
Technical Notes — Methodology

"That, sir, is the good of counting; it brings everything to a certainty, which before floated in the mind indefinitely."

—Samuel Johnson

MORTALITY

Comparability Between ICD-9 and ICD-10 Codes

The *International Classification of Diseases* (ICD) codes are periodically revised to reflect progress in the identification of diseases.¹ This practice began in 1900 and occurs every 10 to 20 years. Each of these revisions has produced some breaks in the comparability of cause of death statistics.

ICD-10 has many changes from ICD-9, including: considerably greater detail for some causes (and less detail for others); shifts of inclusion in terms and titles from one category, section, or chapter to another; regrouping of diseases; new titles and sections; and modifications in coding rules. As a result, serious breaks occur in comparability for a number of causes of death. Measures of this discontinuity are essential to the interpretation of mortality trends. Comparability ratios between ICD-9 and ICD-10 have been computed for this purpose (please see the table at the end of Appendix B). Note that data tables showing cause of death information for years prior to 1999 are based on the original ICD-9 codes and have not been adjusted using comparability ratios.

Studies of the comparability between revisions of the ICD have been carried out and published since at least the fifth revision. Comparability studies, also called bridge-coding studies, involve the dual classification of a single year of mortality data, that is classifying the underlying cause of death on mortality records by the new revision and the previous revision. The key element of the comparability study is the comparability ratio, which is derived from the dual classification. It is calculated by dividing the number of deaths for a selected cause of death classified by the new revision by the number of deaths classified to the most nearly comparable cause of death using the previous revision (in this case the number of deaths identified as being attributable to a particular cause using ICD-10 codes and rules divided by the number of deaths attributed to the same cause using ICD-9 codes and rules). The resulting ratio represents the net effect of the new revision on statistics for this cause and can be used as a factor to adjust previously calculated mortality statistics.

A comparability ratio of 1.00 indicates that the same number of deaths was assigned to a particular cause or combination of causes, regardless of the revision used. A ratio showing perfect correspondence (1.00) between the two revisions does not necessarily indicate that the cause was unaffected by changes in classification and coding procedures but merely that there was no net change.

A ratio less than 1.00 results from a decrease in assignments of death to a cause in ICD-10 compared with ICD-9. A ratio of more than 1.00 results from an increase in assignments of deaths to a cause in ICD-10 compared to the corresponding ICD-9 cause.

In regard to the magnitude of coding effects produced by rule changes, that of Rule 3 is among the most prominent. This rule is used to determine the direct sequels of causes. It states "If the conditions selected by the general principle or by Rule I or by Rule 2 is obviously a direct consequence of another reported condition, whether in Part I or Part II [of the medical certification portion of the death certificate], select this primary condition." The cause of death most affected by Rule 3 is pneumonia, which is often the consequence of another condition or injury. In ICD-10 the applicability of Rule 3 to pneumonia is broader than in ICD-9, so pneumonia is considered a consequence of a much wider range of conditions. As a result, pneumonia is much less likely to be selected as the underlying cause of death under ICD-10 than under ICD-9.

The following describes selected leading causes of death affected by changes in classification and underlying cause of death rules.

Heart Disease. The comparability ratio (CR) for this cause is 0.9858, indicating a net decrease of nearly 1.5 percent in the allocation of heart disease as the underlying cause of death when using the ICD-10 classification scheme. This net decrease is a result primarily of shifts away from heart disease to other causes of death due to Rule A; under this rule, certain disorders are considered ill-defined and not reflecting the true underlying cause of death. Cardiac arrest is one such disorder. Thus, it is ignored in the selection of underlying cause of death if another more specific cause is listed on the death certificate.

Malignant Neoplasms. The CR for cancer is 1.0068, indicating considerable comparability in numbers and rates between revisions. Nevertheless, a substantial number of deaths are classified under malignant neoplasms in ICD-10 that were not classified as such under ICD-9. Most of these were classified as pneumonia in ICD-9 and were affected by the change in Rule 3 (described above). In ICD-10, the applicability of Rule 3 to pneumonia is broader than in ICD-9; that is, pneumonia is considered a consequence of a much wider range of conditions. As a result, pneumonia is much less likely to be selected as the underlying cause of death under ICD-10 than under ICD-9. In addition, some deaths shifted out of the malignant neoplasm category due to the revision. Most of these are classified in ICD-10 as HIV or, *in situ* neoplasms, benign neoplasms, and neoplasms of uncertain or unknown behavior.

