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Multiple causes-of-death statistics in South Africa: Their utility and changing profile over the period 1997 to 2001

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30 January 2003

Introduction

In analyses of causes of death, two sets of statistics often used are that of ‘underlying cause of death’ and ‘multiple causes of death’, with the former being far more popular, but not necessarily more important, than the latter. Underlying-cause-of-death statistics are basically summary statistics, in which, all the causes of death mentioned in the death certificate are reduced to one cause of death, ‘the one that started the chain of events leading to the death’. As Israel *et al.* (1986:163) put it, ‘Although the underlying cause of death concept is easy to understand, it sometimes fails to adequately convey the complexity of reported medical conditions at the time of death.’ The analysis of causes of death can be greatly enriched when the other causes of deaths mentioned on the death certificate (contributing causes) are considered, in addition to the underlying cause of death. The more contributing causes are listed on the death certificate, the greater the utility of such data. In situations when multiple chains of diseases exist, each with its own initiating condition, only one disease is selected as the underlying cause of death, to the exclusion of the others. This reductionist approach becomes problematic in the case of chronic diseases where a number of coexisting conditions are present at the time of death. Also, in case of deaths due to unnatural causes, the underlying cause of death may only capture the circumstance of injuries resulting in a death, missing out the nature of injuries causing the death. It is these kinds of limitations in the concept of underlying cause of death that led to the emergence of the concept of multiple causes of death. While the importance of multiple causes of death statistics has been appreciated for several decades, its use has not been widespread and has had a rather late start in a few countries while others are yet to catch up. For example, while the United States first published national statistics on causes of death in 1918, Australia only published such statistics for the first time in 1999. In Africa, a country such as the Island of Mauritius, having more complete and up-to-date causes-of-death statistics, has not as yet published statistics on multiple causes of death. It was in December 2002 that South Africa published for the first time, tables on multiple causes of death and made electronic data on multiple causes of death available to researchers. This is probably the first set of multiple-cause-of-death statistics published for any African country. The aim of this paper is to primarily to show the utility of such statistics, first in the context of a developing country and second in the context of the country experiencing increased mortality that is largely due to HIV/AIDS. The paper also aims to show the changing profile of multiple causes of death over the study period from 1997 to 2001.

Literature review

¹ Acknowledgement: The results in this paper draw heavily from Stats SA report on Causes of Death in South Africa, 1997-2001.

Some of the leading countries that nationally undertake multiple-cause coding are the USA, UK, France, Australia, Sweden, Norway, Denmark, Canada, Latvia and Japan. A country such as Brazil only undertakes multiple-cause coding for sub-national jurisdictions. While national statistical agencies do multiple-cause coding for all registered deaths in the country, in the case of Canada, the multi-cause coding for the early 1990s (1990-1993) was done on 19,2% of all deaths of Canadian residents (Wilkins *et al.*, 1997). For most part, national reports on multiple causes of deaths use the standard tabulations recommended at two international meetings, one in 1967 in London and the other in 1969 in Geneva (Israel *et al.*, 1986). Using available multiple causes of death data, some researchers have gone a step further in their analysis. For example, Mannino *et al.* (1998) restricted their analysis of multiple cause data only to lung cancer. Using the US Multiple-Cause Mortality Files (MCMF) for 1979 to 1992, they searched the database for any mention of lung cancer, not necessarily when it appeared as the underlying cause of death. In addition, they searched for co-morbid diseases that were listed as being present with lung cancer. They then used regression models to determine the effect of sex, age and race on whether lung cancer was listed as being present but not the underlying cause of death. From their results, they concluded that the underlying cause of death database, which captures about 92% of decedents with lung cancer present, accurately tracks lung cancer mortality trends in the US.

Methods and materials

In the past, the deaths data compiled by Statistics South Africa (Stats SA) were based on hard copies of death notification forms collected from the Department of Home Affairs (DHA). After receiving death notification forms, the Department of Home Affairs (DHA) goes through the process of putting bar codes on the forms. Thereafter, the images of the forms are put onto rolls of microfilm that are placed in queue for verification. It is only after the verification has been completed that DHA sends the forms to Stats SA for processing. This lengthy process was in place up till the completion of the 1996 deaths data. For processing the 1997 to 2001 deaths data, Stats SA resorted to using scanned images of the death notification forms stored on rolls of microfilm. These scanned images were bulk-printed using laser technology and were subsequently processed in place of their hard copies.

