Cancer mortality and predictions for 2018 in selected Australasian countries and Russia

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Short title: Cancer mortality in selected Australasian countries and Russia

Key message: Total cancer mortality in Russia and Australasia is predicted to decline persistently until 2018. Lung cancer trends in men were favourable, with stronger falls in the 25-44 years age-group, but remained exceedingly high in Russian men. Between 1993 and 2018 about 1 million cancer deaths were avoided in Russia and 650,000 in Japan.

Abstract

Background: Predicted cancer mortality figures and rates are useful for public health planning.

Materials and Methods: We retrieved cancer death certification data from 10 major cancer sites and total cancers from the World Health Organisation (WHO) database and population data from WHO and United Nations Population Division databases. We obtained figures for Russia, Israel, Hong Kong, Japan, the Philippines, Korea, and Australia in 1970-2015. We predicted numbers of deaths by age-group and age-standardized rates (world population) for 2018 by applying a linear regression to mortality data of each age-group over the most recent trend segment identified by a joinpoint regression model.

Results: Russia had the highest predicted total cancer mortality rates, 158.5/100,000 men and 84.1/100,000 women. Men in the Philippines showed the lowest rates for 2018 (84.6/100,000) and Korean males the most favourable predicted fall (21% between 2018 and 2012). Women in Korea had the lowest total cancer predicted rate (52.5/100,000). Between 1993 and 2018, i.e. by applying the 1993 rates to populations in subsequent years, a substantial number of cancer deaths was avoided in Russia (1,000,000 deaths, 821,000 in men and 179,000 in women), Israel (40,000 deaths, 21,000 in men and 19,000 in women), Hong Kong (63,000 deaths, 40,000 in men and 23,000 in women), Japan (651,000 deaths, 473,000 in men and 178,000 in women), Korea (327,000 deaths, 250,000 in men and 77,000 in women) and the Australia (181,000 deaths, 125,000 in men and 56,000 in women). No appreciable reduction in cancer deaths was found in the Philippines.

Conclusion: Overall, we predicted falls in cancer mortality. However, these are less marked and later compared to the EU and USA. Substantial numbers of deaths were averted in all countries considered except the Philippines underlining the need for improvement in cancer prevention and management.

Keywords: cancer, Russia, Australasia, mortality, projections, lung cancer.

Introduction

Since 2011, we published cancer mortality predictions for the European Union (EU) as a whole and its largest countries [1, 2] on the basis of the World Health Organization (WHO) mortality database. We also produced prediction estimates for 2017 for the most populous Latin American countries [3]. Thus, in this paper we considered major countries for which we had good quality data: we predicted the number of cancer deaths and mortality rates for 2018 for the Russian Federation and six Australasian countries, focusing on lung cancer.

Materials and methods

We obtained death certification data from the WHO database [4] for the Russian Federation and selected Australasian countries with over 7 million inhabitants and over 90% death certification coverage (i.e., Israel, Hong Kong SAR, Japan, the Philippines, the Republic of Korea, and Australia) in the period between 1970 and 2015 (up to 2011 for the Philippines, 2013 for Russia, and 2014 for Israel). Cancer deaths were recoded according to the 10th International Classification of Diseases Revision [5]. We considered cancer of the stomach, colorectum, pancreas, lung, breast, uterus (cervix and corpus), ovary, prostate, bladder, leukaemias and total neoplasms (malignant and benign).

We retrieved resident population figures from the same WHO database and, when necessary, due to lack of data, from the United Nations (UN) Population Division database [4, 6].

We used certified deaths and resident population matrices to calculate age-specific death rates for each 5-year age-group (from 0-4 to 85+ years), sex and calendar year. We also calculated yearly and quinquennial age-standardized rates per 100,000 person-years (direct method, world standard population) at all ages and, for lung cancer, also at the truncated 25-44, 45-64, 65-74, and 75+ age-groups.

We computed predicted age-specific estimates of certified numbers of deaths for 2018 and the corresponding 95% prediction intervals (PIs) by fitting a logarithmic Poisson count data joinpoint regression model to the number of certified deaths in each 5-year age-group [7]. We applied a linear regression to mortality data of each age-group over the most recent trend segment identified by the joinpoint model to obtain the prediction estimates. We predicted age-standardized death rates with their corresponding 95%

PIs using the predicted age-specific death counts and the predicted population data from the UN database [6].