Nearly all of the specified malignant neoplasm categories show some shifts of deaths into and out of the specified category.

For example, because of changes in the rule governing the selection of the primary site, deaths involving cancer of the trachea, bronchus, and lung are a little less likely to be attributed to this cause. (The comparability ratio is 0.9837.) This occurred because ICD-10, in contrast to ICD-9, classifies malignant neoplasms of the lung as secondary to many other cancers. Further, when classifying deaths according to ICD-10, unlike ICD-9, selection of the primary site is not determined by order of entry on the death certificate. Thus, when two primary sites from different organ systems are listed, the deaths are classified to C97, the category for independent (primary) multiple sites.

Alzheimer's Disease. The CR published in the previously described NCHS publication should not be applied to Oregon data. Unlike the nation, deaths assigned to this category have included both Alzheimer's disease (ICD-9 331.0) and presenile dementia (ICD-9 290.1). A study of deaths coded to ICD-9 290.1 showed that 99 out of 100 were attributable to Alzheimer's dementia and that physicians were using the terms "Alzheimer's disease" and "Alzheimer's dementia" essentially interchangeably. To provide a more realistic measure of the impact of Alzheimer's disease, both diseases were included in Oregon's "Alzheimer's Disease" category. ICD-10 eliminated the separate category for "Alzheimer's dementia"; just one code (G30) is present in the current revision.

Unintentional Injuries. With a comparability ratio of 1.0303, deaths were slightly more likely to be attributed to unintentional injuries than previously. Virtually all of this increase involves shifts from natural causes in ICD-9 to unintentional injuries in ICD-10. Most of these deaths were classified as pneumonia or cardiac arrest in ICD-9 but were coded to unintentional injuries as a consequence of the changes in Rule 3 and Rule A, respectively. The CR for the largest subset in this group, motor vehicles, is 0.9754, but the specific category with the largest difference (CR = 0.8409) is falls. This 16 percent decrease is the result of the change in the classification of unspecified fractures. In ICD-9, if the term "fracture" was listed on the death certificate without mention of an external cause, the death was classified to "Fracture, cause unspecified" (E887) within the greater "Accidental Falls" (E880-888) category. In ICD-10, a fall is not assumed to be responsible for an unspecified fracture, and the death is classified to "Exposure to Unspecified Factor," (X59), which is classified as an unintentional injury, but in a residual category, not a fall.

Intentional Self-Harm. This category (i.e., suicide) has a comparability ratio of 0.9962. The slight decline may have resulted from records pending amendment that were unable to be identified at the time of the study. Some changes in coding categories have resulted in less specific data. For example, the type of firearm used in suicide (and all other external cause categories) is no longer distinguished other than handgun vs. long gun; previously,

