

Appendix B: International Comparability of Cause-of-Death Data

International differences in medical training and practices and in death certification procedures are among the factors that affect the comparability of cause-specific mortality data. Within-country studies indicate that from 12 to 29 percent of death certificates do not correctly report the autopsy-confirmed underlying cause of death (97). International differences in the accuracy of death certificates are likely because of differences in the use of diagnostic tests, the proportion of physicians who are specialists, autopsy rates,² and hospital use for terminally ill patients (table B-1). More diagnostic information, for example, is probably available for certifying deaths that occur in medical facilities than for those occurring at home or elsewhere. The proportion of deaths occurring in hospitals or other medical facilities varies substantially by country from a low of 30 percent in Spain to a high of 79 percent in Sweden. In the United States, 60 percent of deaths occur in medical facilities (264).³

Aspects of the health care delivery system could also affect mortality reporting. Countries with national health insurance systems, for example, are more likely to have uniform medical records, which may enhance physicians access to cause-of-death information. Greater use of general practitioners and better continuity of care within such systems may also increase the likelihood of physicians' being familiar with decedents' medical histories.

There are documented international differences in how physicians complete death certificates and how countries code cause-of-death information (93,94,136).⁴ Predictably, the greatest differences are observed at the level of specific diseases (e.g., site-specific cancers), but international differences in reporting and coding appear to exist even for broad categories of illness (e.g., malignant neoplasms, cardiovascular system diseases) (136). The Office of Technology Assessment (OTA) adjusted U.S. and French male age-adjusted

¹Technology use trends have recently been linked to mortality trends. Secular increases in rates of death from breast and brain cancer probably stem from the increased use of noninvasive screening and diagnostic tests, especially among the elderly (47,1 18).

²The proportion of deaths for which an autopsy is performed varies significantly **from** a low of 4 percent in Japan to a high of 37 percent in Sweden (table B-1) (264). In the United States, 12 percent of deaths **are autopsied**. In U.S. teaching hospitals, between 20 and 30 percent of deaths are **autopsied** (168).

³Medical facilities do not include nursing homes.

⁴One type of coding problem is the extent to which imprecise codes are used to identify the underlying cause of death on the death **certificate**. In 1988-89, the proportion of deaths with the underlying cause of death "signs, symptoms, and other ill-defined conditions" (ICD-9 codes 780-799) such as "senility without mention of psychosis" (ICD-9 code 797) ranged from less than 1 percent of deaths in the United **Kingdom**, to more than 6 percent of deaths in France (table B-1). In France and the Netherlands, as many as 8 percent of deaths in the age group 15 to 44 are assigned underlying **cause-of-death** codes representing "signs, symptoms, and other **ill-defined** conditions." Before making international comparisons, some analysts adjust mortality data by apportioning deaths attributed to **nonspecific** causes to other causes according to age- and **cause-specific** mortality patterns (1 12).

cancer mortality rates for international coding differences, to illustrate the extent to which they could affect published cause-specific mortality rates.⁵ The published French male 1988 age-adjusted cancer rate is 22 percent higher than the U.S. rate (262.5 vs. 215.5 per 100,000), but when further adjusted for various coding differences, the French rate could be from 11 to 26 percent higher than the U.S. rate.

It should not be surprising that there are international differences in how causes of death are recorded on death certificates. The underlying cause of death recorded on each death certificate is used for comparison, but identifying a single underlying cause of death

has become more difficult as an increasing proportion of deaths occurs among the elderly, who are likely to have more than one chronic illness contributing to death.⁶ Even for younger decedents, deaths increasingly result from chronic diseases that often cannot be well characterized by single causes (86).⁷

International comparability of data on cause-specific mortality will likely improve as countries adopt automated cause-of-death coding systems. Furthermore, physicians' training regarding appropriate methods for completing death certificates will improve the quality of the data (170,229).

⁵ **OTA adjusted the rates for differences in how** physicians assign the underlying causes of death on death certificates **and for the use of** nonspecific cause-of-death codes (136).

⁶ In most developed countries at least one-third of deaths occur among those aged **80** and older, and **approximately 60 to 70** percent of deaths are attributed to three chronic diseases: heart disease, cancer, and stroke.

⁷ Some advocate analyzing **all** of the causes listed as contributing to death to better understand the contribution to death of conditions like diabetes, which is rarely reported as the underlying cause of death on death **certificates** (122). Such **multiple-cause-of-death** analyses provide information on the prevalence of disease at death but are limited because of differences in the extent to which physicians list causes other than the underlying cause of death on the certificate. There are probably international differences in the extent to which physicians list more than one cause on the certificate, in part, because of differences in the format of death **certificates**.