Numbers of avoided cancer deaths over the 25 years from 1993 to 2018 were estimated by comparing observed deaths and expected ones on the basis of the 1993 age-specific rate (total cancer mortality peak rate for most considered countries).

Results

Figure 1 displays bar plots of age-standardized mortality rates per 100,000 person-years for all neoplasms in the studied countries, in men and women separately, in 2012 (dark grey) and predicted rates for 2018 (light grey). We predicted favourable total cancer mortality trends for all countries; men showed more marked declines.

Table 1 (men), and table 2 (women), show numbers of cancer deaths and age-standardized rates observed in 2012, along with predicted figures for 2018; they include 95% PIs and percent differences between 2018 and 2012 age-standardized rates. In men, Russia showed the highest total cancer mortality rates, with values of 167.8/100,000 in 2012 and 158.5 in 2018 (-5.6%). The most favourable predicted trend in all cancers rates was in Korean men, reaching a rate of 108.9 in 2018; however, the number of deaths is predicted to increase. Appreciable declines (around 13-15%) were predicted in Hong Kong, Japan, and Australia. Israel and the Philippines had the lowest predicted rates around 95 and 85/100,000, respectively. The Philippines showed the largest increase in terms of numbers of deaths (+16.8%). Russian women had the highest predicted total cancer mortality (84.1/100,000), Korean women had the lowest one, 52.5/100,000, and they also showed the largest fall in rates.

Figure 2 shows trends in total cancer mortality rates, from 1970-1974 to 2010-2014, in men and women separately, and predicted rates for 2018. In males, declines in rates started around 2000, except for Hong Kong and Australia, where rates started to fall earlier. In women trends started to decline around 1990 or earlier (Hong Kong). Rates in Japan declined over the whole period, while the Philippines had a rising trend up to 2000 and then levelled off.

Figure 3 displays mortality trends for the studied cancer sites by country and sex. In men, lung cancer rates in Russia were the highest over the studied period. Stomach cancer trends declined over the whole period and colorectal cancer trends have been increasing up to around 2000, to level off or decrease thereafter. Russia and Hong Kong showed upwards prostate cancer trends. In Israel lung, colorectal and prostate trends showed a peak around 2000s. Japan and Korea showed strong declines in stomach cancer rates (they had the highest ones in the 1970-80s). Overall, men in all countries had stable or slightly increasing patterns for pancreas and bladder. In Russia, rates for breast and colorectal cancers are predicted to decline. In Japan the lung cancer in women tended to increase up to 2000s to then decline; breast cancer rates rose over the whole period to then flatten in recent years. The highest female mortality rates in the Philippines were for breast cancer and uterus. Australia had strong downward breast and colorectal cancer trends.

Table 3 shows age-standardized mortality rates for lung cancer at all ages and at 25-44, 45-64, 65-74, and 75+ years age-groups, in 2005-2009 and 2010-2014, including predicted rates for 2018, the corresponding 95% PIs, and the percent difference between 2018 and 2010-2014. Men and women presented favourable predicted patterns at all ages, with the exception of Hong Kong women (+0.4%); trends had stronger falls for the 25-44 age-group, but not for women from Israel, Japan, and the Philippines. Trends in women are less favourable.

Figure 4 shows the estimated number of avoided cancer deaths in men and women between 1993 and 2018, assuming the age-specific rates in 1993 as constant (light grey area). Over the 25 years considered, a substantial number of cancer deaths was avoided in Russia (1,000,000 deaths, 821,000 in men and 179,000 in women), Israel (40,000, 21,000 in men and 19,000 in women), Hong Kong (63,000, 40,000 in men and 23,000 in women), Japan (651,000, 473,000 in men and 178,000 in women), Korea (327,000, 250,000 in men and 77,000 in women) and Australia (181,000, 125,000 in men and 56,000 in women). There was no appreciable reduction in cancer deaths in the Philippines.

Discussion

Similarly to other areas of the world [8, 9], in Russia and the six Australasian studied countries, favourable trends for total cancer mortality are predicted to continue up to 2018 in both sexes. However, the number of cancer deaths is still increasing [10, 11]. Except Hong Kong and Australia, total cancer mortality started to decline about a decade later than the EU and the USA [9, 12].

In all countries (except Australia) lung cancer trends peaked in males between late 1990s and 2000s (later than in North America and most EU countries). Female lung cancer trends were favourable and particularly low in Russia as compared to the EU and North America, reflecting the low prevalence of smoking among Russian women [13]. The rise in lung cancer mortality rate for women aged 25-44 years in Israel is particularly worrisome. Hong Kong and Australia reached the highest rates in 2018 [2]. Thus, urgent measures on tobacco control are needed [14, 15].