Table 1. Estimated comparability ratios for 113 selected causes of death

List number	Cause of death ¹	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95 percent confidence limits	
		ICD-10 ²	ICD-9 ²				Lower	Upper
001	Salmonella infections	30	37	0.8108	0.0644	7.9	0.6846	0.9370
002	Shigellosis and amebiasis	*	*	*	*	*	*	*
003	Certain other intestinal infections	*	*	*	*	*	*	*
004	Tuberculosis	653	764	0.8547	0.0172	2	0.8209	0.8885
005	Respiratory tuberculosis	518	572	0.9056	0.0201	2.2	0.8662	0.9450
006	Other tuberculosis	135	192	0.7031	0.0407	5.8	0.6233	0.7830
007	Whooping cough	*	*	*	*	*	*	*
008	Scarlet fever and erysipelas	*	*	*	*	*	*	*
009	Meningococcal infection	221	222	0.9955	0.0149	1.5	0.9663	1.0247
010	Septicemia	21,258	17,791	1.1949	0.0042	0.3	1.1867	1.2030
011	Syphilis	21	33	0.6364	0.1184	18.6	0.4043	0.8685
012	Acute poliomyelitis	*	*	*	*	*	*	*
013	Arthropod-borne viral encephalitis	*	*	*	*	*	*	*
014	Measles	*	*	*	*	*	*	*
015	Viral hepatitis	1,123	1,346	0.8343	0.0120	1.4	0.8109	0.8578
016	Human immunodeficiency virus (HIV) disease	25,089	23,586	1.0637	0.0018	0.2	1.0601	1.0673
017	Malaria	*	*	*	*	*	*	*
018	Other and unspecified infectious and parasitic diseases and their sequelae	2,865	2,607	1.0990	0.0154	1.4	1.0688	1.1291
019	Malignant neoplasms	464,688	461,544	1.0068	0.0002	0.0	1.0064	1.0072
020	Malignant neoplasms of lip, oral cavity and pharynx	5,927	6,172	0.9603	0.0040	0.4	0.9525	0.9681
021	Malignant neoplasm of esophagus	9,596	9,630	0.9965	0.0020	0.2	0.9926	1.0003
022	Malignant neoplasm of stomach	11,480	11,408	1.0063	0.0019	0.2	1.0025	1.0101
023	Malignant neoplasms of colon, rectum and anus	48,583	48,619	0.9993	0.0009	0.1	0.9975	1.0010
024	Malignant neoplasms of liver and intrahepatic bile ducts	9,732	10,102	0.9634	0.0023	0.2	0.9588	0.9679
025	Malignant neoplasm of pancreas	24,313	24,361	0.9980	0.0009	0.1	0.9963	0.9997
026	Malignant neoplasm of larynx	3,209	3,194	1.0047	0.0053	0.5	0.9943	1.0150
027	Malignant neoplasms of trachea, bronchus and lung	131,750	133,936	0.9837	0.0005	0.1	0.9827	0.9846
028	Malignant melanoma of skin	5,941	6,139	0.9677	0.0032	0.3	0.9614	0.9741
029	Malignant neoplasm of breast	38,102	37,891	1.0056	0.0010	0.1	1.0036	1.0075
030	Malignant neoplasm of cervix uteri	3,753	3,802	0.9871	0.0034	0.3	0.9805	0.9938
031	Malignant neoplasms of corpus uteri and uterus, part unspecified	5,318	5,183	1.0260	0.0040	0.4	1.0182	1.0339
032	Malignant neoplasm of ovary	11,292	11,344	0.9954	0.0016	0.2	0.9923	0.9985
033	Malignant neoplasm of prostate	30,672	30,267	1.0134	0.0015	0.1	1.0105	1.0162
034	Malignant neoplasms of kidney and renal pelvis	9,521	9,521	1.0000	0.0022	0.2	0.9957	1.0043
035	Malignant neoplasm of bladder	9,563	9,594	0.9968	0.0026	0.3	0.9916	1.0019
036	Malignant neoplasms of meninges, brain and other parts of central nervous system	10,039	10,359	0.9691	0.0025	0.3	0.9642	0.9740
037	Malignant neoplasms of lymphoid, hematopoietic and related tissue	44,715	44,530	1.0042	0.0012	0.1	1.0019	1.0064
038	Hodgkin's disease	1,021	1,036	0.9855	0.0089	0.9	0.9680	1.0030
039	Non-Hodgkin's lymphoma	17,924	18,326	0.9781	0.0018	0.2	0.9745	0.9817
040	Leukemia	16,600	16,405	1.0119	0.0019	0.2	1.0083	1.0155
041	Multiple myeloma and immunoproliferative neoplasms	9,099	8,763	1.0383	0.0030	0.3	1.0324	1.0443
042	Other and unspecified malignant neoplasms of lymphoid, hematopoietic and related tissue	*	*	*	*	*	*	*
043	All other and unspecified malignant neoplasms	51,182	45,492	1.1251	0.0021	0.2	1.1210	1.1292
044	In situ neoplasms, benign neoplasms and neoplasms of uncertain or unknown behavior	9,263	5,532	1.6744	0.0164	1.0	1.6422	1.7067
045	Anemias	3,059	3,200	0.9559	0.0077	0.8	0.9409	0.9710
046	Diabetes mellitus	48,636	48,242	1.0082	0.0011	0.1	1.0060	1.0103
047	Nutritional deficiencies	3,215	2,763	1.1636	0.0165	1.4	1.1312	1.1960
048	Malnutrition	2,607	2,665	0.9782	0.0151	1.5	0.9487	1.0078
049	Other nutritional deficiencies	608	98	6.2041	0.5961	9.6	5.0358	7.3724
050	Meningitis	592	584	1.0137	0.0136	1.3	0.9871	1.0403
051	Parkinson's disease	10,404	10,392	1.0012	0.0028	0.3	0.9956	1.0067
052	Alzheimer's disease	29,707	19,121	1.5536	0.0071	0.5	1.5398	1.5675
053	Major cardiovascular diseases	796,919	798,435	0.9981	0.0002	0.0	0.9977	0.9985
054	Diseases of heart	615,564	624,405	0.9858	0.0002	0.0	0.9854	0.9863
055	Acute rheumatic fever and chronic rheumatic heart diseases	2,446	2,980	0.8208	0.0089	1.1	0.8034	0.8382
056	Hypertensive heart disease	17,322	21,577	0.8028	0.0028	0.3	0.7973	0.8083
057	Hypertensive heart and renal disease	2,170	2,027	1.0705	0.0160	1.5	1.0392	1.1019
058	Ischemic heart diseases	466,459	466,935	0.9990	0.0002	0.0	0.9985	0.9994
059	Acute myocardial infarction	178,125	180,169	0.9887	0.0003	0.0	0.9880	0.9893
060	Other acute ischemic heart diseases	2,667	2,638	1.0110	0.0117	1.2	0.9880	1.0340
061	Other forms of chronic ischemic heart disease	285,667	284,128	1.0054	0.0004	0.0	1.0046	1.0062

