administrative sectors, or coverage of specific socioeconomic groups. Coverage is also relevant in the context of sample-based systems.
- *Completeness*. Within the population covered by the systems for recording cause of death (e.g. urban areas only), what percentage of deaths are registered with a cause?

Another consideration is *reliability*, i.e. how consistent are the data with respect to epidemiological expectations. For example, previous research suggests that proportionate mortality from various causes changes in a predictable fashion over time as overall mortality declines with socioeconomic development and disease control (4–6). Equally, large annual fluctuations in levels of mortality from such causes as cancer or stroke would be unexpected. We propose two criteria under this rubric:

- consistency of cause patterns with general levels of mortality; and
- consistency of cause-specific mortality rates over time (e.g. over 5 years).

Arguably, the most important elements of any framework for evaluating data quality are indicators of the *validity* of the data. For this, we propose three criteria:

- *Content validity*; that is, do the statistics actually show what they purport to show? Is there information on the proportion of deaths certified by medical practitioners? Are procedures for certification and coding comparable across the population covered by the statistics? Are there periodic comparisons of the accuracy of diagnoses with some “gold standard”? Information on such issues allows the user to assess the validity of the data.
- *Use of ill-defined categories and codes*; what proportion of deaths is assigned an ill-defined cause, or otherwise poorly diagnosed (e.g. cancer without mention of primary site; injury that has not been classified according to whether or not it was intentional). Such diagnoses are of little value for policy or epidemiological research.
- *Incorrect or improbable age or sex dependency*; several causes of death are strongly age-dependent (e.g. stroke or perinatal causes) or uniquely sex-specific (e.g. prostate cancer and maternal haemorrhage). Departures from these patterns reflect serious concerns with the validity of the data.

The final element of the framework groups together criteria to assess the *policy relevance* of the data. We propose two criteria, both of which are of critical importance for policy-makers.

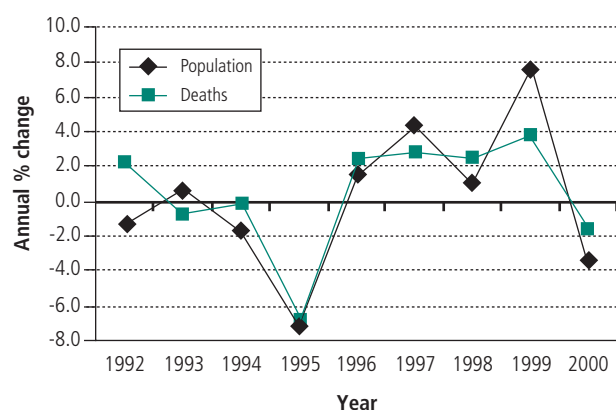
- *Timeliness*; data on causes of death that are more than, say 2 years out of date rapidly lose their relevance for policy and programme purposes.
- *Geographical disaggregation*; statistics that identify the extent and pattern of health differentials in populations within health service jurisdictions are critical for informing policies to reduce health inequalities and target interventions.

Implementation

Ease of application is the key to the success of an evaluation framework. In most cases, the criteria we propose can be evaluated directly from the cause-of-death statistics, administrative information on the registration system or other information that is readily available. For example, completeness can be calculated using indirect demographic methods (7) and available estimates of total mortality (8, 9). Alternatively, direct methods based on the dual record system (10) could be employed by conducting independent re-surveys. Some of the indicators of data reliability and validity can be calculated directly from the data, such as consistency over time, age or sex dependency, and proportions of deaths assigned ill-defined codes. Timeliness is readily apparent, and the availability of geographical statistics can be determined from data management systems in place. The only criterion for which assessment might prove difficult is content validity, as this requires either supplementary tabulations (e.g. proportion of deaths medically certified, or extent of lay reporting), or reference to the research literature on formal validation studies (11–17).

Another critical issue is the standards by which quality will be judged. Although a detailed scoring system for each criterion would certainly increase the discriminatory power of the framework, in most cases it is likely to be sufficient to judge performance as simply “satisfactory” or “unsatisfactory”, or if insufficient information is available, “unknown”. The thresholds we propose for differentiating the first two of these categories are based on a common-sense understanding of which data are usable and which are not. Coverage of less than the entire population is obviously unsatisfactory, unless based on representative sampling. Completeness levels of less than 90–95%

Fig. 1. Annual percentage change in reported population and deaths by the Ministry of Health-Vital Registration system, 1992–2000



WHO 05.85

Table 1. Percentage under-reporting of deaths by age and sex, Disease Surveillance Point system, China, 1996–98

Sex	< 5 yrs	5–29 yrs	30–59 yrs	> 60 yrs	Total
Male	19.8	12.6	10.7	12.6	12.4
Female	23.6	18.6	14.1	13.2	14.1
Total	21.6	14.7	12.0	12.9	13.1

Source: Jiemin Ma, personal communication, September 2004.

could imply biases in the data towards conditions more commonly treated in health facilities, or medico-legal cases (for which a police or judicial enquiry is required to ascertain the cause of death). Consistency of cause-of-death data with overall mortality might be assessed in comparison with cause-of-death models, using the criterion that more than two standard deviations from predicted levels reflects unsatisfactory performance (18), unless there is convincing evidence to suggest that the observed deviations are likely to be real.

