Singapore Cancer Registry Annual Report 2018

National Registry of Diseases Office

31 Mar 2021

Staff of the Singapore Cancer Registry, Health Promotion Board

Group Director, Policy, Research & Surveillance Division	Dr Annie Ling
Deputy Director, National Registry of Diseases Office	Dr Foo Ling Li
Data Manager	Mr Eric Lee
Epidemiologist	Ms Kuo Simin
Quality Assurance	Ms Sandra Lim Ms Cai Mingshi
Registry Coordinators	Ms Lee Bee Guat (Team Leader) Ms Amy Yap Ms Gan Siew Ching Ms Haryati Abu Bakar Ms Ling Sing Nang Ms Sarjit Kaur Ms Shirlyn Choo Ms Yun Sou Har

Advisors

Professor, NUS Saw Swee Hock School of Public Health	Prof Chia Kee Seng
Visiting Consultant Pathologist, Singapore Cancer Registry Chairman and Senior Consultant, Division of Pathology, SGH	Prof Tan Puay Hoon

TABLE OF CONTENTS

SINGAPORE CANCER REGISTRY

The Singapore Cancer Registry (SCR) was first established in 1967 to collect information on all cancers diagnosed in Singapore from 1 January 1968 onwards. The key objective of setting up this registry was to obtain information on population-based cancer trends and patterns in Singapore.

LEGISLATION

The National Registry of Diseases (including the Singapore Cancer Registry) is governed by the National Registry of Diseases Act which was enacted in 2007. The Act ensures comprehensive coverage of reportable diseases through the mandatory reporting and collection of information from healthcare providers and ensures appropriate use of the information while maintaining patient confidentiality. The National Registry of Diseases (Cancer Notification) Regulations 2009 has been operational since 1 August 2009.

DATA SOURCES

Comprehensive cancer registration was achieved through data obtained from notifications received from (a) medical practitioners, (b) pathology laboratories, (c) haematology laboratories and departments, and (d) healthcare institutions.

IDENTIFICATION KEY

The primary identification key for Singapore residents (consisting citizens and permanent residents) is the National Registration Identity Card (NRIC) number. These unique numbers are used for updating existing records in the database and filtering duplicate records notified by multiple data sources.

VERIFICATION OF INFORMATION

All notifications were corroborated with clinical medical records. Registry coordinators (RCs) would review medical records to verify discrepancies in information and collect data to complete the registration of case records. A visiting consultant pathologist would be consulted for complex cases. Regular internal audits to assess the quality of the data were conducted and results from the audits showed that the registry achieved high inter-rater reliability (above 95%) for all data items.

CODING OF PRIMARY SITE AND HISTOLOGY

In this report, data on primary site was presented using the International Statistical Classification of Diseases and Related Health Problems, 10th Edition, Australian Modification (ICD-10-AM) [1]. The referenced sites and respective ICD-10-AM codes can be found in **Appendix 1**.

The Manual of Tumour Nomenclature and Coding (MOTNAC) [2] was used for histology coding up till 1992. Between 1993 and 2002, the SCR employed the International Classification of Diseases for Oncology, 2nd Edition (ICD-O-2) [3]. From 2003 onwards, the International Classification of Diseases for Oncology, 3rd Edition (ICD-O-3) was adopted [4]. In addition to ICD-O-3, the World Health Organisation (WHO) Classification of Tumours, 4th Edition volumes (also known as the Blue Books) were also used [5].

CANCER STAGING

The registry adopted stage grouping guidelines from the American Joint Committee on Cancer (AJCC) Cancer Staging Manual, 6th edition for cases diagnosed between 2003 and 2009, 7th edition for cases diagnosed from 2010 to 2017, and 8th edition for cases diagnosed from 2018 onwards [6] [7] [8].

STATISTICAL METHODS

This report is based on the anonymised data on all cases of malignant and borderline tumours diagnosed among Singapore residents (citizens and permanent residents) from 1 January 1968 through 31 December 2018 in Singapore, as they stood as of 31 December 2019. Mortality data were as they stood as of 31 December 2019.

CANCER INCIDENCE AND MORTALITY

Computation of cancer incidence excludes benign and in-situ tumours (behaviour codes '0' and '2' respectively).

Cancer incidence and mortality rates were calculated for all cancer sites combined, and for the most common cancer sites by gender, ethnicity, and age group. Incidence and mortality rates were age-standardised to adjust for differences in age structure in the Singapore resident population over time. Age-standardised incidence or mortality rates (ASIR or ASMR) were calculated as the sum of the weighted age-specific incidence or mortality rates using the direct method based on the Segi-Doll World Standards. The age-specific incidence or mortality rates are defined as the number of new cancer cases or deaths, in the specified time period by the population at risk for that age stratum.

The population estimates were used as the denominators to calculate incidence and mortality rates. Population denominators from 1968 to 2018 were obtained from the Department of Statistics (DOS) [9].

RELATIVE SURVIVAL

Single and multiple primary malignant tumours diagnosed in individuals aged 15 years and above were included for survival analysis in this report. Childhood cancer cases were not included in survival analysis because of their differences in biological characteristics, treatment protocols and survival outcomes. Multiple primary cases were included in accordance with the (European Cancer Registry) Eurocare-6 and CONCORD-3 study protocols [10] [11].

Cases based on Death Certificates Only (DCO i.e. cases which were registered based on mortality data) were excluded from the survival analysis since their survival time was unknown.

Relative survival is defined as the ratio of observed survival of the patients with the expected survival of a comparable group in the general population, matched according to factors believed to be associated with survival at baseline (gender, age and calendar year of diagnosis). In other words, it reflects the chances of survival assuming that cancer is the only possible cause of death.

The expected survival was estimated from the Singapore general population which included deaths from all causes. Population life tables for the period of 1968-2002 were constructed using the Mortpak software with deaths and population counts obtained from the DOS [12] [9] . Complete life tables for the period of 2003-2018 were available from the DOS [13].

The Brenner method is used for age-standardisation [14]. This was done so that age-standardised survival could still be obtained even if none of the patients within one or more age strata was followed up over the entire period of interest. Furthermore, this method also assures that age-adjustment using the study's population own age-distribution yields exactly the same result as obtained in the crude analysis. Analysis of five-year relative survival for the earliest five-year period, 1968-1972 was omitted, as there were insufficient cases available for analysis in one or more age groups.

Age-standardisation was performed using the International Cancer Survival Standards (ICSS) age categories for weights [15].

(1) TRENDS IN CANCER INCIDENCE AND MORTALITY, 1968-2018

1.1 Gender trends

Incidence and mortality of cancer by gender, 1968-2018

Since 1968, the age-standardised incidence rate (ASIR) of cancer had risen for both males and females. It increased from 228.2 to 235.8 per 100,000 population among males and from 155.0 to 231.6 per 100,000 population for females over the period spanning 1968-1972 to 2014-2018, thereby narrowing the gender gap (Figure 1.1.1, Table 1.1.1).

Over the same period, a similar pattern of a narrowing gender gap was also observed for cancer mortality, and there was an overall decrease in the age-standardised mortality rate (ASMR) of cancer among males from 122.1 to 96.5 per 100,000 population. The ASMR of cancer among females saw little overall change at 67.6 and 66.5 per 100,000 population in 1968-1972 and 2014-2018 respectively (Figure 1.1.1, Table 1.1.2). However, despite the narrowing gender gap, the ASIR and ASMR of cancer had remained consistently higher among males than females during this period.

Ten most frequent incident cancers and cancer deaths by gender, 2014-2018

For the latest five-year period of 2014-2018, a total of 36,187 diagnoses of cancer were made in males and 38,349 in females; while 15,429 males and 12,706 females died of cancer (Figure 1.1.2, Table 1.1.3). Among males, colorectal, prostate, and lung cancers comprised the three most frequent incident cancers, while the three most frequent incident cancers in females were breast, colorectal and lung cancers (Figure 1.1.2, Table 1.1.3). Colorectal cancer, the most common cancer in males, comprised about 17% of diagnoses with 6,129 cases; while breast cancer, the most common cancer in females with 11,232 diagnoses over five years, alone accounted for about three-tenths of all cancer diagnoses in females. Lung cancer was the leading cause of cancer death in males, accounting for 4,076 or more than a quarter of cancer deaths among males in 2014-2018, while breast cancer was the leading cause of cancer mortality in females, contributing 2,196 or about 17% of cancer deaths.

Figure 1.1.1 Age-standardised incidence and mortality rate (per 100,000 population) of cancer by gender, 1968-2018

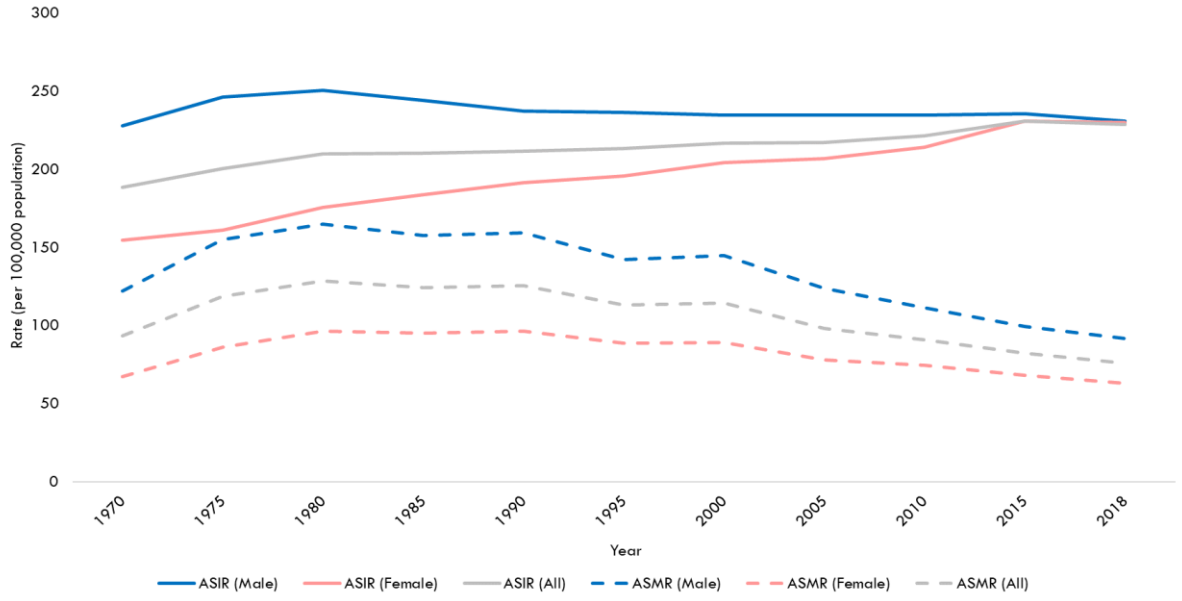


Table 1.1.1 Incidence number and age-standardised incidence rate (per 100,000 population) of cancer by gender, 1968-2018