See footnotes at end of table.

Table 1. Estimated comparability ratios for 113 selected causes of death—Con.

List number	Cause of death ¹	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95 percent confidence limits	
		ICD-10 ²	ICD-9 ²				Lower	Upper
062	Atherosclerotic cardiovascular disease, so described	64,354	61,362	1.0488	0.0016	0.2	1.0456	1.0519
063	All other forms of chronic ischemic heart disease	221,313	222,766	0.9935	0.0004	0.0	0.9927	0.9942
064	Other heart diseases	127,167	130,886	0.9716	0.0010	0.1	0.9696	0.9736
065	Acute and subacute endocarditis	552	554	0.9964	0.0137	1.4	0.9695	1.0233
066	Diseases of pericardium and acute myocarditis	489	475	1.0295	0.0160	1.6	0.9981	1.0608
067	Heart failure	44,297	42,554	1.0410	0.0013	0.1	1.0384	1.0435
068	All other forms of heart disease	81,829	87,303	0.9373	0.0014	0.2	0.9345	0.9401
069	Essential (primary) hypertension and hypertensive renal disease	11,958	10,684	1.1192	0.0050	0.4	1.1094	1.1291
070	Cerebrovascular diseases	137,264	129,640	1.0588	0.0008	0.1	1.0572	1.0604
071	Atherosclerosis	13,894	14,417	0.9637	0.0025	0.3	0.9588	0.9686
072	Other diseases of circulatory system	18,239	19,289	0.9456	0.0021	0.2	0.9414	0.9498
073	Aortic aneurysm and dissection	12,216	12,201	1.0012	0.0010	0.1	0.9992	1.0032
074	Other diseases of arteries, arterioles and capillaries	6,023	7,088	0.8497	0.0053	0.6	0.8394	0.8601
075	Other disorders of circulatory system	2,984	2,899	1.0293	0.0172	1.7	0.9956	1.0631
076	Influenza and pneumonia	50,526	72,371	0.6982	0.0018	0.3	0.6947	0.7016
077	Influenza	572	567	1.0088	0.0073	0.7	0.9945	1.0231
078	Pneumonia	49,954	71,804	0.6957	0.0018	0.3	0.6922	0.6992
079	Other acute lower respiratory infections	346	355	0.9746	0.0392	4.0	0.8978	1.0515
080	Acute bronchitis and bronchiolitis	265	355	0.7465	0.0264	3.5	0.6947	0.7983
081	Unspecified acute lower respiratory infection	*	*	*	*	*	*	*
082	Chronic lower respiratory diseases	94,326	90,022	1.0478	0.0009	0.1	1.0460	1.0496
083	Bronchitis, chronic and unspecified	913	2,320	0.3935	0.0107	2.7	0.3726	0.4145
084	Emphysema	14,369	14,774	0.9726	0.0031	0.3	0.9666	0.9786
085	Asthma	4,217	4,718	0.8938	0.0061	0.7	0.8819	0.9057
086	Other chronic lower respiratory diseases	74,827	68,210	1.0970	0.0014	0.1	1.0943	1.0998
087	Pneumoconioses and chemical effects	860	845	1.0178	0.0099	1.0	0.9983	1.0372
088	Pneumonitis due to solids and liquids	10,183	9,104	1.1185	0.0048	0.4	1.1092	1.1279
089	Other diseases of respiratory system	16,656	14,269	1.1673	0.0052	0.4	1.1572	1.1774
090	Peptic ulcer	3,574	3,686	0.9696	0.0045	0.5	0.9608	0.9784
091	Diseases of appendix	209	202	1.0347	0.0242	2.3	0.9873	1.0820
092	Hernia	658	633	1.0395	0.0154	1.5	1.0094	1.0696