The process of bulk printing of forms off scanned images of rolls of microfilm necessitated that a three-stage processing strategy be adopted. At the first stage, rolls were collected on the basis of year of preparation. At the second stage, the forms were arranged according to year of registration for deaths registered between January 1997 and December 2001. However, because of the above-mentioned phenomenon of late preparation of rolls, the cut-off date for 2001 registrations was the end of April 2002. At the third stage, the registered deaths were allocated to their respective years of occurrence.

From the records at DHA, it was established that in 1997, the number of rolls of microfilm prepared for deaths was 290. For the years 1998, 1999, 2000 and 2001, the number of rolls prepared were, 341, 374, 345 and 382 respectively. From January 2002 up to end of April 2002, the number of rolls prepared were 140. The fluctuation in the number of rolls raised some concern. After crosschecking against the records of DHA, it was established that the numbers were correct. A systematic random sample of 15% of rolls was drawn for each of the years. All the forms from the selected rolls were printed and the relevant information was processed, including the coding, capturing and cleaning of the data on causes of death. The coding of causes of death was done using WHO's tenth revision of the International Classification of Diseases (ICD-10). Further details about the processing can be found in Stats SA (2002).

Using standard multiple cause tables as guidelines, counting was done on the different causes of death, taking their positions into account. For n given lines on the death certificate, the different ways in which r causes of death can be positioned is given as: $\binom{n}{r} = \frac{n!}{r!(n-r)!}$. This means that the different possible combinations have to be counted to obtain the desired figure, depending on the table being produced. As the death notification form allows for five lines of causes of death to be listed, the immediate cause and four contributing causes, the Stats SA database made allowance for five multiple causes of death.

Results

Table 1 shows the number of underlying causes of death, the corresponding number of multiple causes of death for each year during the study period and the ratio between the two. This is done separately for males and females. If no contributing causes were mentioned in all the certificates then the ratio between the number of multiple causes and that of the underlying causes would be one. As Table 1 shows, for each year, the ratio of the number of multiple causes to that of the underlying cause is higher for females than males. The average ratio for males is 1,59 and that for females is 1,68.

Table 1: Relationship between multiple cause to underlying cause, males and females, 1997-2001

Year	Males			Females		
	Number of multiple causes mentioned	Number of underlying causes mentioned	Ratio of multiple to underlying cause	Number of multiple causes mentioned	Number of underlying causes mentioned	Ratio of multiple to underlying cause
1997	42 099	26 248	1,60	35 439	20 690	1,71
1998	48 551	30 218	1,61	42 001	24 637	1,70
1999	52 499	32 483	1,62	46 576	27 226	1,71
2000	44 773	28 136	1,59	41 946	25 110	1,67
2001	52 699	33 876	1,56	50 278	30 940	1,63
Average	48 124	30 192	1,59	43 248	25 721	1,68

Table 2 shows the number of causes that form the basis of the choice of underlying causes of death shown in Table 1. On the average, in 72,2% of male deaths, the first listed cause of death (the immediate cause) is the same as the underlying cause of death. For females, the corresponding average figure is 68,7%. For males, with the exception of 1997, this percentage has remained fairly stable, ranging between 70,0% and 73,0%, over the remaining years of the study period. For females, with the exception of 1999, this percentage has remained fairly stable, ranging between 68,0% and 71,0%, over the remaining years of the study period.

Equivalence between the underlying causes of death and the immediate cause of death does not necessarily mean that it was equivalence by default, that no other causes were listed on the certificate. Table 3 shows the number of causes forming the basis for the choice of the underlying cause of death. On the average, for males, 59,3% of the underlying causes of death were chosen based on only one listed cause of death (which could be anywhere on the certificate), 26,4% were chosen based on two causes of death and 10,6% were chosen based on three causes of death. Over the years, the percentages of underlying causes of death based on one, two or three causes of death do not differ much from the average.