Stomach cancer showed strong falls over the whole period up to 2018 for all countries and both sexes; however, in Russia, Japan and Korea, rates were about double than in the EU or other high-income countries [9, 16]. In the other selected countries, rates over last years were very low and closer to North American ones (around 3/100,000 men and 2/100,000 women) [8]. The fall in gastric cancer rates is related to both a declining prevalence of Helicobacter pylori and improvements in diet and food conservation over the period [17].

Trends from colorectal cancer started to decline around 2000 or later (Russia and Korea), i.e. later than most high-income countries [8, 9]. The falls in colorectal cancer mortality are largely due to earlier diagnosis – including, in selected areas, population screening – the removal of adenomas and treatments [18]; the later onset of declines suggests delays in colorectal cancer management in several of the countries considered, in any case acceptable information on national screening programs in the considered countries is not available [19]. However, rates remain comparatively low in Japan, Korea and other Asian countries. Also, use of aspirin may have favourably influenced colorectal cancer trends [20].

Pancreatic cancer mortality showed unfavourable patterns in most countries considered, for both sexes. Predicted rates were similar to the EU and higher than Latin America [3, 21]. Smoking is the main known risk factor for pancreatic cancer. Under-certification remains possible.

Russia and Israel showed similar breast cancer mortality rates to the EU and North America [3, 8]. The falls in breast cancer rates are largely due to improved management and diagnosis; national screening and cancer control programs are only available in selected countries (i.e. Israel) [19]: their widespread adoption could lead to improvements in breast cancer rates in several of the considered countries [22, 23].

Except for Russia and the Philippines, uterine cancer trends declined, similarly to the EU and USA. We were unable to distinguish between cervical and corpus uteri cancer from death certification data. However, since in some of the largest countries considered (cervix) uterus remains a major cause of cancer deaths it is worthwhile investigating in spite of this limitation. Most declines in (cervix) uterus cancer rates worldwide were due to screening [24, 25]. The limited declines in some of the studied countries indicate the urgent need to adopt modern population-based cervical screening programs.

Ovarian cancer mortality declines in the considered countries are mainly due to the widespread use of oral contraceptives (OCs) in generations born after 1930 [26-28]. Declines were smaller than in North America and Northern Europe [29] because OCs where used less frequently and later in Russia, Japan, Korea, explaining the less favourable predictions.

Recent falls in prostate cancer mortality registered in North America and in the EU are due to early diagnosis and mainly improved treatment [30], predictions for Australia were similar. The absence of such favourable trends in Russia suggests delays in prostate cancer management.

Bladder cancer predictions were favourable for both sexes, as in other areas of the world [9]. For men this reflects the declining exposure to occupational bladder carcinogens and mostly the declining prevalence of tobacco smoking. The favourable prediction for women may reflect an improved control of chronic cystitis [31]. Better disease management may have favourably affected trends [32].

Predictions for leukaemias were favourable in all countries considered, reflecting the improved disease treatment [33, 34].

We considered countries with relatively large population sizes, and good death certification coverage, thus our projection methods should not be appreciably affected by random oscillations; however, caution should be exercised when interpreting results, which in any case indicate a substantial number of cancer death avoided over the last 25 years in all countries considered, except the Philippines.

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Disclosure

The authors disclose no conflicts.

Figure legends

Figure 1. Bar-plots of age-standardized (world population) death rates per 100,000 person-years for the year 2012 (dark grey) and predicted rates for 2018 (light grey) for total cancer in Russia and six selected Australasian countries, men and women.

Figure 2. Age-standardized (world population) total cancer mortality rate trends in quinquennia from 1970 to 2014 and predicted rates for 2018 with 95% prediction intervals (PIs), for Russia (diamonds), Israel (circles), Hong Kong (squares), Japan (triangles), the Philippines (crosses), Korea (xs), and Australia (inverted triangles), in men and women.

Figure 3. Age-standardized (world population) cancer mortality rate trends in quinquennia from 1970 to 2014 and predicted rates for 2018 with 95% prediction intervals (PIs) for Russia and the six Australasian countries. Men: stomach (squares), colorectum (circles), pancreas (triangles), lung (crosses), prostate (ticked squares), bladder (asterisks) and leukaemias (ticked diamonds). Women: stomach (squares), colorectum (circles), pancreas (triangles), lung (crosses), breast (xs), uterus (cervix and corpus) (diamonds), ovary (inverted triangles), bladder (asterisks) and leukaemias (ticked diamonds).

