Hospital cause-of-death statistics: what should we make of them?

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Public health planning should be based on reliable and timely data on the leading causes of death and disability. Civil registration of all deaths, with certification and coding of their cause by a qualified physician based on the *International classification of diseases and related health problems*,[1] is the preferred standard for generating cause-of-death statistics. Most deaths whose cause is certified occur in hospitals. Although not all hospitals have the same diagnostic tools, it seems reasonable to expect hospital-based certifying physicians to correctly identify patients' underlying causes of death, since hospitals usually have established clinical protocols for monitoring disease progression. After all, if physicians in hospitals cannot correctly ascertain their patients' cause of death, who can?

Cause-of-death statistics from hospitals are routinely amalgamated – along with mortality statistics from other sources – to constitute the essential statistics on the health of a population. Such statistics are widely used by governments, researchers, donors and global development agencies, often uncritically, on the assumption that they reliably capture a country's epidemiological profile. They are used to periodically review health priorities, set research agendas and monitor progress towards national and global health and development goals. We take for granted that such data are correct. But are they?

That the answer is a resounding no is only a part of the problem. More worrying perhaps is the fact that custodians of national mortality data systems fail to grasp the importance of periodically assessing the accuracy of hospital cause-of-death data. Physicians in hospitals may lack the time, incentives, diagnostic facilities or training to correctly certify causes of death and seldom understand that their diagnoses guide national health priorities. Medical records' departments, which code death certificates

and compile the data into cause-of-death tables by age and sex, are often understaffed, lack rigorous statistical protocols for checking data quality, and may not appreciate the epidemiological and statistical importance of their work. Thus, hospital cause-of-death data, even from advanced tertiary hospitals, can be expected to contain errors. But how common are these errors and are they serious enough to make the data unsuitable for informing public policy and research?

Remarkably, the quality of hospital-based mortality data has seldom been investigated. In a recent review, Rampatige et al.[2] identified only 29 studies published since 1980 and nine studies published since 2005 that met their inclusion criteria. The studies were of variable quality and lacked a standardized methodological framework. Research from China,[3] the Islamic Republic of Iran,[5] Mexico,[7] Sri Lanka[6] and Thailand[4] has revealed massive misclassification of causes of death in hospitals. In China, most deaths from misclassified ischaemic heart disease (IHD) were attributed to stroke. In Thailand, many deaths from stroke and acquired immunodeficiency syndrome (AIDS) were attributed to septicaemia, and deaths from various forms of heart disease, diabetes and chronic obstructive pulmonary disease (COPD) were often coded to ill-defined causes. Interestingly, half of the many in-hospital deaths that were coded to ill-defined causes in the Islamic Republic of Iran were caused by trauma. In Sri Lanka, one of every three in-hospital deaths from IHD was coded to other forms of heart disease or diabetes. These systematic errors can misguide public policy. For example, a study conducted in Thailand in 2005 with a nationally representative sample of over 12 000 deaths showed that mortality from AIDS was 400% higher than reported in the national vital registration data. Mortality from stroke,

IHD and COPD was from 200 to 350% higher than reported and road traffic deaths were twice what the national mortality data suggested.[8]

So what is to be done? Countries continue to invest in their national cause-of-death information systems, but the gross inaccuracies in the data render them unsuitable for accurately describing the countries' main health problems or their burden of disease. To amend this situation, three broad interventions are required:

- hospital physicians, hospital administrators and medical associations should be made more fully aware of the primary purpose and public health importance of correctly certifying and coding causes of death and of properly maintaining hospital medical records to support better diagnosis;[9]
- hospitals, perhaps on a rolling sample basis, should regularly evaluate the accuracy of cause-of-death certification and coding and of medical record practices to identify and address key problems using the standard methods proposed by Rampatige et al.; and
- training of doctors and medical students in how to certify causes of death should be intensified using simple tools that have recently become available.[10,11]

Countries, the World Health Organization, academics and development partners should all champion and support the urgent and widespread implementation of these interventions to rapidly improve knowledge about the true causes of death in populations and avoid basing policy on flawed data. ■

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