		1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1993-1997
Male	**No.**	6986	8558	10126	11683	13642	16248
	ASIR	228.2	246.4	250.8	244.1	237.2	236.6
	(95% CI)	(222.4-234.0)	(240.9-251.8)	(245.8-255.8)	(239.6-248.6)	(233.2-241.3)	(232.9-240.3)
Female	**No.**	5087	6191	7993	10072	12765	15753
	ASIR	155.0	161.3	175.8	183.8	191.7	196.1
	(95% CI)	(150.6-159.3)	(157.2-165.4)	(171.9-179.8)	(180.2-187.5)	(188.3-195.1)	(192.9-199.2)
All	**No.**	12073	14749	18119	21755	26407	32001
	ASIR	188.7	200.7	210.2	210.6	211.7	213.3
	(95% CI)	(185.2-192.2)	(197.4-204.0)	(207.1-213.3)	(207.8-213.4)	(209.1-214.3)	(210.9-215.7)
		1998-2002	**2003-2007**	**2008-2012**	**2013-2017**	**2018**	**2014-2018**
Male	**No.**	19060	22381	27956	34727	7700	**36187**
	ASIR	234.9	235.0	235.0	235.7	230.8	**235.8**
	(95% CI)	(231.5-238.3)	(231.8-238.1)	(232.2-237.8)	(233.2-238.3)	(225.5-236.2)	**(233.3-238.3)**
Female	**No.**	19876	23614	29347	37021	8116	**38349**
	ASIR	204.5	207.1	214.1	230.8	230.3	**231.6**
	(95% CI)	(201.6-207.4)	(204.4-209.8)	(211.6-216.7)	(228.4-233.3)	(225.0-235.6)	**(229.1-234.0)**
All	**No.**	38936	45995	57303	71748	15816	**74536**
	ASIR	216.7	217.5	221.6	231.0	228.8	**231.6**
	(95% CI)	(214.5-218.9)	(215.4-219.5)	(219.7-223.4)	(229.3-232.8)	(225.0-232.5)	**(229.9-233.3)**

Table 1.1.2 Mortality number and age-standardised mortality rate (per 100,000 population) of cancer by gender, 1968-2018

		1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1993-1997
Male	**No.**	3675	5336	6545	7449	9035	9601
	ASMR	122.1	155.3	165.2	158.0	159.5	142.4
	(95% CI)	(117.9-126.4)	(151.0-159.7)	(161.1-169.3)	(154.3-161.6)	(156.2-162.8)	(139.5-145.2)
Female	**No.**	2191	3225	4281	5105	6366	7056
	ASMR	67.6	86.5	96.4	95.1	96.4	88.7
	(95% CI)	(64.8-70.5)	(83.4-89.5)	(93.5-99.3)	(92.5-97.8)	(94.0-98.9)	(86.6-90.9)
All	**No.**	5866	8561	10826	12554	15401	16657
	ASMR	93.4	119.0	128.6	124.3	125.7	113.2
	(95% CI)	(90.9-95.9)	(116.4-121.6)	(126.1-131.0)	(122.1-126.5)	(123.7-127.7)	(111.4-114.9)
		1998-2002	**2003-2007**	**2008-2012**	**2013-2017**	**2018**	**2014-2018**
Male	**No.**	11539	11691	13337	15191	3231	**15429**
	ASMR	145.0	123.9	111.4	99.7	92.0	**96.5**
	(95% CI)	(142.3-147.7)	(121.7-126.2)	(109.5-113.3)	(98.1-101.3)	(88.8-95.2)	**(95.0-98.1)**
Female	**No.**	8621	9181	11041	12539	2610	**12706**
	ASMR	89.1	78.1	74.7	68.5	63.3	**66.5**
	(95% CI)	(87.1-91.0)	(76.4-79.7)	(73.2-76.1)	(67.2-69.7)	(60.7-65.8)	**(65.3-67.7)**
All	**No.**	20160	20872	24378	27730	5841	**28135**
	ASMR	114.4	98.4	90.8	82.3	76.0	**79.8**
	(95% CI)	(112.8-116.0)	(97.0-99.8)	(89.6-92.0)	(81.3-83.3)	(74.0-78.0)	**(78.9-80.8)**

Figure 1.1.2 Ten most frequent incident cancers and cancer deaths by gender, 2014-2018

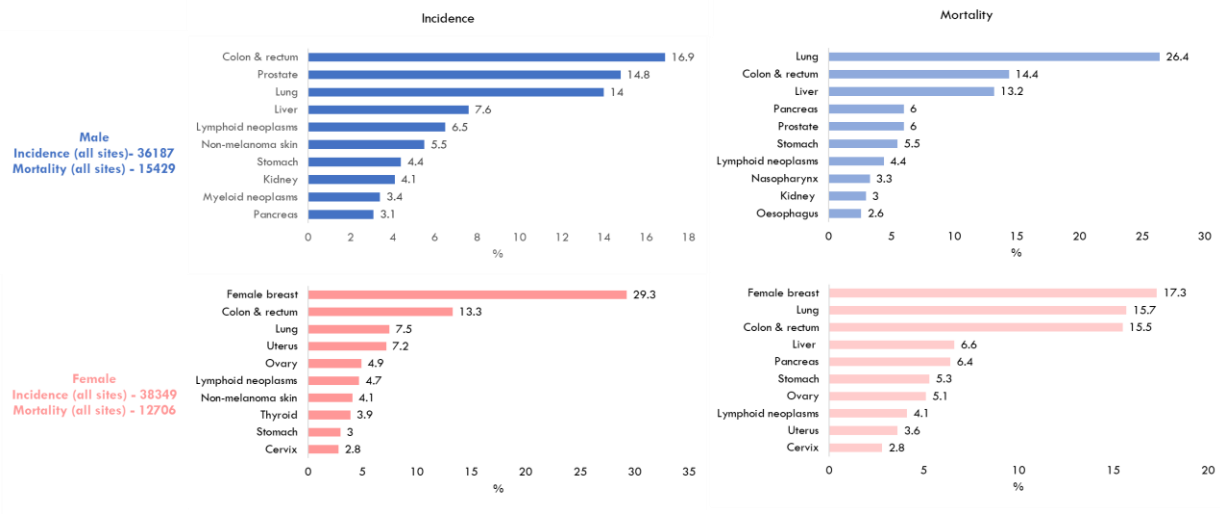


Table 1.1.3 Ten most frequent incident cancers and cancer deaths by gender, 2014-2018

Gender	Rank	Incidence			Mortality		
		Site	No.	%	Site	No.	%
Male	1	Colon & rectum	6129	16.9	Lung	4076	26.4
	2	Prostate	5368	14.8	Colon & rectum	2223	14.4
	3	Lung	5083	14.0	Liver	2036	13.2
	4	Liver	2758	7.6	Pancreas	930	6.0
	5	Lymphoid neoplasms	2358	6.5	Prostate	926	6.0
	6	Non-melanoma skin	1975	5.5	Stomach	850	5.5
	7	Stomach	1605	4.4	Lymphoid neoplasms	677	4.4
	8	Kidney	1494	4.1	Nasopharynx	502	3.3
	9	Myeloid neoplasms	1232	3.4	Kidney	456	3.0
	10	Pancreas	1119	3.1	Oesophagus	400	2.6
		All sites	**36187**	**100**	**All sites**	**15429**	**100**
Female	1	Female breast	11232	29.3	Female breast	2196	17.3
	2	Colon & rectum	5109	13.3	Lung	1992	15.7
	3	Lung	2862	7.5	Colon & rectum	1968	15.5
	4	Uterus	2769	7.2	Liver	843	6.6
	5	Ovary	1897	4.9	Pancreas	813	6.4
	6	Lymphoid neoplasms	1809	4.7	Stomach	675	5.3
	7	Non-melanoma skin	1568	4.1	Ovary	648	5.1
	8	Thyroid	1483	3.9	Lymphoid neoplasms	518	4.1
	9	Stomach	1160	3.0	Uterus	455	3.6
	10	Cervix	1088	2.8	Cervix	355	2.8
		All sites	**38349**	**100**	**All sites**	**12706**	**100**

1.1 Gender trends for incidence and mortality of cancer, 1968-2018

KEY POINTS

- The incidence rate of cancer had risen for both males and females during the period between 1968-1972 and 2014-2018.
- However, there had been a decrease in the age-standardised mortality rate of cancer for males, whereas there was little overall change among females.
- 36,187 males and 38,349 females were diagnosed with cancer in 2014-2018.
- 15,429 males and 12,706 females died of cancer in 2014-2018.
- Three most frequent incident cancers (2014-2018):
    - Males – colorectal, prostate, lung
    - Females – breast, colorectal, lung
- Three leading causes of cancer deaths (2014-2018):
    - Males – lung, colorectal, liver
    - Females – breast, lung, colorectal

1.2 Ethnic trends

Incidence and mortality of cancer by gender and ethnicity, 1968-2018

Among males, while the ASIR of cancer among the Chinese had decreased from 258.1 per 100,000 population in 1968-1972 to 242.4 per 100,000 population in 2014-2018, it had risen among the Malays and Indians instead, doubling from 96.2 to 212.8 per 100,000 population among the former, and rising less drastically overall with some fluctuations over the years from 125.4 to 155.1 per 100,000 population for the latter (Figure 1.2.1(a), Table 1.2.1(a)).