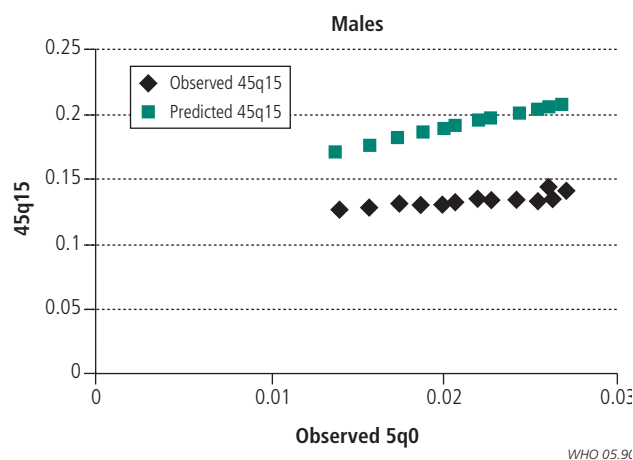
Similarly, annual fluctuations in death rates from leading causes that are greater than about 2–3% suggest quality concerns and an “unsatisfactory” rating. Because it is difficult to assess content validity objectively, it may be captured by other criteria. For example, a high proportion of ill-defined deaths (> 10%) suggests unsatisfactory certification and coding procedures, and implies inadequate medical input into the certification process, leading to an “unsatisfactory” rating for content validity. Any indication that causes of death are being assigned to impossible or improbable age or sex categories for specific diseases based on known epidemiological considerations would warrant caution, and hence an “unsatisfactory” score. Finally, given the need for up-to-date information, statistics that are more than two calendar years old are likely to be of limited value.

Evaluation of Chinese mortality statistics systems

In this section, we apply the criteria listed above to the two mortality data systems currently in operation in China: the Ministry of Health-Vital Registration (MOH-VR) system, and the Disease Surveillance Points (DSP) system. A detailed description of the history and organization of mortality registration in China is described elsewhere (19). In urban areas, certification of cause of non-domiciliary deaths is done by the hospital where the deceased was treated. In rural areas both systems employ “verbal autopsies” (VA) to ascertain the cause of death, supplemented by information from medical records kept on the household. Verbal autopsy is a process that involves a structured interview with relatives of the deceased to collect information on symptoms and events during the illness that preceded death. This information is subsequently reviewed to determine the probable cause of death.

Age-standardized mortality rates differ between the two systems for deaths due to communicable diseases, noncommunicable diseases and external causes (19). Protein–energy malnutrition and meningitis are among the leading causes of childhood mortality according to the DSP, but are absent from the 10 leading causes in the MOH-VR. Among the elderly, there are important differences in the reporting of proportions of deaths from ischaemic heart disease (7.7% in DSP;

Fig. 2. Observed and model predicted risks of adult mortality (45q15) in males, for observed levels of child mortality (5q0) in the Ministry of Health-Vital registration system 1989–2000



10.5% in MOH-VR), and lung cancer (4.3% in DSP; 5.7% in MOH-VR). These observations lead to uncertainty about the true level and pattern of cause-specific mortality in China. In the following sections, we systematically assess the operational characteristics of the two systems using the nine specific criteria described above to illustrate how they might be applied in practice to mortality registration data.

Coverage

The MOH-VR covers about 8% (110 million) of the national population, whereas the DSP covers about 1%. The sample sites in the DSP system remain constant over time, and are representative of the national population (satisfactory). In contrast, the sites represented in the MOH-VR data are not representative because they are focused almost entirely in the eastern region (19). Also, the number of sites represented in the MOH-VR data varies from year to year, and there are no specific criteria for inclusion or exclusion. During the period 1988–2000, annual fluctuations in the reported sample population and registered deaths exceeded 2% compared to the previous year in eight instances (Fig. 1). These fluctuations raise doubts about the validity of the statistics generated by this system (unsatisfactory).

Completeness

To assess completeness, the DSP conducts independent surveys on a sample of about 5000 households in each province once every 3 years. The results from the 1998 survey (Table 1) suggest that significant under-reporting occurs at all ages, particularly in children. Uncertainty exists about the independence of the two data collection efforts (an underlying principle in the application of these statistical methods (10)) because the village doctors could be involved in both systems. However, an indirect demographic assessment of completeness (the growth-balance method (20)) also suggests under-reporting of adult mortality (30%) in the DSP system (9); hence we rate it as unsatisfactory on this criterion. (The Brass Growth-Balance technique assesses the completeness of death registration at ages above 5 years by comparing the age-distribution of reported deaths with the expected age distribution based on the observed population age–sex structure, assuming the population is closed to migration.)