Figure 4. Total avoided cancer deaths for 6 out of the 7 countries considered, men and women, between the rate in 1993 and 2018 (light grey area); observed numbers of cancer deaths from 1993 to 2015 (or the latest available year) and predicted cancer deaths from 2015 to 2018 (black line); estimated numbers of total cancer deaths by applying 1993 age-specific mortality rate (dark grey line). During the 25 years period a total of over 2,200,000 cancer deaths have been avoided in 6 of the 7 countries considered (1,700,000 in men and 500,000 in women). No reduction in cancer deaths was registered in the Philippines. In 2018 alone about 174,000 deaths are predicted to be avoided in men, and about 57,000 in women. Abbreviation: ASR, age-specific rate.

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Table 1. Number of predicted deaths and mortality rates per 100,000 men for the year 2018 and comparison figures for the year 2012 (2011 for Philippines), from Russia and selected Australasian countries, with 95% prediction intervals and percent differences between 2018 and 2012 rates.

		Observed number of deaths 2012	Predicted number of deaths 2018	Lower prediction limit (95%)	Upper prediction limit (95%)	Observed ASR* 2012	Predicted ASR* 2018	Lower prediction limit (95%)	Upper prediction limit (95%)	% difference 2018 versus 2012
Russian Federation	STOMACH	18314	13840	11861	15821	19.65	13.57	11.37	15.77	-30.9
	COLORECTUM	17368	17890	15790	19991	18.44	17.62	15.30	19.94	-4.4
	PANCREAS	8208	9140	8323	9963	8.91	9.16	8.27	10.06	2.8
	LUNG	41041	40240	35980	44497	44.52	39.72	35.14	44.30	-10.8
	PROSTATE	10860	12030	10574	13489	11.40	11.71	10.11	13.32	2.8
	BLADDER	5174	4520	3917	5131	5.39	4.43	3.77	5.08	-17.8
	LEUKAEMIAS	3477	3380	3024	3733	4.09	3.73	3.34	4.11	-8.9
	ALL CANCERS	154550	158950	143103	174795	167.79	158.46	141.21	175.71	-5.6
Israel	STOMACH	294	300	259	339	5.62	4.89	4.24	5.53	-13.1
	COLORECTUM	725	730	652	818	12.93	11.39	10.04	12.74	-11.9
	PANCREAS	471	530	479	582	9.28	9.01	8.05	9.97	-2.9
	LUNG	1178	1400	1307	1497	23.73	24.14	22.39	25.89	1.7
	PROSTATE	417	370	315	423	6.43	4.71	4.00	5.42	-26.8
	BLADDER	264	320	276	366	4.33	4.23	3.64	4.83	-2.3
	LEUKAEMIAS	275	300	269	332	5.21	4.86	4.28	5.43	-6.8
	ALL CANCERS	5525	5910	5562	6256	104.19	95.15	88.82	101.49	-8.7
Hong Kong SAR	STOMACH	379	380	328	424	5.37	4.42	3.76	5.08	-17.8
	COLORECTUM	1110	1210	1112	1298	15.58	13.99	12.80	15.17	-10.2
	PANCREAS	287	340	312	376	4.41	4.59	4.12	5.05	4.1
	LUNG	2597	2670	2498	2848	37.56	31.55	29.10	34.00	-16.0
	PROSTATE	362	400	351	452	4.39	3.83	3.29	4.36	-12.9
	BLADDER	132	120	97	147	1.61	1.15	0.85	1.45	-28.4
	LEUKAEMIAS	181	170	143	193	3.04	2.37	1.69	3.06	-22.0
	ALL CANCERS	8342	8840	8448	9234	125.49	108.14	102.53	113.74	-13.8
Japan	STOMACH	32206	29450	28711	30188	17.65	12.94	12.37	13.52	-26.7
	COLORECTUM	26870	29740	28841	30645	15.48	14.94	14.30	15.57	-3.5
	PANCREAS	15516	17090	16559	17619	9.16	8.67	8.37	8.97	-5.4
	LUNG	51371	54230	53242	55223	27.40	24.73	24.01	25.46	-9.7
	PROSTATE	11143	11780	11290	12262	4.78	4.18	4.02	4.34	-12.7
	BLADDER	5002	6060	5857	6256	2.37	2.40	2.29	2.51	1.3
	LEUKAEMIAS	4779	4830	4591	5078	3.34	2.62	2.40	2.85	-21.5
	ALL CANCERS	220971	226450	222331	230559	123.21	104.86	101.83	107.88	-14.9
Philippines	STOMACH	786	780	708	858	2.67	2.10	1.91	2.30	-21.2
	COLORECTUM	3150	3720	3578	3866	10.58	9.71	9.32	10.11	-8.2
	PANCREAS	684	830	781	878	2.21	2.16	2.03	2.29	-2.5
	LUNG	5969	6550	6241	6860	20.60	17.89	17.04	18.75	-13.2
	PROSTATE	2467	3070	2882	3256	10.79	9.98	9.38	10.57	-7.5