Table 2: Relationship between the first cause and the underlying cause, males and females, 1997-2001

Year	Males			Females		
	When the first cause is the same as the underlying cause	When the first cause is different from the underlying cause	Total	When the first cause is the same as the underlying cause	When the first cause is different from the underlying cause	Total
1997	N 19 443	6 805	26 248	14 546	6 144	20 690
	% 74,1	25,9	100,0	70,3	29,7	100,0
1998	N 21 612	8 606	30 218	16 755	7 882	24 637
	% 71,5	28,5	100,0	68,0	32,0	100,0
1999	N 22 995	9 488	32 483	18 196	9 030	27 226
	% 70,8	29,2	100,0	66,8	33,2	100,0
2000	N 20 224	7 912	28 136	17 136	7 974	25 110
	% 71,9	28,1	100,0	68,2	31,8	100,0
2001	N 24 733	9 143	33 876	21 697	9 243	30 940
	% 73,0	27,0	100,0	70,1	29,9	100,0
Average	N 21 801	8 391	30 192	17 666	8 055	25 721
	% 72,2	27,8	100,0	68,7	31,3	100,0

On the average, for females, 53,3% of the underlying causes of death were chosen based on only one listed cause of death (which could be anywhere on the certificate), 30,3% were chosen based on two causes of death and 12,3% were chosen based on three causes of death. Over the years, the percentages of the underlying causes of death based on one cause of death do not differ much from the average (with the exception of 2001). The percentages underlying causes of death based on two or three causes of death do not differ much from the average over the study period.

Table 3: Number of multiple causes forming the basis for choice of underlying cause, males and females, 1997-2001

Year	Males						Females					
	Total	1 cause	2 causes	3 causes	4 causes	5 causes	Total	1 cause	2 causes	3 causes	4 causes	5 causes
1997	N 26 242	15 631	6 667	2 887	827	230	20 687	10 853	6 084	2 802	725	223
	%	59,6	25,4	11,0	3,2	0,9	52,5	29,4	13,5	3,5	1,1	
1998	N 30 210	17 774	7 919	3 380	898	239	24 632	12 916	7 403	3 218	858	237
	%	58,8	26,2	11,2	3,0	0,8	52,4	30,1	13,1	3,5	1,0	
1999	N 32 479	18 889	8 715	3 572	1056	247	27 223	14 001	8 550	3 452	986	234
	%	58,2	26,8	11,0	3,3	0,8	51,4	31,4	12,7	3,6	0,9	
2000	N 28 135	16 615	7 617	2 899	791	213	25 106	13 489	7 637	2 951	822	207
	%	59,1	27,1	10,3	2,8	0,8	53,7	30,4	11,8	3,3	0,8	
2001	N 33 874	20 608	8 943	3 296	819	208	30 935	17 213	9 327	3 345	884	166
	%	60,8	26,4	9,7	2,4	0,6	55,6	30,2	10,8	2,9	0,5	
Average	N 30 188	17 903	7 972	3 207	878	227	25 717	13 694	7 800	3 154	855	213
	%	59,3	26,4	10,6	2,9	0,8	53,3	30,3	12,3	3,3	0,8	

Table 4 shows the breakdown of the multiple causes of death according to the order of listing on the certificates. For males, of all the multiple causes stated, the proportion belonging to the category of being the first stated cause ranged between 62,0% and 65% over the study period. Those belonging to the category of being the second stated cause stated ranged between 24,0% and 26,0% over the study period. Similarly, for females, of all the multiple causes stated, the proportion belonging to the category of being the first stated cause ranged between 58,0% and 62,0% over the study period. Those belonging to the category of being the second stated cause stated ranged between 27,0% and 29,0% over the study period.

Table 4: Multiple causes of death broken down by order of listing, males and females, 1997-2001