Among Chinese females, the ASIR of cancer rose from 158.5 to 235.0 per 100,000 population. As with their male counterparts, the ASIR of cancer in Malay females more than doubled over the years, from 98.5 per 100,000 population in 1968-1972 to 222.7 per 100,000 population in 2014-2018. Cancer incidence among Indian females had little overall change, remaining stable at 181.9 and 186.4 per 100,000 population in 1968-1972 and 2014-2018 respectively (Figure 1.2.1(b), Table 1.2.1(b)).

Similar to the incidence trends, cancer mortality had decreased from 140.4 to 98.7 per 100,000 population for Chinese males (Figure 1.2.1(a), Table 1.2.2(a)). However, it had risen drastically among Malay males, increasing more than twofold from 45.8 to 107.1 per 100,000 population. Among Indian males, the ASIR remained fairly stable at 60.5 and 63.2 per 100,000 population in 1968-1972 and 2014-2018 respectively.

Among females, an overall increase in cancer mortality over the years was only observed in the Malays – from 46.6 to 80.3 per 100,000 population, an almost twofold increase; whereas among the Chinese and Indian females, it remained similar at 68.4 and 65.7 per 100,000 population for the former and fell from 82.6 to 54.2 per 100,000 population for the latter (Figure 1.2.1(b), Table 1.2.2(b)).

Ten most frequent incident cancers by gender and ethnicity, 2014-2018

A total of 30,093 Chinese males and 31,357 Chinese females were diagnosed with cancer in 2014-2018. 3,310 Malay males and 3,913 Malay females were diagnosed with cancer; while 1,685 Indian males and 2,072 Indian females were diagnosed with cancer over this period (Figure 1.2.2, Table 1.2.3).

While colorectal, prostate, and lung cancer were the three most frequent incident cancers among Chinese and Indian males, lung and colorectal cancers and lymphoid neoplasms were the three most frequent incident cancers among Malay males (Figure 1.2.2, Table 1.2.3). The three most frequent incident cancers among Chinese, Malay and Indian males accounted for 40-47% of all diagnoses among the respective ethnicities.

Breast cancer was by far the most frequent incident cancer among females of all three ethnicities; especially among the Indians, amongst whom it comprised more than one-third of all diagnoses of cancer in 2014-2018 (Figure 1.2.2, Table 1.2.3). Colorectal and uterine cancer were also among the three most frequent incident cancers among Malays and Indians, whereas colorectal and lung cancers were the second and third most commonly diagnosed cancers in Chinese females. Notably, while cervical cancer was the tenth most frequent incident cancer among the female population as a whole during 2014-2018, it was among the ten most commonly diagnosed cancers only among the Malays in seventh place and had fallen out of the top ten list among Chinese and Indian females altogether.

Figure 1.2.1(a) Age-standardised incidence and mortality rate (per 100,000 population) of cancer in males by ethnicity, 1968-2018

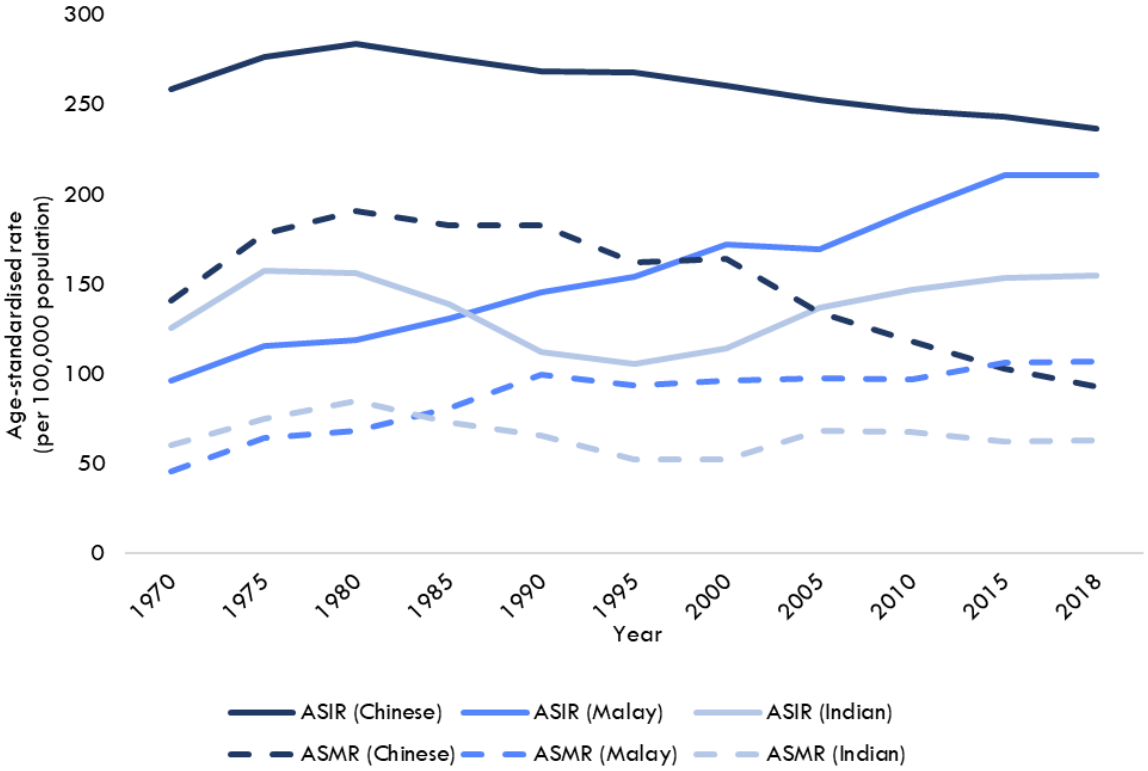


Figure 1.2.1(b) Age-standardised incidence and mortality rate (per 100,000 population) of cancer in females by ethnicity, 1968-2018

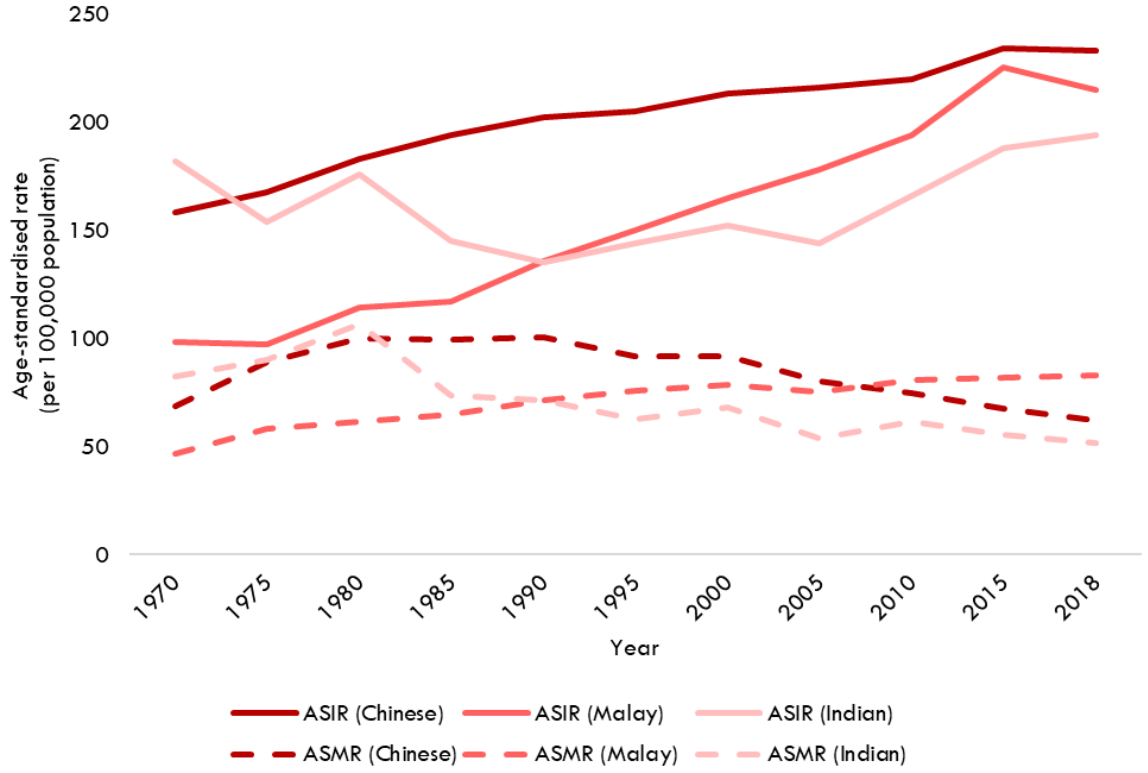


Table 1.2.1(a) Incidence number and age-standardised incidence rate (per 100,000 population) of cancer in males by ethnicity, 1968-2018