		Observed number of deaths 2012	Predicted number of deaths 2018	Lower prediction limit (95%)	Upper prediction limit (95%)	Observed ASR* 2012	Predicted ASR* 2018	Lower prediction limit (95%)	Upper prediction limit (95%)	% difference 2018 versus 2012
	BLADDER	223	280	245	310	0.84	0.78	0.69	0.87	-7.1
	LEUKAEMIAS	1445	1620	1530	1715	3.56	3.45	3.25	3.65	-3.1
	ALL CANCERS	27616	32260	31608	32906	91.35	84.55	82.79	86.30	-7.4
Republic of Korea	STOMACH	6090	5050	4832	5276	17.55	10.61	10.06	11.16	-39.6
	COLORECTUM	4961	5230	4941	5514	14.59	11.25	10.61	11.88	-22.9
	PANCREAS	2616	3120	2977	3264	7.57	6.77	6.45	7.08	-10.6
	LUNG	12175	13700	13275	14130	35.06	28.58	27.65	29.50	-18.5
	PROSTATE	1460	1920	1839	2009	4.53	4.00	3.81	4.18	-11.8
	BLADDER	918	1080	1001	1165	2.79	2.29	2.12	2.45	-17.9
	LEUKAEMIAS	919	920	841	1005	3.18	2.21	1.92	2.51	-30.3
	ALL CANCERS	47228	50720	49353	52095	138.08	108.91	105.79	112.04	-21.1
Australia	STOMACH	707	680	618	750	3.48	2.85	2.55	3.14	-18.3
	COLORECTUM	2958	2840	2669	3001	13.94	11.39	10.76	12.01	-18.3
	PANCREAS	1331	1410	1323	1497	6.48	5.84	5.44	6.25	-9.8
	LUNG	4883	4970	4779	5158	23.22	19.74	18.95	20.53	-15.0
	PROSTATE	3078	3020	2842	3199	11.94	9.39	8.88	9.91	-21.3
	BLADDER	707	730	655	806	2.96	2.42	2.17	2.67	-18.2
	LEUKAEMIAS	943	930	849	1005	4.58	3.48	3.12	3.84	-23.9
	ALL CANCERS	24596	25990	25335	26648	115.50	101.08	98.60	103.57	-12.5

*ASR, age-standardized mortality rates using the World Standard Population.

Table 2. Number of predicted deaths and mortality rates per 100,000 women for the year 2018 and comparison figures for the year 2012 (2011 for Philippines), from Russia and selected Australasian countries, with 95% prediction intervals and percent differences between 2018 and 2012 rates.