No data are available for direct assessment of completeness in the MOH-VR system. Conventional life-table analysis of observed age-specific mortality rates from this system yields implausibly low levels of adult mortality (9). This was confirmed by comparing observed and model-predicted levels of adult mortality from the modified logit model life table system (21) (Fig. 2). The system uses levels of child mortality (${}_5q_0$) to predict adult mortality (${}_{45}q_{15}$), based on regression equations developed from observed relationships between these two parameters in empirical data. We used the model to predict a ${}_{45}q_{15}$ for every observed ${}_5q_0$ for males in the MOH-VR data series from 1989–2000. Observed values of ${}_{45}q_{15}$ are consistently and markedly lower than the values predicted by the model. Similar results were obtained for females. These analyses suggest that levels of adult mortality as measured from MOH-VR data are implausibly low, hence we rate the MOH-VR system as unsatisfactory on this criterion.

Content validity

To assess content validity, we focused on the specific collection mechanisms for collecting data on individuals who had died, and the process used to compile statistics based on underlying causes of death. Following new legislation in 1992 (22), a uniform death certification procedure has been practised for deaths in health facilities in China, using the international form of the medical certificate of cause of death (23). For deaths that occur in the home, both systems rely on information obtained from family members, with the DSP using verbal autopsy interviews, whereas the MOH-VR sometimes records family

opinion alone, without detailed investigation. The DSP carries out coding and classification of underlying causes at the central level, which reduces inter-rater errors (i.e. differences between different coders) in these procedures, whereas the MOH-VR conducts coding at the provincial level.

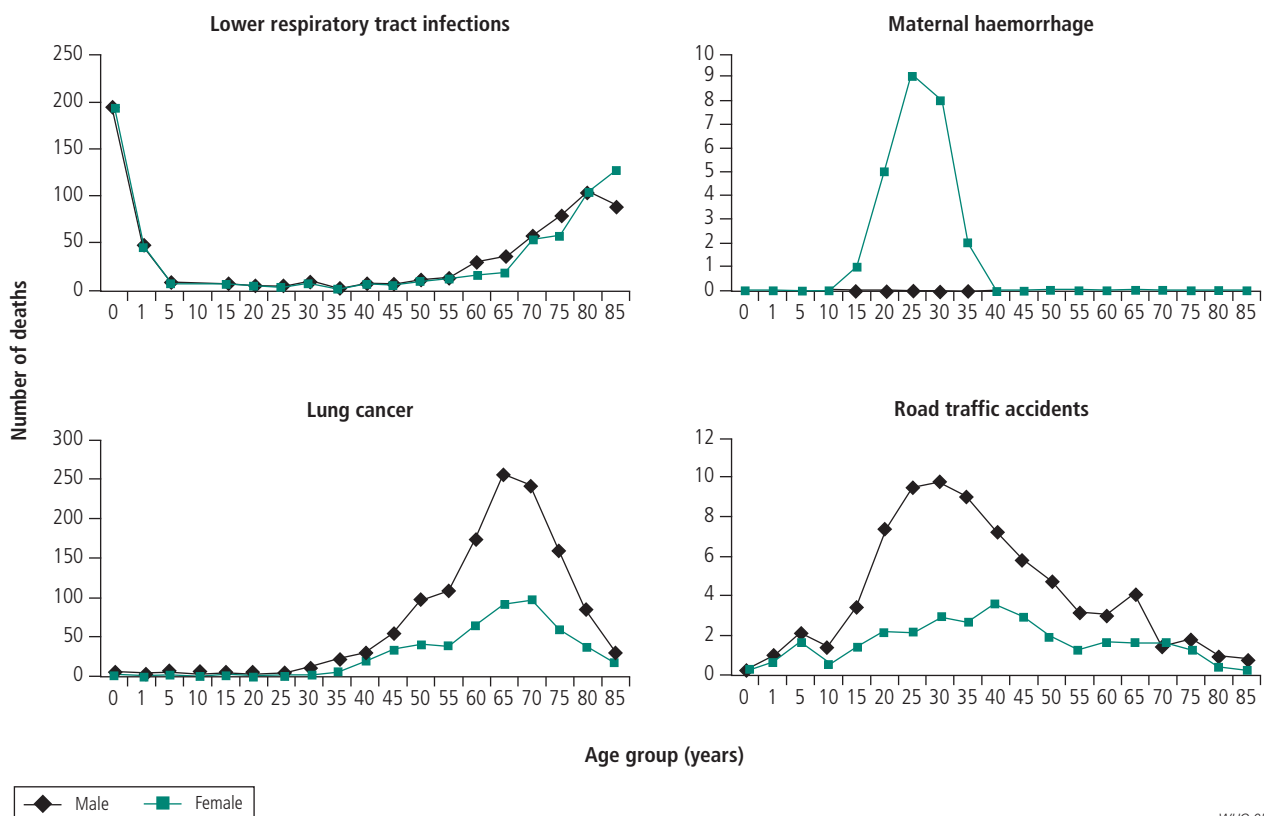
The final statistical tabulations from both systems include all data, without differentiation of institutional deaths from home deaths, and home deaths are not differentiated according to whether or not a medical opinion was obtained as to the cause. The validity of the content of data sets from both systems is therefore questionable, given the absence of these supplementary statistics. No studies have been published that measure the accuracy of death certificates in comparison with clinical records (unsatisfactory).