Table B-I-Background Information on Mortality Statistics, Circa 1989^a

country	% deaths medically certified	% deaths occurring in a hospital or other medical establishment	% deaths for which an autopsy was performed	Age	%	Followup inquiries in case of doubt about the cause of death	Death recorded by date of:	Coding procedure	Remarks on coverage of mortality	% deaths attributed to 'signs, symptoms and other ill-defined conditions'	Age	%	% deaths among elderly (age 85 and over) attributed to "senility without mention of psychosis"
WHO Region of the Americas													
United states	100	60	0	1-14	46	Yes, for about 10% of deaths.	Occurrence	Coded by National center for Health Statistics or under its guidance.	Since, 1970, residents only except for deaths ^a tabulated by place or occurrence.	1-4	4		<1%
			15-44	45						5-14	2		
			45-64	15						15-44	3		
			65+	16						4 5 - 6 4	6 5 +		
			All ages	5						6 5 +			
				12									
Canada	100	73 ^b	0	1-4	62	Yes	Occurrence	Separately coded in large provinces, centrally for the small ones.	All deaths occurring in country; residents dying abroad included.	1-4	5		<1
			15-44	55						5-14	3		
			45-64	49						15-44	3		
			65+	56						4 5 - 6 4	6 5 +		
			All Ages	29						6 5 +			
				13									
				20									
WHO European Region													
France	100	50	No information			Yes	Occurrence	Centrally coded.	Overseas departments and territories included.	1-4	9		2
										5-14	4		
										15-44	8		
										45-64	4		
										65+	4		
Germany ^c	100	53	8			Yes	Occurrence	Descendants under guidance Of Federal Statistical Office. Berlin (west) included.	dying abroad included;	1-4	7		
										5-14	3		
										1544	5		
										45-64	3		
										65+	1		

Table B-I-Background Information on Mortality Statistics, Circa 1989a (Continued)

country	% deaths medic-ally Certified	% deaths occurring in a hospital or other medical establish-ment	% deaths for which an autopsy was performed		Followup inquiries in case of doubt about the cause of death	Death recorded by date of:	Coding procedure	Remarks on coverage of mortality	% deaths attributed to "signs, symptoms and other ill-defined conditions"		% deaths among elderly (age 65 and over) attributed to "senility without mention of psychosis"
			Age	%					Age	%	
Italy	100	37	No information	Yes	Occurrence	Centrally coded.	All deaths occurring in country; nationals resident abroad excluded.	1-4 5-14 15-44 45-64 65+	4 2 3 1 1	2	
Netherlands	100	44	o	48	Yes	Occurrence	Centrally coded.	Residents and nationals dying abroad included; resident foreigners included.	1-4 5-14 15-44 45-64 65+	12 9 8 4 2	
			1-14	18							
			15-44	14							
			45-64	11							
			6 5 +	7							
			All ages	8							
Spain	100	30	No Information	Yes, in some regions	Occurrence	Decentralized, reviewed by National Institute of Statistics.	All deaths occurring in country; nationals dying abroad excluded.	1-4 5-14 15-44 45-64 65+	3 1 2 1 1	2	
Sweden	100	79	o	74	Yes, about 3% of deaths	Occurrence	Centrally coded.	Residents dying abroad included; nationals resident abroad excluded.	1-4 5-14 15-44 45-64 65+	6 1 2 1 0	
			1-14	6 6							
			15-44	76							
			45-64	56							
			65+	36							
			All ages	37							
United Kingdom England and Wales	100	57	0-14	56	Yes, 2-3% of death	Registration	Centrally coded	All deaths occurring in England and Wales	1-4 5-14 15-44 45-64 65+	3 <1 <1 <1 <1	

Table B1-Background Information on Mortality Statistics, Circa 1989^a (Continued)

country	% deaths medic-ally certified	% deaths occurring in a hospital or other medical establishment	% deaths for which an autopsy was performed		Followup inquiries in case of doubt about the cause of death	Death recorded by date of	Coding procedure	Remarks on coverage of mortality	% deaths attributed to "signs, symptoms and other ill-defined conditions" Age %		% deaths among elderly (age 65 and over) attributed to "senility without mention of psychosis"
WHO Western Pacific Region											
Australia	100	75 ^d	0	43	Yes, 9% of death certifiedd queried in 1985.	Occurrence	Decentralized with quality control through a system of sample checking at state and national levels.	All deaths occurring in country except foreign diplomatic personnel; nationals dying abroad excluded .	1-4	3	<1
			1-14	68					5-14	1	
			15-44	70					15-44	1	
			45-64	29					45-64	<1	
			65+	12					65+	<1	
			All ages ^e	21							
Japan	100	67	0	19	No	Occurrence	Centrally coded.	Resident nationals only.	1-4	3	5
			1-14	12					5-14	1	
			15-44	8					15-44	1	
			45-64	7					45-64	<1	
			65+	3					65+	1	
			All ages	4							
New Zealand	100	63	0	74	Yes	Registration	Centrally coded.	A n * occurring in country; nationals dying abroad excluded .	1-4	3	<1
			1-14	71					5-14	0	
			15-44	71					15-44	<1	
			45-64	35					45-64	<1	
			65+	18					65+	<1	
			All ages	26							

^aStatistics reflect situation around 1989.

^bExcluding Quebec.

^cBased on data from the former Federal Republic of Germany.

^dBased on data for New South Wales.

^ebased on for western Australia.

SOURCES: World Health Organization, World Health Statistics Annual (Geneva, Switzerland: World Health Organization, 1969,1990,1991, and 1992); M. Chief, Demographer, New Zealand Department of Statistics, Christchurch, New Zealand, personal communication, August 6, 1993.