Year		Males						Females					
		All multiple causes	First listed	Second listed	Third listed	Fourth listed	Fifth listed	All multiple causes	First listed	Second listed	Third listed	Fourth listed	Fifth listed
1997	N	42 099	26 203	10 595	3 966	1 053	282	35 439	20 648	9 803	3 772	946	270
	%	100,0	62,2	25,2	9,4	2,5	0,7	100,0	58,3	27,7	10,6	2,7	0,8
1998	N	48 551	30 171	12 380	4 552	1 169	279	42 001	24 595	11 650	4 336	1 134	286
	%	100,0	62,1	25,5	9,4	2,4	0,6	100,0	58,6	27,7	10,3	2,7	0,7
1999	N	52 499	32 443	13 552	4 886	1 307	311	46 576	27 192	13 180	4 689	1 232	283
	%	100,0	61,8	25,8	9,3	2,5	0,6	100,0	58,4	28,3	10,1	2,6	0,6
2000	N	44 773	28 091	11 496	3 911	1 007	268	41 946	25 064	11 592	3 983	1 037	270
	%	100,0	62,7	25,7	8,7	2,2	0,6	100,0	59,8	27,6	9,5	2,5	0,6
2001	N	52 699	33 760	13 248	4 329	1 050	312	50 278	30 866	13 699	4 408	1 086	219
	%	100,0	64,1	25,1	8,2	2,0	0,6	100,0	61,4	27,2	8,8	2,2	0,4
Average	N	48 124	30 134	12 254	4 329	1 117	290	43 248	25 673	11 985	4 238	1 087	266
	%	100,0	62,6	25,5	9,0	2,3	0,6	100,0	59,4	27,7	9,8	2,5	0,6

Tables 5 and 6 show the yearly breakdown of the leading multiple causes of death for males and females respectively. As described earlier, for males, the subgroup of unnatural causes of death was the leading underlying cause of death from 1997 to 2001, but with declining proportions. The subgroup was also the leading multiple cause of death from 1997 to 1999, with declining proportions as well. However, in 2000 and 2001, the subgroup dropped in rank to become third leading multiple cause of death, with proportions remaining almost constant. As an underlying cause of death, TB was the third leading cause from 1997 to 1998 and subsequently, became the second leading cause from 1999 onwards. As a multiple cause of death, TB was the fourth leading cause from 1997 to 1999 and moved on to become the second leading cause in 2000 and subsequently to become the leading cause in 2001. As an underlying cause of death, influenza and pneumonia was the fifth leading cause from 1998 onwards. However, as a multiple cause of death, influenza and pneumonia was the third leading cause in 1997 and 1998 and by 2001, it had become the second leading cause of death. In total, the two top leading multiple causes of death in 2001 account for 17,8% of all multiple causes of deaths among males. These same causes of death account for 18,1% of all underlying causes of deaths among males for the same year. In short, TB and influenza and pneumonia are important multiple causes of death as much as they are important underlying causes of death. Just as the ranks of ill-defined causes and HIV remained the third and fourth leading underlying causes of death from 1999 to 2001, respectively, these two subgroups of causes of death remained the fifth and sixth leading multiple causes of death, respectively, from 1999 to 2001. One subgroup of causes of death that did not appear as a leading underlying cause of death but did appear as a leading multiple cause of death is metabolic disorders. This was among the top twenty leading multiple causes of death throughout the

study period and by 2001, it accounted for 2,0% of all the multiple causes of death. Another example of such a sub-group of causes of death is 'aplastic and other anemias'. This subgroup was among the top twenty leading multiple causes of death but its contribution was less than 1,0% throughout the study period.

For females, the sub-group of ill-defined causes of death was the leading underlying cause of death from 1997 to 1998 and the second leading underlying cause from 1999 onwards. As a multiple cause of death, this sub-group of causes of death did not have such a prominence in either rank or proportions. The sub-group was the fourth leading multiple cause in 1997 and 1998 and by 2001, it had fallen in rank to fifth. On the contrary, influenza and pneumonia which was not important underlying cause in 1997 (ranking seventh), was actually the second leading multiple cause for that year and stayed in that rank up till 1999 after which it became the leading multiple cause of death. To some extent a similar observation can be made for TB, which was the fourth leading underlying cause in 2001 but the third leading multiple cause for that year and the previous year as well. As in the case of males, metabolic disorders also appeared as a leading multiple cause of death but was not a leading underlying cause of death during the study period.

Discussion

One important finding from the analysis of multiple causes of death data is the fact that for about 70% of deaths, the immediate cause of death is same as the underlying cause of death. This means the South African Population Register (SAPR), which records the immediate cause of death, can serve as a good source for obtaining statistics on underlying causes of death. The SAPR is updated daily and provides a readily available administrative data. As data captured by multiple capturers at different offices of the Department of Home Affairs are what feed into the SAPR, the data it contains, as with other administrative data, has its problems. Some of these problems have been discussed in a document prepared by Stats SA and MRC (Stats SA and MRC, 2001). As the SAPR has been used to produce an *Advance release of recorded deaths*, it can also be used to produce an *Advance release of recorded causes of deaths*.