		Observed number of deaths 2012	Predicted number of deaths 2018	Lower prediction limit (95%)	Upper prediction limit (95%)	Observed ASR* 2012	Predicted ASR* 2018	Lower prediction limit (95%)	Upper prediction limit (95%)	% difference 2018 versus 2012
Russian Federation	STOMACH	13610	10920	9372	12465	8.03	5.84	4.86	6.83	-27.2
	COLORECTUM	21388	21010	19131	22892	12.18	11.12	9.93	12.31	-8.7
	PANCREAS	7969	7920	7136	8698	4.70	4.43	3.93	4.93	-5.8
	LUNG	8839	8890	8101	9683	5.47	5.34	4.84	5.84	-2.4
	BREAST	22932	21000	18849	23154	15.90	13.20	11.81	14.58	-17.0
	UTERUS (CERVIX AND CORPUS)	12922	14180	12958	15406	9.62	10.24	9.46	11.03	6.5
	OVARY	7788	7290	6526	8056	5.61	5.16	4.62	5.70	-7.9
	BLADDER	1413	1290	1124	1450	0.70	0.62	0.53	0.70	-12.3
	LEUKAEMIAS	3553	3140	2767	3503	2.65	2.09	1.82	2.36	-21.2
	ALL CANCERS	136246	137810	124794	150834	88.60	84.08	75.84	92.33	-5.1
Israel	STOMACH	199	190	158	224	3.06	2.55	2.07	3.02	-16.8
	COLORECTUM	705	670	604	737	9.36	8.02	7.13	8.91	-14.3
	PANCREAS	401	460	417	499	5.65	5.80	5.27	6.32	2.7
	LUNG	583	650	593	705	9.44	9.02	8.28	9.76	-4.4
	BREAST	994	1000	923	1087	16.81	13.96	12.65	15.27	-17.0
	UTERUS (CERVIX AND CORPUS)	248	340	293	381	4.14	4.43	3.83	5.02	6.9
	OVARY	302	330	289	361	5.21	4.88	4.27	5.48	-6.5
	BLADDER	85	100	79	112	1.01	0.97	0.76	1.17	-4.3
	LEUKAEMIAS	245	240	214	272	3.59	3.11	2.66	3.57	-13.4
	ALL CANCERS	5382	5890	5679	6110	81.37	76.49	73.34	79.64	-6.0
Hong Kong SAR	STOMACH	278	260	217	294	3.20	2.43	1.98	2.88	-24.3
	COLORECTUM	854	1020	949	1100	9.55	9.32	8.53	10.12	-2.3
	PANCREAS	251	300	269	327	3.15	3.19	2.88	3.51	1.3
	LUNG	1296	1530	1422	1633	15.56	15.41	14.11	16.71	-0.9
	BREAST	601	680	632	736	8.58	8.68	7.95	9.41	1.1
	UTERUS (CERVIX AND CORPUS)	250	300	270	335	3.49	3.74	3.31	4.18	7.3
	OVARY	176	220	190	244	2.47	2.82	2.44	3.20	14.5
	BLADDER	52	50	29	69	0.49	0.34	0.17	0.51	-31.4
	LEUKAEMIAS	95	150	120	178	1.53	1.80	1.13	2.48	18.0
	ALL CANCERS	5609	6570	6350	6782	69.72	68.25	65.56	70.94	-2.1
Japan	STOMACH	16922	15310	14779	15848	6.67	4.80	4.53	5.08	-28.0
	COLORECTUM	22768	24900	24410	25390	8.97	8.60	8.34	8.86	-4.2
	PANCREAS	14399	16380	15836	16933	5.76	5.48	5.24	5.72	-4.9
	LUNG	20145	22290	21790	22790	7.76	7.22	6.93	7.51	-7.0
	BREAST	12527	13680	13296	14072	8.67	8.49	8.16	8.82	-2.1