		1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1993-1997
Chinese	**No.**	6166	7466	8881	10156	11815	14083
	ASIR	258.1	276.2	283.7	275.6	268.6	267.5
	(95% CI)	(251.2-264.9)	(269.7-282.7)	(277.7-289.7)	(270.1-281.0)	(263.6-273.5)	(263.0-272.0)
Malay	**No.**	357	508	606	786	1013	1242
	ASIR	96.2	115.6	118.7	131.0	145.2	154.1
	(95% CI)	(84.5-107.9)	(104.6-126.6)	(108.6-128.9)	(121.3-140.6)	(136.0-154.4)	(145.2-163.0)
Indian	**No.**	398	499	537	622	625	696
	ASIR	125.4	157.3	155.9	139.0	112.3	105.8
	(95% CI)	(109.2-141.5)	(140.5-174.1)	(140.9-170.9)	(127.1-150.9)	(103.1-121.5)	(97.6-114.0)
		1998-2002	**2003-2007**	**2008-2012**	**2013-2017**	**2018**	**2014-2018**
Chinese	**No.**	16347	19157	23540	28928	6388	**30093**
	ASIR	260.6	252.4	246.4	242.8	236.4	**242.4**
	(95% CI)	(256.6-264.7)	(248.8-256.1)	(243.1-249.6)	(239.9-245.7)	(230.3-242.5)	**(239.6-245.3)**
Malay	**No.**	1591	1779	2367	3163	709	**3310**
	ASIR	172.0	169.3	190.6	210.4	210.2	**212.8**
	(95% CI)	(163.2-180.8)	(161.1-177.6)	(182.6-198.6)	(202.9-218.0)	(194.4-226.0)	**(205.3-220.3)**
Indian	**No.**	827	992	1282	1614	352	**1685**
	ASIR	113.9	136.8	146.6	153.1	154.4	**155.1**
	(95% CI)	(105.7-122.1)	(127.8-145.7)	(138.1-155.1)	(145.2-160.9)	(137.6-171.2)	**(147.4-162.9)**

Table 1.2.1(b) Incidence number and age-standardised incidence rate (per 100,000 population) of cancer in females by ethnicity, 1968-2018

		1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1993-1997
Chinese	**No.**	4460	5470	7031	8887	11204	13622
	ASIR	158.5	167.7	183.2	194.0	202.3	205.2
	(95% CI)	(153.8-163.2)	(163.2-172.2)	(178.9-187.6)	(189.9-198.1)	(198.5-206.2)	(201.7-208.8)
Malay	**No.**	368	411	574	734	1010	1338
	ASIR	98.5	97.3	114.5	117.0	135.6	149.8
	(95% CI)	(87.0-110.0)	(86.9-107.6)	(104.3-124.7)	(108.0-126.1)	(126.8-144.3)	(141.4-158.1)
Indian	**No.**	168	223	298	345	428	607
	ASIR	181.9	153.6	175.7	144.9	135.2	144.2
	(95% CI)	(146.2-217.5)	(129.5-177.6)	(152.1-199.4)	(127.2-162.6)	(121.2-149.2)	(131.6-156.9)
		1998-2002	**2003-2007**	**2008-2012**	**2013-2017**	**2018**	**2014-2018**
Chinese	**No.**	17026	20057	24329	30278	6610	**31357**
	ASIR	213.4	215.8	220.0	233.9	233.2	**235.0**
	(95% CI)	(210.1-216.7)	(212.7-218.9)	(217.0-222.9)	(231.1-236.8)	(227.1-239.2)	**(232.2-237.8)**
Malay	**No.**	1745	2208	2881	3836	808	**3913**
	ASIR	165.0	178.0	194.2	225.3	215.0	**222.7**
	(95% CI)	(156.9-173.0)	(170.3-185.8)	(186.9-201.6)	(217.9-232.6)	(199.7-230.2)	**(215.5-229.9)**
Indian	**No.**	849	1012	1466	1995	461	**2072**
	ASIR	152.3	143.7	166.0	187.7	193.8	**186.4**
	(95% CI)	(141.4-163.2)	(134.4-153.0)	(157.2-174.8)	(179.2-196.2)	(175.7-211.9)	**(178.2-194.7)**

Table 1.2.2(a) Mortality number and age-standardised mortality rate (per 100,000 population) of cancer in males by ethnicity, 1968-2018

		1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1993-1997
Chinese	**No.**	3318	4756	5871	6614	7900	8383
	ASMR (95% CI)	140.4 (135.3-145.4)	178.2 (173.0-183.5)	190.6 (185.7-195.6)	182.4 (177.9-186.9)	182.4 (178.3-186.4)	162.2 (158.7-165.8)
Malay	**No.**	164	301	343	476	686	730
	ASMR (95% CI)	45.8 (37.6-54.0)	64.6 (56.6-72.6)	68.3 (60.5-76.1)	80.9 (73.2-88.5)	99.7 (92.0-107.4)	93.6 (86.6-100.6)
Indian	**No.**	167	237	279	312	359	346
	ASMR (95% CI)	60.5 (47.3-73.7)	74.8 (63.9-85.6)	85.1 (73.6-96.6)	72.8 (64.0-81.7)	65.7 (58.5-72.9)	52.0 (46.3-57.7)
		1998-2002	**2003-2007**	**2008-2012**	**2013-2017**	**2018**	**2014-2018**
Chinese	**No.**	10051	10067	11420	12731	2677	**12847**
	ASMR (95% CI)	163.8 (160.6-167.0)	134.0 (131.4-136.7)	118.2 (116.0-120.4)	102.8 (101.0-104.7)	93.1 (89.5-96.7)	**98.7 (97.0-100.4)**
Malay	**No.**	868	1004	1188	1606	363	**1674**
	ASMR (95% CI)	96.3 (89.7-103.0)	97.7 (91.4-104.1)	97.0 (91.2-102.7)	106.3 (100.9-111.6)	106.7 (95.5-117.9)	**107.1 (101.8-112.4)**
Indian	**No.**	396	505	580	661	151	**695**
	ASMR (95% CI)	52.1 (46.6-57.5)	68.2 (62.0-74.5)	67.8 (62.0-73.6)	62.6 (57.6-67.6)	62.8 (52.6-73.0)	**63.2 (58.4-68.1)**

Table 1.2.2(b) Mortality number and age-standardised mortality rate (per 100,000 population) of cancer in females by ethnicity, 1968-2018

		1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1993-1997
Chinese	**No.**	1913	2844	3789	4532	5617	6133
	ASMR (95% CI)	68.4 (65.3-71.5)	89.0 (85.7-92.2)	99.8 (96.6-103.0)	99.7 (96.7-102.6)	100.8 (98.1-103.6)	91.9 (89.5-94.3)
Malay	**No.**	166	223	291	368	497	640
	ASMR (95% CI)	46.6 (38.6-54.5)	58.2 (49.8-66.6)	61.4 (53.7-69.0)	64.8 (57.8-71.8)	71.3 (64.8-77.8)	75.9 (69.8-82.0)
Indian	**No.**	75	113	151	156	198	228
	ASMR (95% CI)	82.6 (59.0-106.3)	90.0 (70.1-109.9)	106.6 (87.0-126.2)	73.4 (60.1-86.8)	71.3 (60.5-82.1)	62.4 (53.5-71.3)
		1998-2002	**2003-2007**	**2008-2012**	**2013-2017**	**2018**	**2014-2018**
Chinese	**No.**	7404	7861	9237	10332	2118	**10434**
	ASMR (95% CI)	91.5 (89.3-93.7)	80.2 (78.3-82.0)	74.9 (73.3-76.5)	67.8 (66.4-69.2)	61.8 (58.9-64.6)	**65.7 (64.4-67.1)**
Malay	**No.**	779	887	1165	1447	328	**1484**
	ASMR (95% CI)	78.4 (72.7-84.1)	75.4 (70.3-80.6)	81.0 (76.2-85.9)	81.6 (77.2-85.9)	83.1 (73.9-92.3)	**80.3 (76.1-84.5)**
Indian	**No.**	343	351	511	592	128	**610**
	ASMR (95% CI)	68.1 (60.4-75.8)	53.7 (47.8-59.5)	61.3 (55.8-66.8)	55.5 (50.9-60.1)	51.6 (42.6-60.7)	**54.2 (49.8-58.6)**

Figure 1.2.2 Ten most frequent incident cancers by gender and ethnicity, 2014-2018