Use of ill-defined categories

In any population, there are invariably some deaths for which the cause is difficult to ascertain. These are coded according to chapter XVI in the International Classification of Diseases (ICD)-9 (24). Few deaths were assigned codes in this category over the period 1995–99 (average of 2.5 % in DSP; 5% in the MOH-VR). This suggests that when deaths are registered, the cause is determined with a high degree of specificity. Hence, we rate both systems as “satisfactory” under this criterion.

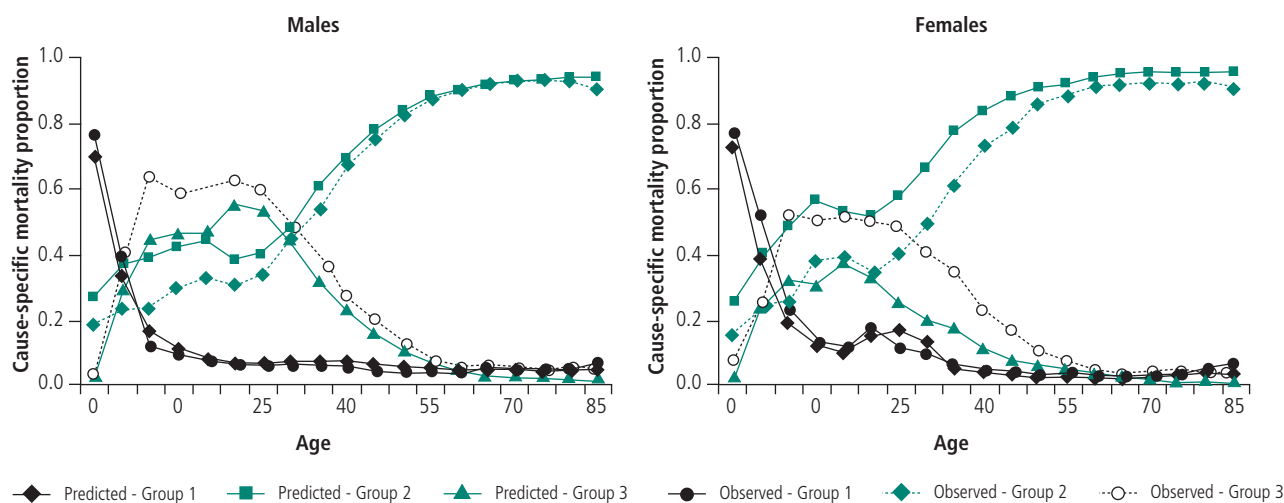
Other categories that could also be assessed under this criterion are septicæmia (A41 in ICD-10), cardiac arrest (I46), heart failure (I50) injuries of undetermined intent (Y10–Y34), and malignant neoplasms of ill-defined, secondary and unspecified sites (C76–C80).

Fig. 3. Numbers of deaths by age for selected causes: Disease Surveillance Point system, China, 1999



WHO 05.91

Fig. 4. Comparison between observed and model-predicted cause-specific mortality proportions, by age and sex, for three broad cause groups,^a Disease Surveillance Point system, China 1997–99



^a Group 1: communicable, maternal, perinatal and nutritional conditions; Group 2: noncommunicable diseases; Group 3: injuries.

WHO 05.92

Age and sex dependency

Certain causes are uniquely age-specific (e.g. perinatal conditions) or sex-specific (e.g. prostate cancer), and although misclassifications of this nature could appear in the final statistics as a result of clerical error, adequate screening of aggregated data with subsequent review should correct them. Data from neither system during 1995–99 revealed any such instances. We therefore rate both data sources “satisfactory” under this criterion.

Furthermore, certain diseases and conditions mainly cause mortality in specific age groups (e.g. diarrhoeal diseases or meningitis in children, road traffic accidents in young adults, chronic obstructive pulmonary disease (COPD) and stroke in the elderly). Deviations from expected age patterns of mortality for specific conditions, unless explained by local epidemiological phenomena, raise doubts about the quality of certification and coding. Fig. 3 shows age patterns of numbers of deaths due to four selected causes from the DSP data. All appear plausible and consistent with data from countries with high-quality mortality statistics systems (25). Age patterns for 20 leading causes from each system were examined, and found to be similarly consistent, and hence we rate both data sources “satisfactory” on this criterion.