093	Chronic liver disease and cirrhosis	21,688	20,920	1.0367	0.0027	0.3	1.0314	1.0420
094	Alcoholic liver disease	10,147	9,965	1.0183	0.0050	0.5	1.0085	1.0281
095	Other chronic liver disease and cirrhosis	11,541	10,955	1.0535	0.0041	0.4	1.0454	1.0615
096	Cholelithiasis and other disorders of gallbladder	1,725	1,803	0.9567	0.0060	0.6	0.9450	0.9685
097	Nephritis, nephrotic syndrome and nephrosis	24,939	20,242	1.2320	0.0044	0.4	1.2234	1.2407
098	Acute and rapidly progressive nephritic and nephrotic syndrome	161	249	0.6466	0.0342	5.3	0.5796	0.7136
099	Chronic glomerulonephritis, nephritis and nephropathy not specified as acute or chronic, and renal sclerosis unspecified	468	1,213	0.3858	0.0144	3.7	0.3575	0.4141
100	Renal failure	24,290	18,758	1.2949	0.0050	0.4	1.2852	1.3047
101	Other disorders of kidney	20	22	0.9091	0.0867	9.5	0.7392	1.0790
102	Infections of kidney	731	726	1.0069	0.0144	1.4	0.9786	1.0352
103	Hyperplasia of prostate	326	327	0.9969	0.0159	1.6	0.9658	1.0280
104	Inflammatory diseases of female pelvic organs	63	64	0.9844	0.0410	4.2	0.9040	1.0648
105	Pregnancy, childbirth and the puerperium	*	*	*	*	*	*	*
106	Pregnancy with abortive outcome	*	*	*	*	*	*	*
107	Other complications of pregnancy, childbirth and the puerperium	*	*	*	*	*	*	*
108	Certain conditions originating in the perinatal period	10,184	9,555	1.0658	0.0033	0.3	1.0593	1.0724
109	Congenital malformations, deformations and chromosomal abnormalities	5,950	7,025	0.8470	0.0055	0.6	0.8362	0.8577
110	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	16,940	17,732	0.9553	0.0034	0.4	0.9487	0.9620
111	All other diseases (Residual)	109,853	122,107	0.8996	0.0015	0.2	0.8968	0.9025
112	Accidents (unintentional injuries)	31,084	30,163	1.0305	0.0014	0.1	1.0278	1.0333
113	Transport accidents	17,547	17,586	0.9978	0.0006	0.1	0.9966	0.9990
114	Motor vehicle accidents	14,539	17,051	0.8527	0.0027	0.3	0.8473	0.8581
115	Other land transport accidents	*	*	*	*	*	*	*
116	Water, air and space, and other and unspecified transport accidents and their sequelae	351	347	1.0115	0.0209	2.1	0.9706	1.0525
117	Nontransport accidents	13,537	12,577	1.0763	0.0035	0.3	1.0696	1.0831
118	Falls	5,173	6,152	0.8409	0.0049	0.6	0.8313	0.8505
119	Accidental discharge of firearms	493	466	1.0579	0.0127	1.2	1.0331	1.0828
120	Accidental drowning and submersion	283	284	0.9965	0.0127	1.3	0.9716	1.0213
121	Accidental exposure to smoke, fire and flames	493	506	0.9743	0.0089	0.9	0.9568	0.9918
122	Accidental poisoning and exposure to noxious substances	*	*	*	*	*	*	*
123	Other and unspecified nontransport accidents and their sequelae	6,698	4,721	1.4188	0.0123	0.9	1.3947	1.4428