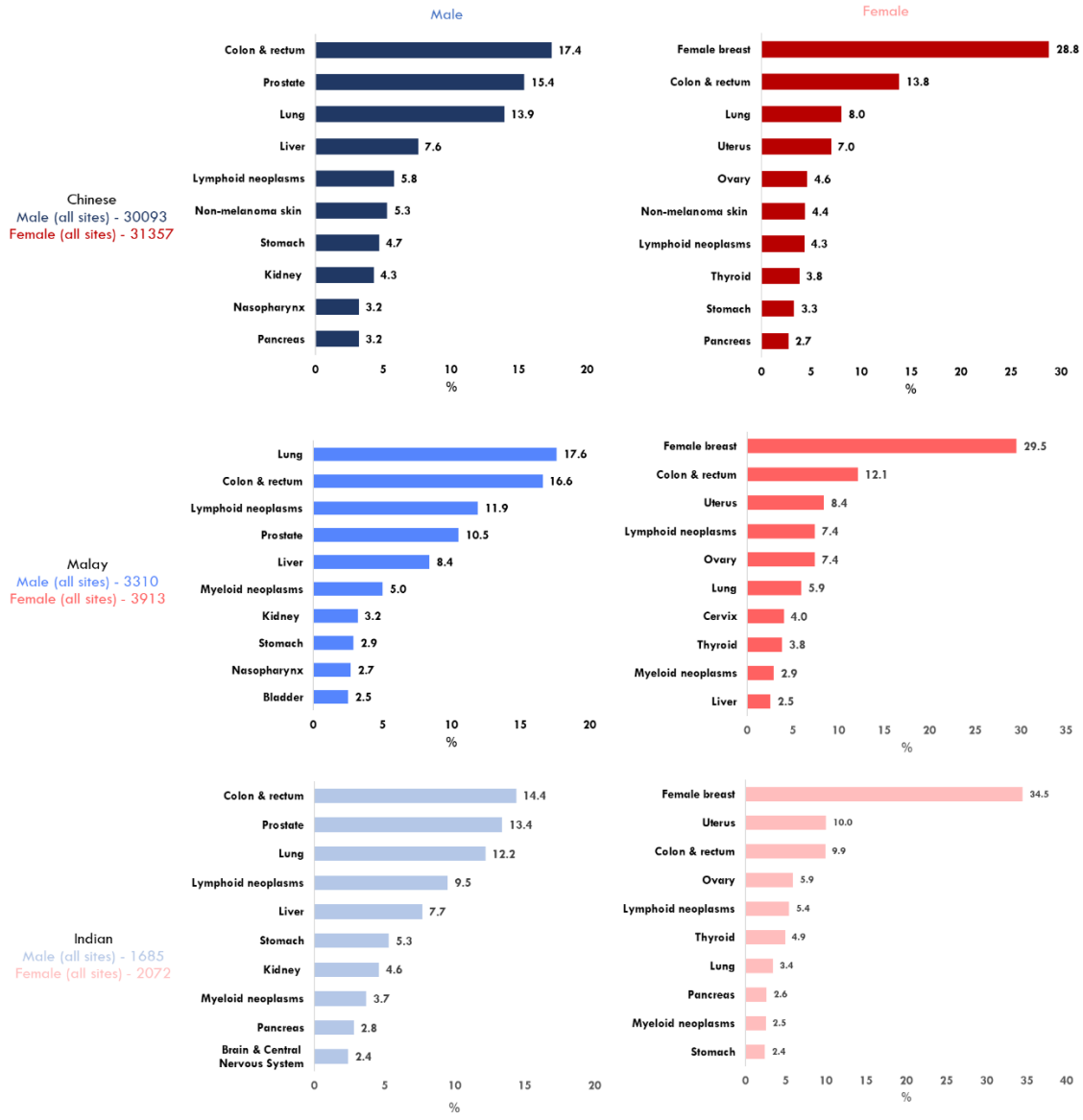


Table 1.2.3 Ten most frequent incident cancers by gender and ethnicity, 2014-2018

Ethnicity	Rank	Male			Female		
		Site	No.	%	Site	No.	%
Chinese	1	Colon & rectum	5229	17.4	Female breast	9036	28.8
	2	Prostate	4638	15.4	Colon & rectum	4325	13.8
	3	Lung	4195	13.9	Lung	2513	8.0
	4	Liver	2299	7.6	Uterus	2182	7.0
	5	Lymphoid neoplasms	1733	5.8	Ovary	1439	4.6
	6	Non-melanoma skin	1597	5.3	Non-melanoma skin	1382	4.4
	7	Stomach	1400	4.7	Lymphoid neoplasms	1358	4.3
	8	Kidney	1285	4.3	Thyroid	1180	3.8
	9	Pancreas	969	3.2	Stomach	1033	3.3
	10	Nasopharynx	969	3.2	Pancreas	852	2.7
		All sites	**30093**	**100.0**	**All sites**	**31357**	**100.0**
Malay	1	Lung	583	17.6	Female breast	1155	29.5
	2	Colon & rectum	548	16.6	Colon & rectum	474	12.1
	3	Lymphoid neoplasms	393	11.9	Uterus	327	8.4
	4	Prostate	348	10.5	Lymphoid neoplasms	290	7.4
	5	Liver	278	8.4	Ovary	288	7.4
	6	Myeloid neoplasms	165	5.0	Lung	229	5.9
	7	Kidney	107	3.2	Cervix	157	4.0
	8	Stomach	97	2.9	Thyroid	149	3.8
	9	Nasopharynx	88	2.7	Myeloid neoplasms	114	2.9
	10	Bladder	84	2.5	Liver	97	2.5
		All sites	**3310**	**100.0**	**All sites**	**3913**	**100.0**
Indian	1	Colon & rectum	243	14.4	Female breast	715	34.5
	2	Prostate	226	13.4	Uterus	208	10.0
	3	Lung	205	12.2	Colon & rectum	205	9.9
	4	Lymphoid neoplasms	160	9.5	Ovary	122	5.9
	5	Liver	129	7.7	Lymphoid neoplasms	112	5.4
	6	Stomach	89	5.3	Thyroid	101	4.9
	7	Kidney	77	4.6	Lung	70	3.4
	8	Myeloid neoplasms	62	3.7	Pancreas	53	2.6
	9	Pancreas	47	2.8	Myeloid neoplasms	51	2.5
	10	Brain & Central Nervous System	41	2.4	Stomach	50	2.4
		All sites	**1685**	**100.0**	**All sites**	**2072**	**100.0**

1.2 Ethnic trends for incidence and mortality of cancer, 1968-2018

KEY POINTS

- The incidence rate of cancer had decreased for Chinese males, but increased instead for Malay and Indian males between 1968-1972 and 2014-2018.
- The incidence rate of cancer had increased for Chinese and Malay females but saw little overall change for Indian females between 1968-1972 and 2014-2018.
- The mortality rate of cancer decreased among Chinese males over the years but increased for Malay males. Among Indian males, it remained relatively stable.
- Among females, an overall increase in cancer mortality rates was only observed in the Malays.
- Colorectal and lung cancers were among the three most frequent incident cancers in males for all three ethnic groups.
- Breast cancer was by far the leading cancer diagnosed in females of all three ethnic groups.

1.3 Age group trends

Incidence and mortality of cancer by age group, 1968-2018

Between 1968-1972 and 2014-2018, the proportion of all diagnoses of cancer among the younger age groups had fallen; while that among the older age groups had correspondingly increased (Figure 1.3.1(a), Figure 1.3.1(b)). This pattern was found for both genders. This is a result of an increase in life expectancy over the years, as more individuals are expected to survive past their 80s, when age-specific incidence rate of cancer is at its highest. Over the years, the median age at diagnosis for cancer had also risen for both males and females.

Among males, the proportion of individuals diagnosed with cancer under 40 years of age had fallen from 12.1% in 1968-1972 to 4.5% in 2014-2018 (Table 1.3.1(a)). On the other hand, the proportion of diagnoses at the age of 70 years and above had risen from 15.7% to 41.6% during the same period. Across the years, individuals aged 60-69 years made up the largest age group among cancer patients in almost every five-year period. The median age at diagnosis had risen from 59.6 years in 1968-1972 to 67.6 years in 2014-2018.

Among females, 16.9% of all cancer diagnoses occurred under the age of 40 years in 1968-1972, and this had fallen to 7.6% in 2014-2018 (Table 1.3.1(b)). Correspondingly, the proportion of diagnoses among those aged 70 years and above had risen from 17% to 32.3% over the same period. As with their male counterparts, the 60-69 years age band was also the biggest age group among individuals diagnosed with cancer across most five-year periods from 1968-2018. Similar to the pattern observed in males, the median age at diagnosis for females had also seen an increase from 57.3 years in 1968-1972 to 62.6 years in 2014-2018. However, the median age at diagnosis for females was lower than that of males for every five-year period.

The risk of developing and dying from cancer increases with age, as shown by both the age-specific incidence and mortality rates of cancer which increased with age for males as well as females (Figure 1.3.2(a), Figure 1.3.2(b)). For the period 2014-2018, among those below 60 years of age, women had a higher age-specific incidence rate of cancer compared to men; whereas the age-specific incidence rate of cancer among males increased sharply after 60 years of age to overtake that of females (Table 1.3.2(a), Table 1.3.2(b)).

In 2014-2018, the age-specific incidence rate of cancer among males aged under 30 years was 23.0 per 100,000 population, and this rose to 2900.2 per 100,000 population among the oldest age group of 80 years and above – an increase of more than a hundred-fold (Table 1.3.2(a)). Likewise, the age-specific incidence rate of cancer among females also rose from 27.7 per 100,000 under the age of 30 years to 1811.4 per 100,000 population from the age of 80 years onwards (Table 1.3.2(b)). Similar to the age-specific incidence trends, the age-specific cancer mortality rates increased from 3.0 and 2.1 per 100,000 population for males and females aged under 30 years to 1994.7 and 1217.7 per 100,000 population for males and females aged 80 years and beyond respectively.

Ten most frequent incident cancers by gender and age group, 2014-2018

The pattern of the ten most frequent incident cancers for males and females also differed by age group (Figure 1.3.3, Table 1.3.3). In the period 2014-2018, lymphoid neoplasms were the most common diagnosis in males aged under 30 years, accounting for one in three diagnoses of cancer in this age group. Lung cancer, while less common in younger males, was the most common diagnosis in males aged 80 years and above, accounting for almost one-fifth of all incident cancers among males in that age group. The two other most common cancers diagnosed in older males were colorectal and prostate cancers.

Among females, lymphoid neoplasms were also the most common diagnosis for those before 30 years of age, accounting for about one-fifth of all incident cases of cancer in that age group. However, between the ages of 30 to 79 years, breast cancer was the most common diagnosis, accounting for a

high of nearly half of all diagnoses of cancer in the 40-49 age band. As with males, colorectal cancer was also common among older females.