Consistency with general mortality levels

In the absence of statistics from complete civil registration systems, cause of death models are used to predict the cause structure of mortality by age and sex, for a given level of all-cause mortality (6). We compared observed and model predicted-proportionate composition of mortality by age for males and females according to three broad groups of causes of death. Fig. 4 shows the results for data from the DSP system pooled for the three years 1997–99. For communicable and noncommunicable diseases, observed proportions for age–sex–cause combinations were within two standard deviations of the predicted value (Fig. 5). However, the observed proportions for injuries were significantly higher than the predicted value, especially among females. Although the

models do not include Chinese data, the weight of historical evidence raises uncertainty about the validity of these deviations (18). Medico-legal considerations resulting in more complete registration of deaths from injury could possibly explain the findings. Detailed studies that assess the causes of deaths missed by registration could provide further insight. Evaluation of data from the MOH-VR for 1999 yielded similar results. In view of this uncertainty, we rate both systems as “unknown” under this criterion.

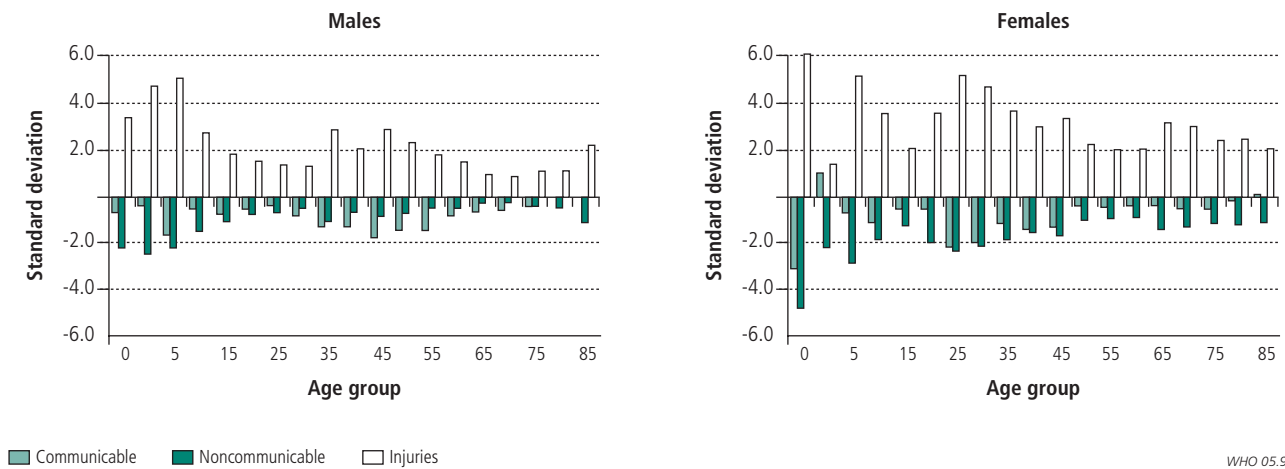
Consistency over time

Apart from changes resulting from new diagnostic methods, or revisions to the classification of diseases (ICD), one would expect a uniform trend in cause-specific mortality in the absence of any disease outbreak or natural disaster. We examined the time trend in cause-specific mortality proportions from 10 leading causes in males and females from each of the systems during 1997–99. Poisson regression methods were applied to calculate 95% confidence intervals for each annual cause-specific mortality proportion. A significant fluctuation in the mortality proportion was observed in only one case (COPD) in the DSP system (satisfactory).

Timeliness

The compilation of statistics including data cleaning (i.e. the identification and correction of errors in the data that could result from incorrect data-entry or processing) and mechanisms of re-enquiry to obtain information pertaining to a potential data error is time consuming. On the other hand, it is technically incorrect and politically unhelpful to publish questionable data. A time lag of about 2 years may be considered reasonable for the release of final tabulations. Statistics from the DSP were available in a timely manner during the 1990s. However, there has been no public release of statistics since 1999. Data from the MOH-VR system are available only for internal use within the Ministry of Health. There is no published analysis of these data within China, and basic statistics are released only to the World Health Organization (unsatisfactory).

Fig. 5. Number of standard deviations by which observed cause-specific mortality proportions differ from mean predicted proportions, Disease Surveillance Point system, 1997–99



WHO 05.93

Usability for subnational purposes

Both the MOH-VR and the DSP systems produce statistics according to a socioeconomic stratification of rural counties. Life tables constructed from the two systems show a plausible decline in life expectancy and rise in risks of child and adult mortality with decreasing socioeconomic status (see Table 2).