See footnotes at end of table.

24 National Vital Statistics Report, Vol. 49, No. 2, May 18, 2001

Table 1. Estimated comparability ratios for 113 selected causes of death—Con.

List number	Cause of death ¹	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95 percent confidence limits	
		ICD-10 ²	ICD-9 ²				Lower	Upper
124	Intentional self-harm (suicide)	18,352	18,422	0.9962	0.0005	0.0	0.9952	0.9972
125	Intentional self-harm (suicide) by discharge of firearms	14,157	14,183	0.9982	0.0007	0.1	0.9968	0.9996
126	Intentional self-harm (suicide) by other and unspecified means and their sequelae	4,195	4,239	0.9896	0.0023	0.2	0.9850	0.9942
127	Assault (homicide)	12,287	12,308	0.9983	0.0006	0.1	0.9972	0.9994
128	Assault (homicide) by discharge of firearms	8,718	8,745	0.9969	0.0008	0.1	0.9953	0.9985
129	Assault (homicide) by other and unspecified means and their sequelae	3,569	3,563	1.0017	0.0024	0.2	0.9969	1.0064
130	Legal intervention	*	*	*	*	*	*	*
131	Events of undetermined intent	*	*	*	*	*	*	*
132	Discharge of firearms, undetermined intent	*	*	*	*	*	*	*
133	Other and unspecified events of undetermined intent and their sequelae	*	*	*	*	*	*	*
134	Operations of war and their sequelae	*	*	*	*	*	*	*
135	Complications of medical and surgical care	*	*	*	*	*	*	*

* Figure does not meet standards of reliability or precision; see Technical notes.

0.0 Quantity more than zero but less than 0.05.

¹Based on the Ninth and Tenth Revision categories shown in table B.

²ICD-10 is *International Classification of Diseases*, Tenth Revision, and ICD-9 is *International Classification of Diseases*, Ninth Revision.

From: Anderson RN, Minino AM, Hoyert DL, Rosenberg HM. Comparability of cause of death between ICD-9 and ICD-10: Preliminary estimates. National vital statistics reports; Vol. 49, No. 2. Hyattsville, Maryland: National Center for Health Statistics. 2001.

rifles, shotguns, and military (assault) weapons were categorized individually. Further, suffocation suicides involving plastic bags are no longer identified (The number of deaths in this category was typically about the same as the number resulting from cutting and piercing injuries).

Assault. Like suicide, this category (i.e., homicide) showed little difference between ICD-9 and ICD-10 coding; the comparability ratio was 0.9983. The reader is cautioned that this CR is applicable only to prior years' categories based on ICD-9 codes E960-E969. Under the ICD-9 classification, legal intervention (E970-E979) deaths were included in the leading cause of death category "Homicide." They no longer are. Further, NCHS has not published a comparability ratio for legal intervention deaths because the figure calculated did not meet standards of reliability or precision.