The multiple-cause data have shown for the first time, that close to 90% of death notification forms have only two causes of death stated on them. In the era of increase in deaths due to HIV/AIDS, one would expect more medical conditions to be present at death. This paucity of stated causes of death partially attest to the weak state of medical certification of deaths in South Africa.

In Africa, some of the principal causes of death associated with HIV/AIDS are TB and influenza and pneumonia. As TB, on its own, is curable and influenza and pneumonia, on their own, are lethal mostly for very old persons, some researchers are very skeptical when rise in deaths are observed for TB and influenza and pneumonia. While some deaths due to these causes can be expected, some researchers view a substantial proportion of such deaths are by as being HIV/AIDS-related. It is therefore important to be able to quantify the magnitude of such deaths when they are not necessarily the underlying causes of death. The results have shown that for both males and females, tuberculosis is more frequent as a multiple cause of death than as an underlying cause of death. This is also the case for influenza and pneumonia. For males, this subgroup of causes ranked fifth as an underlying cause of death among in 2001 but ranked second as a multiple cause of death for that year. Similarly, for females, this subgroup of causes ranked second as an underlying cause of death among in 2001 but ranked first as a multiple cause of death for that year.

One subgroup of causes of death that is relatively difficult to unpack is that of 'ill-defined causes of death'. This stands for those vague listed causes of death such as 'natural deaths' and 'heart failure'. Definitely, almost all the deaths in this category belong to other specific categories. This misreporting could either be due to ignorance or to a deliberate attempt not to report the actual cause of death for one or more of several reasons. While this subgroup of causes of death was the second leading underlying causes of death among females in 2001, the multiple cause analysis does not accord such importance to the cause but relegates it fifth, giving prominence to TB and influenza and pneumonia.

Conclusion

The multiple-cause analysis attempted in this paper has helped to justify the use of the SAPR for providing advance release of causes of death data. Since about 90% of forms have only two causes stated on them and the first cause is same as the underlying cause in about 70% of the cases, the causes of death processed from SAPR would not be too far off. Of course, the caveats about using the SAPR in general would have to be taken into account and explained to the reader. The multiple-cause analysis has also brought out the importance of TB and influenza and pneumonia as contributing causes of death and de-emphasised the importance of ill-defined causes of death. Both of these salient points would not have emerged if the analysis of the 1997 to 2001 data had stopped only at the level of underlying cause of death. Further research on multiple causes of death should be encouraged. Some areas of further research include: studying the association between the different causes, developing a competing risk model and identifying the misreported deaths due to HIV/AIDS.

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Table E: The top 20 leading multiple causes of deaths among males, 1997-2001