		Observed number of deaths 2012	Predicted number of deaths 2018	Lower prediction limit (95%)	Upper prediction limit (95%)	Observed ASR* 2012	Predicted ASR* 2018	Lower prediction limit (95%)	Upper prediction limit (95%)	% difference 2018 versus 2012
	UTERUS (CERVIX AND CORPUS)	6113	6450	6189	6719	4.01	4.19	3.94	4.43	4.3
	OVARY	4790	4710	4511	4904	3.24	2.78	2.61	2.95	-14.2
	BLADDER	2296	2590	2478	2712	0.65	0.59	0.55	0.63	-9.3
	LEUKAEMIAS	3121	3350	3171	3520	1.89	1.40	1.25	1.56	-25.9
	ALL CANCERS	151234	161290	159185	163403	66.05	60.28	58.87	61.68	-8.7
Philippines	STOMACH	604	560	504	624	1.69	1.25	1.12	1.38	-26.3
	COLORECTUM	2580	3050	2921	3184	7.27	6.73	6.43	7.02	-7.5
	PANCREAS	693	830	780	883	1.95	1.84	1.73	1.96	-5.3
	LUNG	2389	2840	2727	2959	6.72	6.30	6.03	6.56	-6.4
	BREAST	6162	7540	7299	7775	16.34	16.03	15.52	16.55	-1.9
	UTERUS (CERVIX AND CORPUS)	2895	3500	3333	3671	7.56	7.43	7.06	7.80	-1.7
	OVARY	1360	1680	1592	1761	3.59	3.56	3.38	3.73	-0.8
	BLADDER	113	130	102	150	0.33	0.28	0.23	0.34	-15.5
	LEUKAEMIAS	1354	1600	1517	1681	3.17	3.20	3.03	3.37	0.8
	ALL CANCERS	26667	32510	31871	33141	71.57	69.99	68.57	71.41	-2.2
Republic of Korea	STOMACH	3252	2640	2461	2818	6.53	3.96	3.58	4.35	-39.3
	COLORECTUM	3667	4050	3856	4235	7.15	5.94	5.58	6.29	-16.9
	PANCREAS	2162	2760	2645	2874	4.38	4.46	4.27	4.65	1.8
	LUNG	4479	5110	4925	5293	8.89	7.85	7.55	8.15	-11.7
	BREAST	1993	2490	2364	2615	5.05	5.58	5.27	5.90	10.5
	UTERUS (CERVIX AND CORPUS)	1219	1330	1232	1429	2.80	2.65	2.44	2.86	-5.3
	OVARY	940	1120	1053	1196	2.26	2.21	2.04	2.37	-2.4
	BLADDER	303	360	316	409	0.50	0.46	0.40	0.52	-7.1
	LEUKAEMIAS	747	680	612	743	2.21	1.32	1.06	1.58	-40.5
	ALL CANCERS	27915	31740	30952	32522	59.28	52.54	50.99	54.10	-11.4
Australia	STOMACH	436	400	354	451	1.66	1.40	1.20	1.61	-15.2
	COLORECTUM	2462	2490	2352	2631	9.28	8.00	7.56	8.45	-13.8
	PANCREAS	1193	1330	1236	1420	4.64	4.55	4.25	4.86	-1.9
	LUNG	3255	3600	3471	3726	14.10	13.65	13.14	14.15	-3.2
	BREAST	2795	2900	2756	3039	13.21	11.68	11.10	12.26	-11.6
	UTERUS (CERVIX AND CORPUS)	646	720	661	773	2.98	2.91	2.65	3.18	-2.3
	OVARY	942	980	889	1062	4.15	3.74	3.38	4.11	-9.9
	BLADDER	331	290	245	331	1.02	0.76	0.64	0.88	-25.7
	LEUKAEMIAS	683	730	679	786	2.95	2.36	2.10	2.63	-19.7
	ALL CANCERS	18957	21250	20846	21645	78.36	74.68	73.37	75.99	-4.7

*ASR, age-standardized mortality rates using the World Standard Population.

Table 3. Age-standardized lung cancer mortality rates in quinquennia 2005-2009 and 2010-2014 and predicted rates for 2018 for all ages, 25-44, 45-64, 65-74, 75+ years age-groups in Russia and different selected Australasian countries, in men and women, with corresponding percent changes.

		Men						Women					
		ASR* 2005-2009	ASR* 2010-2014	Predicted ASR 2018*	Lower prediction limit (95%)	Upper prediction limit (95%)	% difference (2018/2010-14)	ASR* 2005-2009	ASR* 2010-2014	Predicted ASR 2018*	Lower prediction limit (95%)	Upper prediction limit (95%)	% difference (2018/2010-14)
Russian Federation	All ages	50.11	45.54	39.72	35.14	44.30	-12.8	5.51	5.52	5.34	4.84	5.84	-3.2
	Truncated 25-44 years	4.51	4.02	1.86	1.13	2.59	-53.7	1.13	1.28	1.14	0.93	1.35	-10.8
	Truncated 45-64 years	120.92	115.60	120.66	113.15	128.18	4.4	12.50	12.92	13.78	12.54	15.01	6.6
	Truncated 65-74 years	376.21	327.16	191.63	105.79	277.47	-41.4	34.98	33.93	29.60	21.26	37.94	-12.8
	Truncated 75+ years	352.31	303.93	334.64	299.17	370.12	10.1	53.24	50.20	46.19	40.25	52.13	-8.0
Israel	All ages	25.19	24.71	24.14	22.39	25.89	-2.3	8.99	9.71	9.02	8.28	9.76	-7.1
	Truncated 25-44 years	1.84	1.78	1.63	0.73	2.54	-8.2	1.22	0.91	1.16	0.56	1.76	27.3
	Truncated 45-64 years	51.10	48.60	50.10	45.27	54.93	3.1	18.18	20.36	17.21	14.49	19.92	-15.5
	Truncated 65-74 years	189.83	182.55	159.56	131.44	187.67	-12.6	57.95	62.72	60.95	53.98	67.91	-2.8
	Truncated 75+ years	273.50	292.00	309.53	288.90	330.16	6.0	115.58	122.52	120.20	101.65	138.76	-1.9
Hong Kong SAR	All ages	42.16	36.45	31.55	29.10	34.00	-13.4	16.09	15.36	15.41	14.11	16.71	0.4
	Truncated 25-44 years	4.15	2.93	2.16	0.29	4.03	-26.2	2.39	2.44	2.38	1.48	3.28	-2.5
	Truncated 45-64 years	71.11	61.28	55.17	48.64	61.70	-10.0	27.22	29.53	31.96	29.12	34.80	8.2
	Truncated 65-74 years	295.67	256.04	191.90	153.90	229.90	-25.1	96.94	88.70	82.23	59.94	104.52	-7.3
	Truncated 75+ years	637.50	560.04	545.44	505.94	584.93	-2.6	270.88	232.86	229.80	214.12	245.49	-1.3
Japan	All ages	28.87	27.39	24.73	24.01	25.46	-9.7	7.95	7.79	7.22	6.93	7.51	-7.3
	Truncated 25-44 years	1.95	1.56	1.41	1.13	1.70	-9.4	1.07	0.87	0.88	0.71	1.05	1.5
	Truncated 45-64 years	42.51	38.73	28.24	24.99	31.49	-27.1	13.69	12.72	8.98	7.66	10.31	-29.4
	Truncated 65-74 years	190.09	191.79	207.20	200.27	214.13	8.0	48.81	50.81	55.66	53.25	58.06	9.5
	Truncated 75+ years	537.16	500.05	431.52	424.67	438.37	-13.7	130.85	129.44	124.70	121.73	127.67	-3.7