These socioeconomic strata represent subpopulations dispersed throughout the country, not by geographically determined health administration districts, yet health service provision and responsibility is generally organized according to geographical entities. Absence of these data from both systems precludes such analysis. Moreover, the DSP system was designed for health policy and monitoring at the national level and the sample sizes are too small for subnational assessment, even if pooled over several years.

The MOH-VR data are also constrained in this respect, in that they are primarily limited to the urban population living in the eastern China. Hence, we rate both data sources “unsatisfactory” under this criterion.

Discussion

Many countries invest substantial resources in the development and maintenance of data systems for recording cause of death. We have developed a set of criteria which we believe will assist assessments of cause-of-death information from such systems. They are relatively easy to apply, with most being measurable from the data themselves. The criteria are not intended as a tool for evaluating the registration system itself, however, although one might argue that data quality is a reasonable proxy for the functioning of the system that generates the data. Some criteria (e.g. validity) require additional background information or research results, which may not be readily available. For some purposes, the criteria might not possess adequate discriminatory power to distinguish between the quality of different cause-of-death data sets.

The application of the criteria to China suggests that there is an urgent need to address various systemic issues, particularly completeness in the DSP system. Although the system was able to collect data on about 85% of deaths in the late 1990s, higher levels of completeness are necessary to obtain largely unbiased statistics on cause-specific mortality.

Table 2. Life expectancy at birth, risks of child and adult mortality, by socioeconomic strata, from MOH-VR and Disease Surveillance Point systems, China, 1999

	e_0		${}_5q_0$		${}_{45}q_{15}$	
	MOH-VR	DSP	MOH-VR	DSP	MOH-VR	DSP
Males						
Urban	74.2	76.4	0.012	0.011	0.108	0.094
Rural 1	73.7	73.1	0.007	0.012	0.129	0.131
Rural 2	70.5	72.6	0.017	0.016	0.164	0.134
Rural 3	68.2	73.6	0.039	0.023	0.172	0.127
Rural 4	–	72.8	–	0.039	–	0.152
Females						
Urban	78.4	80.5	0.009	0.007	0.064	0.054
Rural 1	78.3	77.5	0.006	0.012	0.075	0.082
Rural 2	74.8	77.5	0.016	0.014	0.119	0.084
Rural 3	72.3	77.8	0.048	0.028	0.125	0.081
Rural 4	–	76.2	–	0.049	–	0.115

MOH-VR, Ministry of Health-Vital registration. DSP, Disease Surveillance Point system; ${}_5q_0$, child mortality; ${}_{45}q_{15}$, adult mortality, e_0 , life expectancy at birth.

Source: Calculated from raw (unadjusted data) from the two systems.

Scale: Rural 1, best socioeconomic scores; Rural 4, worst socioeconomic scores. There are no category 4 counties in the MOH-VR system.

The content validity of cause-of-death reporting in the registration system needs further research. Possible biases in the observed data due to incomplete registration remain unidentified. Additional biases may arise due to the specific sociocultural context within which the system for recording cause of death operates; a better understanding of this will help in interpreting the data. A good example is the larger than predicted proportion of deaths from injury among young women in China (Fig. 4). Furthermore, for individual deaths, there is currently no measure of the accuracy of cause attribution or of the subsequent ICD coding of the underlying cause.

The use of verbal autopsy methods in the DSP raises further concerns. Although these are necessary, due to the large proportion of deaths that occur in the home, a detailed validation of the methods used in China is required. Assessments of

validity and reliability in both urban and rural areas of China are being implemented to guide the integration of the two systems into a unified nationally representative system for mortality statistics.

This evaluation has suggested areas where investment is urgently needed to improve data quality. Other countries where there is uncertainty about data quality may wish to evaluate their statistics against these criteria and conduct similar research.

Periodically carrying out such assessments will greatly enhance the utility of cause-of-death data. ■

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Résumé

Évaluation des statistiques nationales de décès par causes : principes et application au cas de la Chine

Les systèmes de statistiques de mortalité fournissent des données de base sur l'ampleur et les causes de la mortalité parmi les populations. Dans le monde, un tiers seulement des pays disposent d'un système d'état civil complet, procurant des données de mortalité par causes spécifiques utilisables par les décideurs du secteur sanitaire et les services de surveillance. Le présent article décrit la mise au point d'une série de critères permettant d'évaluer la qualité des statistiques de mortalité nationales et l'application de ces critères à la Chine à titre d'exemple. Ces critères couvrent divers aspects structurels, statistiques et techniques des données de mortalité nationales. On sait peu de chose sur les données relatives aux causes de décès en Chine, pays qui abrite pourtant près d'un cinquième de la population mondiale. Les critères établis ont servi à évaluer l'utilité des données fournies par deux systèmes de statistiques de mortalité en usage en Chine, à savoir le système du Ministère de l'état-civil (MOH-VR) et celui du Disease Surveillance