SuperMICAR

Beginning in 1993, the underlying cause of death was determined by using SuperMICAR, software distributed by the National Center for Health Statistics. In the past, the underlying cause of death was determined by a nosologist using information provided on death certificates by physicians. SuperMICAR applies a set of algorithms to all the causes listed on a death certificate to arrive at the underlying cause of death.

This software is being used because the number of deaths among Oregonians has increased substantially during recent years, but has not been accompanied by an increase in staff. Consequently, data availability became increasingly untimely during recent years. Instituting the SuperMICAR system is resulting in more timely data.

An advantage of the SuperMICAR system is that all causes recorded on the death certificate are now included in the data file. We can report, for example, not only the number of Oregonians who died from Alzheimer's Disease but the number of Oregonians who had the disease at the time of their death (provided it was mentioned on the certificate).

Age-adjusted Rates

Most of the death rates in this report are not age-adjusted. Tables 6-44, 45, 50 and 51 are exceptions to this rule. The descriptive narrative of Chapter 6 frequently makes reference to age-adjusted rates and age- or sex-specific rates in addition to mentioning crude death rates. Because age-adjusted rates should be viewed as relative indexes (rather than as actual measures of mortality risk), it is important not to compare them directly to crude rates.

Age-adjusted death rates permit the comparison of populations with disparate age structures as if the populations had similar distributions. They should be used when comparing subsets (e.g., counties and races). See the formulas section of this

Appendix for instructions on calculating age-adjusted rates. Rates may also be computed on-line at the federal Centers for Disease Control (CDC) site.

All of the age-adjusted rates of this report were computed by applying age-specific death rates to the U.S. standard population for the Year 2000 shown in the accompanying table:

Year 2000 United States standard population: Numbers and proportions (weights)					
Age	Number	Weights	Age	Number	Weights
All ages.....	1,000,000	1.000000	35-44 years.....	162,613	0.162613
Under 1 year.....	13,818	0.013818	45-54 years.....	134,834	0.134834
1-4 years.....	55,317	0.055317	55-64 years.....	87,247	0.087247
5-14 years.....	145,565	0.145565	65-74 years.....	66,037	0.066037
15-24 years.....	138,646	0.138646	75-84 years.....	44,842	0.044842
25-34 years.....	135,573	0.135573	85 years and over.....	15,508	0.015508

Minino AM, Arias E, Kochanek KD, Murphy SL, Smith BL. Deaths: Final Data for 2000. National vital statistics reports; vol 50 no 15 Hyattsville, Maryland: National Center for Health Statistics, 2002. p117.

Tobacco-linked Deaths

The number of Oregonians whose deaths were linked to tobacco use are presented in the mortality section. However, the number is artificially low. This is because the role of tobacco, if any, is not routinely noted on the death certificates of Oregonians who died out-of-state. (The footnotes in the tables describe the question on the Oregon death certificate regarding tobacco use.) The potential for undercount is greatest for Oregon residents who live in counties bordering other states. A more detailed discussion can be found in *Tobacco and Oregon: A Legacy of Illness and Death*, published in 1992.

YOUTH SUICIDE ATTEMPTS

Data in the youth suicide attempts section were compiled from teen suicide attempt reports and death certifications files with the Oregon Department of Human Services' Center for Health Statistics. Attempt rates are age-specific and are expressed per 100,000 of the population at risk per year. The Center for Population Research and Census was the source of the population data. Methods of attempts are categorized using a modified International Classification of Diseases system. The name of the attempter is not recorded on attempts reported to the Center for Health Statistics.

Several problems are apparent with the data. The first is that the total number of attempts reported is low. Because Oregon is the only state to require that adolescent suicide attempts be reported, when Oregon adolescents attempt suicide in another state, the event is not reported. More significantly, although required by law, quality assurance studies suggest that not all hospitals are fully cooperating with the program. It is uncertain whether reporting hospitals are using the same criteria in determining whether the patient attempted suicide. Finally, a few data items are poorly reported.

ENDNOTE

1. This description is drawn from *National Vital Statistics Report*, Vol. 49, No. 2, June 26, 2001, which includes additional detail not included here. The document is available online at:
<http://www.cdc.gov/nchs/products/pubs/pubd/nvsr/49/49-pre.htm>