Figure 1.3.1(a) Distribution of age at diagnosis (%) of all cancer in males, 1968-2018

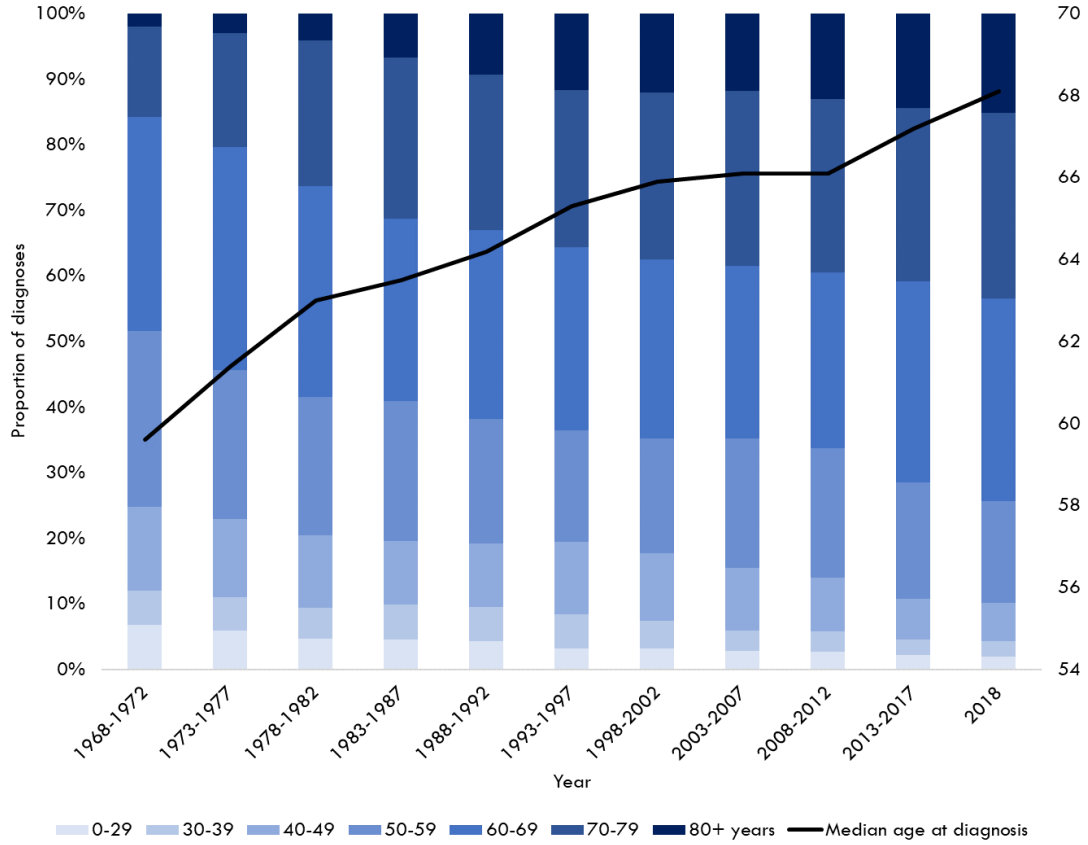


Figure 1.3.1(b) Distribution of age at diagnosis (%) of all cancer in females, 1968-2018

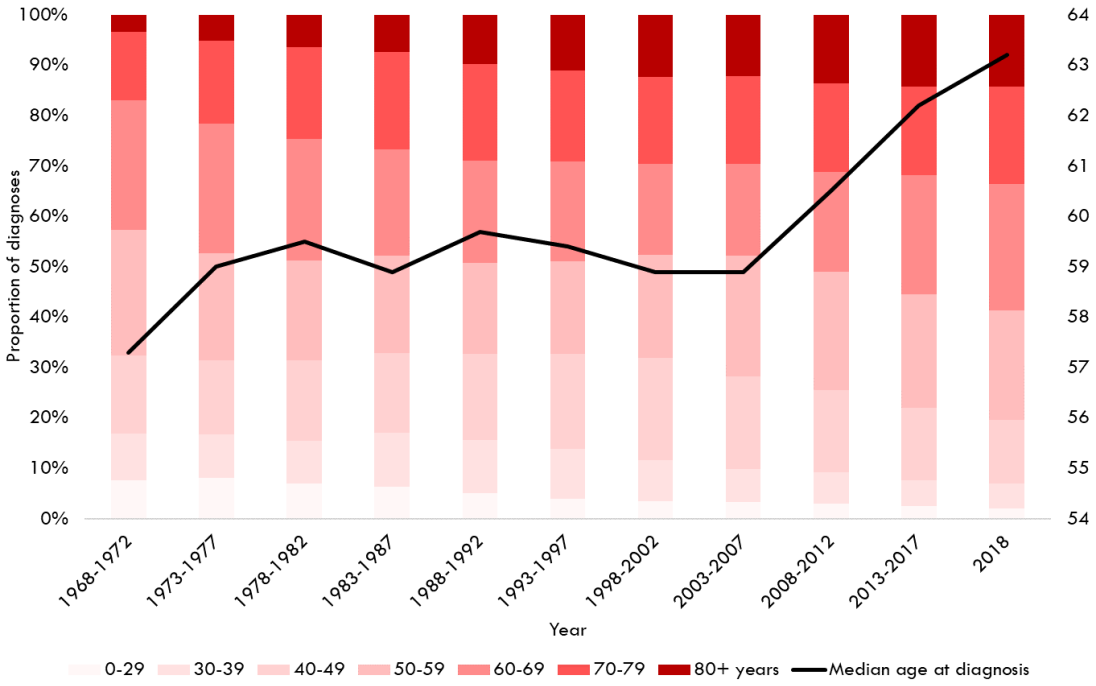


Table 1.3.1(a) Distribution of age at diagnosis (%) of all cancer in males, 1968-2018

Age group	1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1993-1997
0-29 years	6.8	6.0	4.7	4.6	4.3	3.3
30-39 years	5.3	5.0	4.7	5.3	5.2	5.2
40-49 years	12.7	12.0	11.1	9.7	9.7	11.0
50-59 years	26.8	22.6	21.1	21.4	19.0	17.0
60-69 years	32.7	34.0	32.1	27.7	28.7	28.0
70-79 years	13.7	17.3	22.2	24.6	23.7	23.9
80+ years	2.0	3.0	4.1	6.7	9.3	11.7
Median age at diagnosis	59.6	61.4	63.0	63.5	64.2	65.3

Age group	1998-2002	2003-2007	2008-2012	2013-2017	2018	2014-2018
0-29 years	3.3	2.9	2.8	2.3	2.0	**2.2**
30-39 years	4.2	3.1	3.0	2.3	2.3	**2.3**
40-49 years	10.3	9.5	8.2	6.2	5.9	**6.0**
50-59 years	17.4	19.7	19.7	17.7	15.5	**16.9**
60-69 years	27.4	26.4	26.8	30.7	30.9	**31.1**
70-79 years	25.4	26.6	26.5	26.4	28.3	**26.9**
80+ years	12.0	11.8	13.0	14.4	15.1	**14.7**
Median age at diagnosis	65.9	66.1	66.1	67.2	68.1	67.6

Table 1.3.1(b) Distribution of age at diagnosis (%) of all cancer in females, 1968-2018

Age group	1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1993-1997
0-29 years	7.6	8.1	7.0	6.4	5.1	3.9
30-39 years	9.3	8.7	8.4	10.7	10.5	9.9
40-49 years	15.5	14.6	16.0	15.7	17.1	18.9
50-59 years	24.8	21.4	19.9	19.3	18.2	18.3
60-69 years	25.7	25.7	24.0	21.2	20.3	19.8
70-79 years	13.7	16.5	18.3	19.2	19.2	18.1
80+ years	3.3	5.1	6.4	7.4	9.7	11.0
Median age at diagnosis	57.3	59.0	59.5	58.9	59.7	59.4

Age group	1998-2002	2003-2007	2008-2012	2013-2017	2018	2014-2018
0-29 years	3.5	3.3	3.0	2.6	2.1	**2.5**
30-39 years	8.1	6.6	6.2	5.1	4.9	**5.1**
40-49 years	20.4	18.4	16.3	14.3	12.6	**13.8**
50-59 years	20.3	23.9	23.5	22.6	21.8	**22.2**
60-69 years	18.2	18.2	19.8	23.6	25.0	**24.2**
70-79 years	17.2	17.4	17.6	17.6	19.3	**18.0**
80+ years	12.3	12.2	13.6	14.2	14.3	**14.3**
Median age at diagnosis	58.9	58.9	60.5	62.2	63.2	62.6

Figure 1.3.2(a) Age-specific incidence and mortality rate (per 100,000 population) of cancer in males, 2014-2018

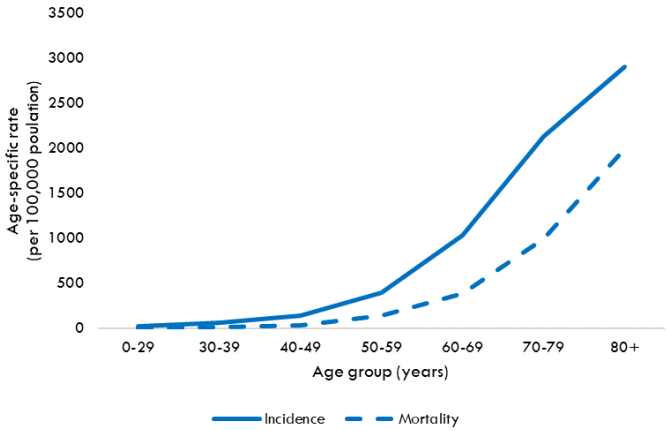


Figure 1.3.2(b) Age-specific incidence and mortality rate (per 100,000 population) of cancer in females, 2014-2018