	1997			1998			1999			2000			2001		
	Cause	N	%	Cause	N	%	Cause	N	%	Cause	N	%	Cause	N	%
	All causes	42 099	100	All causes	48 551	100	All causes	52 499	100	All causes	44 773	100	All causes	52 699	100
1	External causes (undeternined)	5 485	13,0	External causes (undeternined)	5 554	11,4	External causes (undeternined)	4 948	9,4	Influenza and pneumonia	3 767	8,4	Tuberculosis	4 716	8,9
2	Other forms of heart disease	4 549	10,8	Other forms of heart disease	4 666	9,6	Other forms of heart disease	4 240	8,1	Tuberculosis	3 652	8,2	Influenza and pneumonia	4 532	8,6
3	Influenza and pneumonia	2 430	5,8	Influenza and pneumonia	3 363	6,9	Influenza and pneumonia	3 811	7,3	External causes (undeternined)	3 594	8,0	External causes (undeternined)	4 144	7,9
4	Tuberculosis	2 425	5,8	Tuberculosis	3 101	6,4	Tuberculosis	3 797	7,2	Other forms of heart disease	3 210	7,2	Other forms of heart disease	3 584	6,8
5	Ill-defined causes of mortality	2 357	5,6	Ill-defined causes of mortality	2 692	5,5	Ill-defined causes of mortality	2 602	5,0	Ill-defined causes of mortality	2 424	5,4	Ill-defined causes of mortality	3 136	6,0
6	General symptom and signs	1 635	3,9	General symptom and signs	1 876	3,9	HIV disease	2 336	4,4	HIV disease	2 267	5,1	HIV disease	2 600	4,9
7	Cerebrovascular disease	1 564	3,7	Cerebrovascular disease	1 758	3,6	Cerebrovascular disease	2 013	3,8	Cerebrovascular disease	1 675	3,7	Cerebrovascular disease	1 967	3,7
8	Chronic lower resp. diseases	1 378	3,3	Chronic lower resp. diseases	1 710	3,5	Chronic lower resp. diseases	1 858	3,5	Chronic lower resp. diseases	1 504	3,4	General symptom and signs	1 875	3,6
9	Ischaemic heart disease	1 268	3,0	HIV disease	1 588	3,3	General symptom and signs	1 845	3,5	General symptom and signs	1 500	3,4	Chronic lower resp. diseases	1 850	3,5
10	Hypertensive diseases	1 191	2,8	Ischaemic heart disease	1 372	2,8	Ischaemic heart disease	1 635	3,1	Intestinal infectious diseases	1 462	3,3	Hypertensive diseases	1 610	3,1
11	Other diseases of resp. system	1 021	2,4	Hypertensive diseases	1 343	2,8	Hypertensive diseases	1 594	3,0	Hypertensive diseases	1 316	2,9	Ischaemic heart disease	1 551	2,9
12	HIV disease	1 016	2,4	Intestinal infectious diseases	1 338	2,8	Intestinal infectious diseases	1 384	2,6	Ischaemic heart disease	1 303	2,9	Intestinal infectious diseases	1 486	2,8
13	Intestinal infectious diseases	982	2,3	Other diseases of resp. system	1 248	2,6	Other diseases of resp. system	1 240	2,4	Other diseases of resp. system	998	2,2	Other diseases of resp. system	1 262	2,4
14	Cancer of dig. sys.	858	2,0	Metabolic disorders	934	1,9	Renal failure	1 024	2,0	Metabolic disorders	908	2,0	Renal failure	1 080	2,0
15	Renal failure	841	2,0	Renal failure	917	1,9	Metabolic disorders	990	1,9	Renal failure	829	1,9	Metabolic disorders	1 023	1,9
16	Disease of liver	789	1,9	Cancer of dig. sys.	882	1,8	Disease of liver	984	1,9	Other bacterial diseases	805	1,8	Diabetes mellitus	976	1,9
17	Diabetes mellitus	768	1,8	Diabetes mellitus	852	1,8	Other bacterial diseases	952	1,8	Diabetes mellitus	760	1,7	Other bacterial diseases	947	1,8
18	Metabolic disorders	707	1,7	Disease of liver	840	1,7	Cancer of dig. sys.	950	1,8	Cancer of dig. sys.	737	1,6	Cancer of dig. sys.	898	1,7
19	Other bacterial diseases	672	1,6	Other bacterial diseases	825	1,7	Diabetes mellitus	934	1,8	Disease of liver	694	1,6	Disease of liver	824	1,6
20	Cancer of ill-defined	656	1,6	Cancer of ill-defined	636	1,3	Cancer of ill-defined	726	1,4	Sympns and signs (cir and resp. sys)	637	1,4	Sympns and signs (cir and resp. sys)	717	1,4