Point (DSP). L'article conclut à l'incomplétude des registres de mortalité tenus par les deux systèmes. Ceux-ci ne mettent notamment à la disposition des sous-unités géographiques du pays aucune donnée statistique permettant l'affectation à bon escient des ressources ou la surveillance des programmes sanitaires. Dans le cas du DSP, la compilation et la publication des statistiques sont effectuées de manière irrégulière. Quant au MOH-VR, il ne met pas du tout ses statistiques à la disposition du public. Des études supplémentaires sont nécessaires pour mesurer la validité de l'affectation des décès par cause dans les deux systèmes, compte tenu notamment des méthodes d'autopsie verbale utilisées dans les zones rurales. Il est recommandé d'employer le présent cadre d'évaluation sur la base de critères pour juger la valeur des données nationales de mortalité des pays en développement, déterminer l'utilité de ces données et guider les efforts pour accroître leur intérêt en tant qu'élément décisionnel.

Resumen

Evaluación de las estadísticas nacionales sobre las causas de defunción: principios y aplicación al caso de China

Los sistemas de estadísticas de mortalidad proporcionan información básica sobre los niveles y causas de mortalidad en las poblaciones. Sólo un tercio de los países del mundo disponen de sistemas completos de registro civil que generen datos adecuados de mortalidad por causas para la formulación y vigilancia de las políticas sanitarias. En este artículo se describe el desarrollo de un conjunto de criterios para evaluar la calidad de las estadísticas nacionales de mortalidad y, a modo de ejemplo, se aplican dichos criterios a China. Los criterios abarcan diversos aspectos estructurales, estadísticos y técnicos de los datos nacionales de mortalidad. Poco se sabe sobre los datos referentes a las causas de defunción en China, país que alberga aproximadamente a una quinta parte de la población mundial. Estos criterios se utilizaron para evaluar la utilidad de los datos de dos sistemas de estadísticas de mortalidad empleados en China, a saber, el Registro Civil del

Ministerio de Salud (RC-MS) y el sistema de Puntos de Vigilancia de las Enfermedades (PVE). Llegamos a la conclusión de que los registros de mortalidad estaban incompletos en los dos casos. No contenían datos sobre las subdivisiones geográficas del país que permitieran fundamentar la asignación de recursos o monitorizar los programas de salud. La compilación y publicación de estadísticas es irregular en el caso de los PVE, y el RC-MS ni siquiera difunde públicamente sus datos. Se requieren más investigaciones para determinar la validez de la atribución de las causas de defunción en los dos sistemas, considerando sobre todo el uso de métodos de autopsia verbal que se hace en las zonas rurales. Se recomienda emplear este marco de evaluación basada en criterios para valorar los datos nacionales de mortalidad en los países en desarrollo a fin de determinar su utilidad y de orientar las actividades destinadas a mejorar su valor para articular las políticas.

ملخص

تقييم الإحصائيات الوطنية لأسباب الوفيات: مبادئ وتطبيقات حالة الصين

الرصود للأمراض. وقد استنتجنا أن تسجيل الوفيات غير كامل في كلا النظامين. ولم تتوفر أية إحصائيات عن التوزيعات الجغرافية الفرعية في البلاد للإبلاغ عن الموارد المخصصة لرصد البرامج الصحية. وقد كان تجميع ونشر المعطيات غير منتظم في نظام نقطة رصد الأمراض، ولم تكن المعطيات متاح للناس عبر نظام تسجيل الأحوال المدنية في وزارة الصحة. وتمس الحاجة إلى المزيد من البحوث لقياس صحة المحتوى للصفات الخاصة بأسباب الوفيات في النظامين، وذلك ناجم بشكل خاص عن استخدام طرق توصيف تشريحية لفظية لأسباب الوفيات في المناطق الريفية. ويوصى بإجراء تقييم إطارى مركّز على المعايير لتقييم المعطيات الوطنية الخاصة بالوفيات في البلدان النامية، المعرفة منافعها وتوجيه الجهود نحو تحسين قيمة المعطيات بالنسبة للسياسات الموجهة.

تقدم نظم إحصائيات الوفيات المعلومات الأساسية حول مستويات وأسباب الوفيات بين الناس. ولم يستكمل أكثر من ثلث البلدان في العالم نظم تسجيل الأحوال المدنية التي تمد معطيات للوفيات الناجمة عن سبب معيّن، وهي معطيات ضرورية لصنع القرار السياسي ولرصده. وتصنف هذه الورقة إعداد مجموعة من المعايير لتقييم جودة الإحصائيات الوطنية للوفيات وتطبيقها على الصين كأحد الأمثلة. وتغطي المعايير طيفاً من الجوانب التقنية والإحصائية والنيوية للمعطيات الوطنية للوفيات. ولا يعرف سوى القليل عن المعطيات حول أسباب الوفيات في الصين التي تأتي ما يقرب من خمس سكان العالم. وقد كانت هذه المعايير تستخدم لتقييم الانتفاع بالمعطيات من نظامين لإحصاء الوفيات يستعملان في الصين، وهما نظام تسجيل الأحوال الشخصية في وزارة الصحة ونظام نقطة