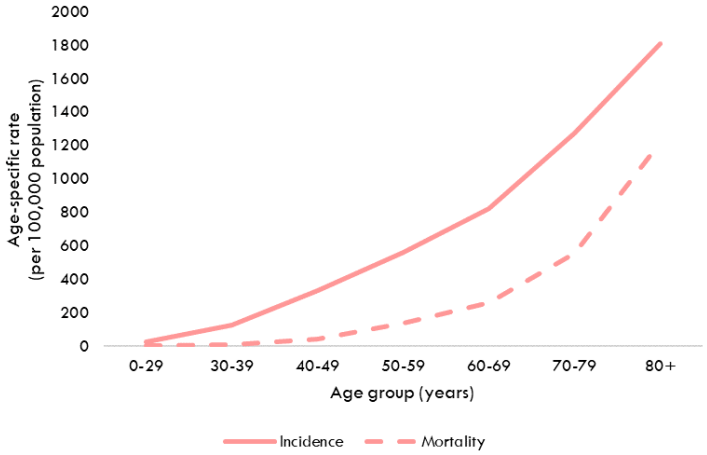


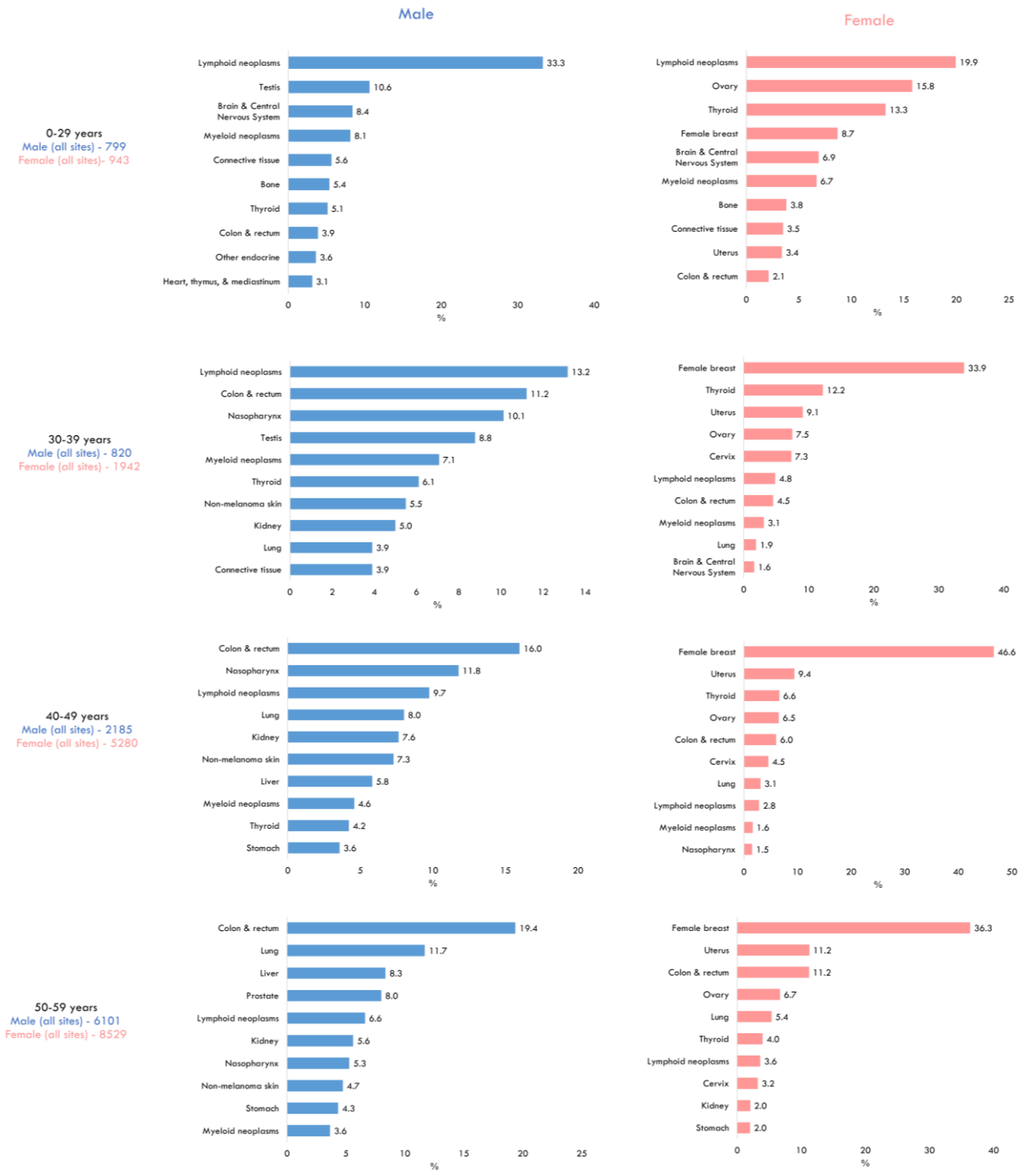
Table 1.3.2(a) Age-specific incidence and mortality number and rate (per 100,000 population) of cancer in males, 2014-2018

Age group (years)		0-29	30-39	40-49	50-59	60-69	70-79	80+
Incidence	No.	799	820	2185	6101	11237	9728	5317
	Age-specific rate (95% CI)	23.0 (21.4-24.6)	58.7 (54.7-62.7)	145.1 (139.0-151.2)	398.2 (388.2-408.2)	1029.1 (1010.0-1048.1)	2128.4 (2086.1-2170.6)	2900.2 (2822.2-2978.1)
Mortality	No.	103	142	577	2147	4251	4552	3657
	Age-specific rate (95% CI)	3.0 (2.4-3.5)	10.2 (8.5-11.8)	38.3 (35.2-41.4)	140.1 (134.2-146.1)	389.3 (377.6-401.0)	995.9 (967.0-1024.8)	1994.7 (1930.1-2059.4)

Table 1.3.2(b) Age-specific incidence and mortality number and rate (per 100,000 population) of cancer in females, 2014-2018

Age group (years)		0-29	30-39	40-49	50-59	60-69	70-79	80+
Incidence	No.	943	1942	5280	8529	9266	6894	5495
	Age-specific rate (95% CI)	27.7 (25.9-29.5)	126.0 (120.4-131.6)	334.2 (325.2-343.3)	559.3 (547.4-571.1)	824.4 (807.6-841.2)	1272.1 (1242.0-1302.1)	1811.4 (1763.5-1859.3)
Mortality	No.	71	180	717	2120	2917	3007	3694
	Age-specific rate (95% CI)	2.1 (1.6-2.6)	11.7 (10.0-13.4)	45.4 (42.1-48.7)	139.0 (133.1-144.9)	259.5 (250.1-269.0)	554.8 (535.0-574.7)	1217.7 (1178.4-1257.0)

Figure 1.3.3 Ten most frequent incident cancers by gender and age group, 2014-2018



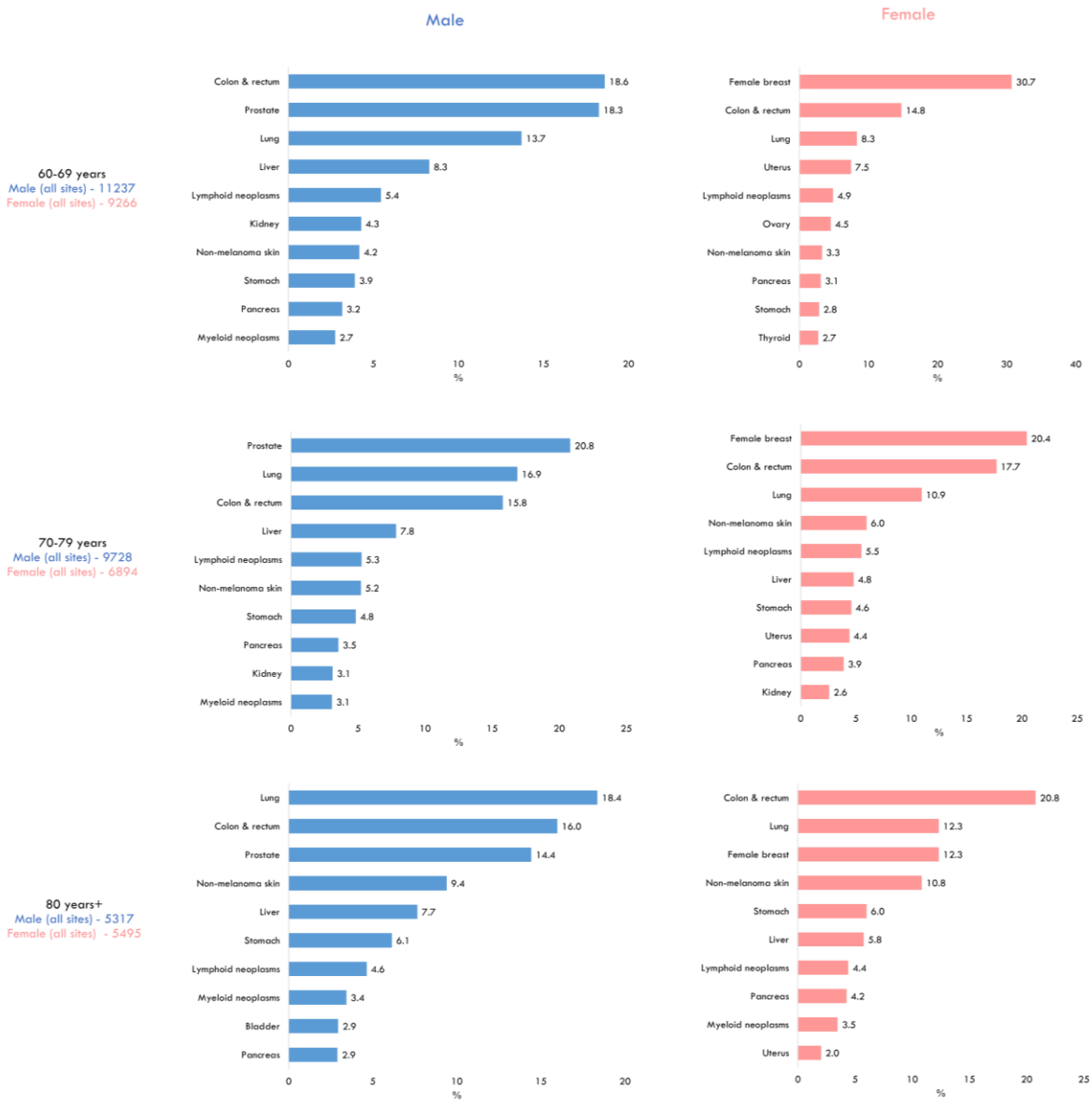

Male
Female
60-69 years
Male (all sites) - 11237
Female (all sites) - 9266
Colon & rectum 18.6
Prostate 18.3
Lung 13.7
Liver 8.3
Lymphoid neoplasms 5.4
Kidney 4.3
Non-melanoma skin 4.2
Stomach 3.9
Pancreas 3.2
Myeloid neoplasms 2.7
0 5 10 15 20
%
Female breast 30.7
Colon & rectum 14.8
Lung 8.3
Uterus 7.5
Lymphoid neoplasms 4.9
Ovary 4.5
Non-melanoma skin 3.3
Pancreas 3.1
Stomach 2.8
Thyroid 2.7
0 10 20 30 40
%
70-79 years
Male (all sites) - 9728
Female (all sites) - 6894
Prostate 20.8
Lung 16.9
Colon & rectum 15.8
Liver 7.8
Lymphoid neoplasms 5.3
Non-melanoma skin 5.2
Stomach 4.8
Pancreas 3.5
Kidney 3.1
Myeloid neoplasms 3.1
0 5 10 15 20 25
%
Female breast 20.4
Colon & rectum 17.7
Lung 10.9
Non-melanoma skin 6.0
Lymphoid neoplasms 5.5
Liver 4.8
Stomach 4.6
Uterus 4.4
Pancreas 3.9
Kidney 2.6
0 5 10 15 20 25
%
80 years+
Male (all sites) - 5317
Female (all sites) - 5495
Lung 18.4
Colon & rectum 16.0
Prostate 14.4
Non-melanoma skin 9.4
Liver 7.7
Stomach 6.1
Lymphoid neoplasms 4.6
Myeloid neoplasms 3.4
Bladder 2.9
Pancreas 2.9
0 5 10 15 20
%
Colon & rectum 20.8
Lung 12.3
Female breast 12.3
Non-melanoma skin 10.8
Stomach 6.0
Liver 5.8
Lymphoid neoplasms 4.4
Pancreas 4.2
Myeloid neoplasms 3.5
Uterus 2.0
0 5 10 15 20 25
%