		Men						Women					
		ASR* 2005-2009	ASR* 2010-2014	Predicted ASR 2018*	Lower prediction limit (95%)	Upper prediction limit (95%)	% difference (2018/2010-14)	ASR* 2005-2009	ASR* 2010-2014	Predicted ASR 2018*	Lower prediction limit (95%)	Upper prediction limit (95%)	% difference (2018/2010-14)
Philippines	All ages	23.01	20.91	17.89	17.04	18.75	-14.4	6.92	6.81	6.30	6.03	6.56	-7.5
	Truncated 25-44 years	2.63	2.63	2.31	1.99	2.63	-12.2	1.58	1.39	1.50	1.27	1.72	7.6
	Truncated 45-64 years	50.00	42.56	33.95	31.38	36.51	-20.2	14.46	14.51	13.33	12.57	14.09	-8.1
	Truncated 65-74 years	169.94	160.53	142.65	129.85	155.44	-11.1	45.08	44.58	39.94	36.22	43.66	-10.4
	Truncated 75+ years	210.95	199.78	181.65	167.86	195.45	-9.1	72.44	70.10	66.69	61.47	71.90	-4.9
Republic of Korea	All ages	39.44	34.71	28.58	27.65	29.50	-17.7	9.46	8.87	7.85	7.55	8.15	-11.5
	Truncated 25-44 years	1.67	1.53	1.03	0.57	1.49	-32.7	1.34	1.17	0.88	0.50	1.27	-24.4
	Truncated 45-64 years	52.38	42.20	32.93	31.41	34.45	-22.0	14.38	13.73	12.64	11.89	13.39	-7.9
	Truncated 65-74 years	320.75	266.73	216.39	202.24	230.54	-18.9	61.53	53.86	46.41	42.72	50.10	-13.8
	Truncated 75+ years	648.67	646.71	561.62	536.39	586.85	-13.2	164.04	162.34	144.94	137.47	152.42	-10.7
Australia	All ages	26.37	23.51	19.74	18.95	20.53	-16.0	14.16	13.96	13.65	13.14	14.15	-2.2
	Truncated 25-44 years	1.62	1.33	1.31	0.82	1.81	-1.1	1.46	1.10	0.92	0.61	1.23	-16.3
	Truncated 45-64 years	42.85	37.16	30.92	28.65	33.20	-16.8	28.13	26.60	27.49	25.56	29.42	3.4
	Truncated 65-74 years	198.27	176.39	153.35	142.55	164.16	-13.1	101.12	104.26	101.18	96.15	106.22	-3.0
	Truncated 75+ years	392.79	362.63	292.14	274.53	309.74	-19.4	167.77	169.09	155.82	144.44	167.19	-7.8

*ASR, age-standardized mortality rates using the World Standard Population.