References

- Ruzicka L, Lopez AD. The use of cause-of-death statistics for health situation assessment: National and international experiences. *World Health Statistics Quarterly* 1990;43:249-57.
- Mahapatra P, Chalapati Rao PV. Cause of death reporting systems in India: a performance analysis. *National Medical Journal of India* 2001;14:154-62.
- Rao C, Bradshaw D, Mathers CD. Improving death registration and statistics in developing countries: Lessons from SubSaharan Africa. *Southern African Journal of Demography* (in press).
- Preston SH, Keyfitz N, Schoen R. *Causes of death: life tables for national populations*. New York: Seminar Press; 1972.
- Omran AR. Epidemiologic transition: a theory of the epidemiology of population change. *Milbank Memorial Fund Quarterly* 1971;49:509-38.
- Salomon JA, Murray CJL. The epidemiological transition revisited. Compositional models for causes of death by age and sex. *Population and Development Review* 2002;28:205-28.
- Preston SH. Use of direct and indirect techniques for estimating the completeness of registration systems. In: *Data bases for mortality measurement. Proceedings of the United Nations/World Health Organization Working Group on Data Bases for Measurement of Levels, Trends, and Differentials in Mortality, Bangkok, 1981*, vol. 84. New York: United Nations, 1981. ST/ESA/Series/A/84. Sales No. E.83/XIII.3.
- United Nations Population Division. *World population prospects: the 2002 revision*. Vols I-III. New York: United Nations; 2003.
- Lopez AD, Ahmad OB, Guillot M, Salomon J, Murray C. *World mortality in 2000: life tables for 191 countries*. Geneva; World Health Organization; 2002, p.4.
- Chandrasekar C, Deming W. On a method of estimating birth and death rates and the extent of registration. *Journal of the American Statistics Association* 1949;44:101.
- Alderson MR, Meade TW. Accuracy of diagnosis on death certificates compared with that in hospital records. *British Journal of Preventive and Social Medicine* 1967;21:22-9.
- Haheim LL. Validation of causes of death by age. *Tidsskrift for den Norske laegeforening* 1999;119:826-30.
- Johansson LA, Westerling R. Comparing Swedish hospital discharge records with death certificates: implications for mortality statistics. *International Journal of Epidemiology* 2000;29:495-502.
- Lahti RA, Penttila A. The validity of death certificates: routine validation of death certification and its effects on mortality statistics. *Forensic Science International* 2001;115:15-32.
- Saito I. Review of death certificate diagnosis of coronary heart disease and heart failure in Japan. *Nippon Kosho Eisei Zasshi*. 2004;51:909-16.
- Chandramohan D, Rodrigues LC, Maude GH, Hayes RJ. The validity of verbal autopsies for assessing the causes of institutional maternal death. *Studies in Family Planning* 1998;29:414-22.
- Snow RW, Armstrong JR, Forster D, Winstanley MT, Marsh VM, Newton CR, et al. Childhood deaths in Africa: uses and limitations of verbal autopsies. *Lancet* 1992;340:351-5.
- Murray CJL, Lopez AD. *The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020*. Cambridge, MA, Published by the Harvard School of Public Health on behalf of the World Health Organization and the World Bank; Distributed by Harvard University Press, 1996.
- Yang G, Hu J, Rao K, Ma J, Rao C, Lopez AD. Mortality registration and surveillance in China: history, current situation, and challenges. *Population Health Metrics* 2005;3:3.
- Brass W. Methods for estimating fertility and mortality from limited and defective data. *Laboratories for population studies*. Chapel Hill, North Carolina: Carolina Population Center; 1975.
- Murray CJL, Ferguson BD, Lopez AD. Modified logit life table system: principles, empirical validation, and application. *Population Studies* 2003;57: 165-82.
- Ministry of Health China. *Notice on use of "medical certification of birth" "medical certification of death" and strengthening vital registration of death causes*. Beijing: Ministry of Health, Ministry of Public Security, Ministry of Civil Administration, China: 1992. Health Statistics Publication No. 1.
- World Health Organization. Mortality: guidelines for certification and rules for coding. *International Statistical Classification of Diseases and Health Related Problems — Tenth revision. volume 2: instruction manual*. Geneva: World Health Organization; 1993, pp. 30-65.
- World Health Organization. Symptoms, signs, and ill-defined conditions. *International Classification of Diseases — ninth Revision*. Geneva: World Health Organization; 1977, pp. 455-73.
- Mathers CD, Ma Fat D, Inoue M, Rao C, Lopez AD. Counting the dead and what they died of: an assessment of the global status of cause of death data. *Bulletin of the World Health Organization* 2005;83:171-7.