Table F: The top 20 leading multiple causes of deaths among females, 1997-2001

	1997			1998			1999			2000			2001		
	Cause	N	%	Cause	N	%	Cause	N	%	Cause	N	%	Cause	N	%
	All causes	35 439	100	All causes	42 001	100	All causes	46 576	100	All causes	41 946	100	All causes	50 278	100
1	Other forms of heart disease	4 582	12,9	Other forms of heart disease	4 808	11,4	Other forms of heart disease	4 604	9,9	Influenza and pneumonia	3 741	8,9	Influenza and pneumonia	4 832	9,6
2	Influenza and pneumonia	2 288	6,5	Influenza and pneumonia	3 097	7,4	Influenza and pneumonia	3 746	8,0	Other forms of heart disease	3 588	8,6	Other forms of heart disease	4 080	8,1
3	General symptom and signs	1 960	5,5	General symptom and signs	2 491	5,9	Cerebrovascular disease	2 526	5,4	Tuberculosis	2 541	6,1	Tuberculosis	3 516	7,0
4	Ill-defined causes of mortality	1 891	5,3	Ill-defined causes of mortality	2 259	5,4	HIV disease	2 483	5,3	HIV disease	2 538	6,1	HIV disease	3 038	6,0
5	Cerebrovascular disease	1 876	5,3	Cerebrovascular disease	2 186	5,2	General symptom and signs	2 476	5,3	Cerebrovascular disease	2 257	5,4	Ill-defined causes of mortality	2 887	5,7
6	External causes (undeternined)	1 725	4,9	Hypertensive diseases	2 045	4,9	Tuberculosis	2 472	5,3	General symptom and signs	2 230	5,3	Cerebrovascular disease	2 697	5,4
7	Hypertensive diseases	1 711	4,8	Tuberculosis	1 967	4,7	Hypertensive diseases	2 443	5,2	Hypertensive diseases	2 215	5,3	Hypertensive diseases	2 668	5,3
8	Tuberculosis	1 448	4,1	External causes (undeternined)	1 701	4,0	Ill-defined causes of mortality	2 144	4,6	Ill-defined causes of mortality	2 168	5,2	General symptom and signs	2 635	5,2
9	HIV disease	1 158	3,3	HIV disease	1 684	4,0	External causes (undeternined)	1 556	3,3	Intestinal infectious diseases	1 663	4,0	Intestinal infectious diseases	1 830	3,6
10	Diabetes mellitus	1 076	3,0	Intestinal infectious diseases	1 430	3,4	Intestinal infectious diseases	1 532	3,3	Diabetes mellitus	1 224	2,9	Diabetes mellitus	1 470	2,9
11	Intestinal infectious diseases	1 056	3,0	Diabetes mellitus	1 179	2,8	Diabetes mellitus	1 385	3,0	External causes (undeternined)	1 051	2,5	External causes (undeternined)	1 211	2,4
12	Chronic lower resp. diseases	913	2,6	Chronic lower resp. diseases	1 082	2,6	Ischaemic heart disease	1 227	2,6	Chronic lower resp. diseases	986	2,4	Chronic lower resp. diseases	1 206	2,4
13	Ischaemic heart disease	785	2,2	Ischaemic heart disease	1 021	2,4	Chronic lower resp. diseases	1 112	2,4	Ischaemic heart disease	984	2,3	Ischaemic heart disease	1 177	2,3
14	Other diseases of resp. system	785	2,2	Other diseases of resp. system	962	2,3	Other bacterial diseases	1 058	2,3	Metabolic disorders	969	2,3	Metabolic disorders	1 142	2,3
15	Renal failure	780	2,2	Metabolic disorders	885	2,1	Metabolic disorders	1 017	2,2	Other bacterial diseases	915	2,2	Other bacterial diseases	1 062	2,1
16	Other bacterial diseases	758	2,1	Other bacterial diseases	863	2,1	Other diseases of resp. system	952	2,0	Other diseases of resp. system	816	1,9	Other diseases of resp. system	1 038	2,1
17	Metabolic disorders	732	2,1	Renal failure	795	1,9	Renal failure	878	1,9	Renal failure	765	1,8	Renal failure	1 008	2,0
18	Cancer of ill-defined	681	1,9	Cancer of ill-defined	670	1,6	Cancer of ill-defined	724	1,6	Cancer of ill-defined	597	1,4	Sympns and signs (cir and resp. sys)	677	1,3
19	Cancer of dig. sys.	516	1,5	Cancer of dig. sys.	581	1,4	Cancer of dig. sys.	663	1,4	Sympns and signs (cir and resp. sys)	531	1,3	Cancer of ill-defined	661	1,3
20	Resp. & cardiovasc. disorders (perinatal)	496	1,4	Disease of liver	507	1,2	Sympns and signs (cir and resp. sys)	582	1,2	Cancer of dig. sys.	513	1,2	Cancer of dig. sys.	606	1,2