Table 1.3.3 Ten most frequent incident cancers by gender and age group, 2014-2018

Age group	Rank	Male			Female		
		Site	No.	%	Site	No.	%
0-29 years	1	Lymphoid neoplasms	266	33.3	Lymphoid neoplasms	188	19.9
	2	Testis	85	10.6	Ovary	149	15.8
	3	Brain & Central Nervous System	67	8.4	Thyroid	125	13.3
	4	Myeloid neoplasms	65	8.1	Female breast	82	8.7
	5	Connective tissue	45	5.6	Brain & Central Nervous System	65	6.9
	6	Bone	43	5.4	Myeloid neoplasms	63	6.7
	7	Thyroid	41	5.1	Bone	36	3.8
	8	Colon & rectum	31	3.9	Connective tissue	33	3.5
	9	Other endocrine	29	3.6	Uterus	32	3.4
	10	Heart, thymus, & mediastinum	25	3.1	Colon & rectum	20	2.1
		All sites	**799**	**100.0**	**All sites**	**943**	**100.0**
30-39 years	1	Lymphoid neoplasms	108	13.2	Female breast	658	33.9
	2	Colon & rectum	92	11.2	Thyroid	236	12.2
	3	Nasopharynx	83	10.1	Uterus	176	9.1
	4	Testis	72	8.8	Ovary	145	7.5
	5	Myeloid neoplasms	58	7.1	Cervix	142	7.3
	6	Thyroid	50	6.1	Lymphoid neoplasms	94	4.8
	7	Non-melanoma skin	45	5.5	Colon & rectum	88	4.5
	8	Kidney	41	5.0	Myeloid neoplasms	60	3.1
	9	Connective tissue	32	3.9	Lung	37	1.9
	10	Lung	32	3.9	Brain & Central Nervous System	31	1.6
		All sites	**820**	**100.0**	**All sites**	**1942**	**100.0**
40-49 years	1	Colon & rectum	349	16.0	Female breast	2460	46.6
	2	Nasopharynx	257	11.8	Uterus	496	9.4
	3	Lymphoid neoplasms	213	9.7	Thyroid	348	6.6
	4	Lung	175	8.0	Ovary	343	6.5
	5	Kidney	167	7.6	Colon & rectum	318	6.0
	6	Non-melanoma skin	159	7.3	Cervix	240	4.5
	7	Liver	127	5.8	Lung	163	3.1
	8	Myeloid neoplasms	100	4.6	Lymphoid neoplasms	148	2.8
	9	Thyroid	92	4.2	Myeloid neoplasms	85	1.6
	10	Stomach	78	3.6	Nasopharynx	81	1.5
		All sites	**2185**	**100.0**	**All sites**	**5280**	**100.0**
50-59 years	1	Colon & rectum	1181	19.4	Female breast	3100	36.3
	2	Lung	713	11.7	Uterus	958	11.2
	3	Liver	509	8.3	Colon & rectum	954	11.2
	4	Prostate	487	8.0	Ovary	569	6.7
	5	Lymphoid neoplasms	403	6.6	Lung	457	5.4
	6	Kidney	342	5.6	Thyroid	339	4.0
	7	Nasopharynx	322	5.3	Lymphoid neoplasms	307	3.6
	8	Non-melanoma skin	288	4.7	Cervix	274	3.2
	9	Stomach	264	4.3	Kidney	172	2.0
	10	Myeloid neoplasms	222	3.6	Stomach	169	2.0
		All sites	**6101**	**100.0**	**All sites**	**8529**	**100.0**
60-69 years	1	Colon & rectum	2090	18.6	Female breast	2847	30.7
	2	Prostate	2052	18.3	Colon & rectum	1368	14.8
	3	Lung	1541	13.7	Lung	772	8.3
	4	Liver	931	8.3	Uterus	693	7.5
	5	Lymphoid neoplasms	611	5.4	Lymphoid neoplasms	452	4.9
	6	Kidney	480	4.3	Ovary	421	4.5
	7	Non-melanoma skin	469	4.2	Non-melanoma skin	302	3.3
	8	Stomach	438	3.9	Pancreas	287	3.1
	9	Pancreas	355	3.2	Stomach	263	2.8
	10	Myeloid neoplasms	308	2.7	Thyroid	250	2.7
		All sites	**11237**	**100.0**	**All sites**	**9266**	**100.0**
70-79 years	1	Prostate	2024	20.8	Female breast	1409	20.4
	2	Lung	1641	16.9	Colon & rectum	1220	17.7
	3	Colon & rectum	1537	15.8	Lung	754	10.9
	4	Liver	763	7.8	Non-melanoma skin	411	6.0
	5	Lymphoid neoplasms	511	5.3	Lymphoid neoplasms	378	5.5
	6	Non-melanoma skin	507	5.2	Liver	330	4.8
	7	Stomach	470	4.8	Stomach	315	4.6
	8	Pancreas	343	3.5	Uterus	303	4.4
	9	Kidney	302	3.1	Pancreas	268	3.9
	10	Myeloid neoplasms	297	3.1	Kidney	178	2.6
		All sites	**9728**	**100.0**	**All sites**	**6894**	**100.0**
80+ years	1	Lung	976	18.4	Colon & rectum	1141	20.8
	2	Colon & rectum	849	16.0	Female breast	676	12.3
	3	Prostate	767	14.4	Lung	676	12.3
	4	Non-melanoma skin	499	9.4	Non-melanoma skin	595	10.8
	5	Liver	407	7.7	Stomach	329	6.0
	6	Stomach	326	6.1	Liver	316	5.8
	7	Lymphoid neoplasms	246	4.6	Lymphoid neoplasms	242	4.4
	8	Myeloid neoplasms	182	3.4	Pancreas	233	4.2
	9	Bladder	156	2.9	Myeloid neoplasms	191	3.5
	10	Pancreas	154	2.9	Uterus	111	2.0
		All sites	**5317**	**100.0**	**All sites**	**5495**	**100.0**

1.3 Age group trends for incidence and mortality of cancer, 1968-2018

KEY POINTS

- There had been a shift towards a greater proportion of cancer diagnoses among the older age groups.
- The median age at diagnosis for cancer had risen for both genders over the years, and was consistently higher for males than females.
- The 60-69 age group was the biggest age band among cancer diagnoses for the majority of the five-year periods for both males and females.
- The risk of developing and dying from cancer increased with age as age-specific incidence and mortality rates rose with age.
- Lymphoid neoplasms were the most common diagnosis in younger males while lung, colorectal, and prostate cancers were more common among older males.
- Breast cancer was the most common diagnosis in females aged 30 – 79 years; colorectal cancer was also common among older females.

(2) TRENDS IN CANCER SURVIVAL, 1968-2018

2.1 Five-year age-standardised relative survival (ASRS) for all cancers, 1968-2018

Gender trends

The five-year age-standardised relative survival (ASRS) of all cancers had improved for males as well as females over the years (Figure 2.1.1, Table 2.1.1). Among males, the five-year ASRS increased from 13.2% in 1973-1977 to 52.1% in 2014-2018. Similarly, that for females rose from 28.1% to 61.1% over the same period. Notably, the five-year ASRS in every five-year period was better for females than for males.

Ethnic trends

For all three ethnic groups, the five-year ASRS of cancer had increased since 1973-1977 (Figure 2.1.2, Table 2.1.2). The five-year ASRS of cancer among the Chinese rose from 19.6% in 1973-1977 to 57.6% in 2014-2018. Similarly, for the Malays, the five-year ASRS increased from 16.8% to 45.3%; and for the Indians, it rose from 24.5% to 56.5% over the same period. Aside from some fluctuation in the five-year ASRS in the earliest time periods, the survival rates of cancer for the Chinese and Indians remained fairly similar. However, the Malays consistently had the lowest five-year ASRS.

Age group trends

The five-year age-specific relative survival of cancer had seen an overall increase for the different age groups. This was so even among the oldest age groups (70-79 years and 80 years and above) – relative survival rose from 13.3% in 1973-1977 to 51.2% in 2014-2018 for the former and from 22.3% to 36.3% over the same period for the latter (Figure 2.1.3(a), Table 2.1.3). In the latest five-year period, 2014-2018, the five-year age-specific relative survival of cancer was observed to decrease with age, particularly after the age of 49 years, dropping from 84.6% in individuals under 30 years of age to 36.3% in those aged 80 years and above (Figure 2.1.3(b), Table 2.1.3).

Figure 2.1.1 Five-year age-standardised relative survival rate (%) of cancer by gender, 1968-2018

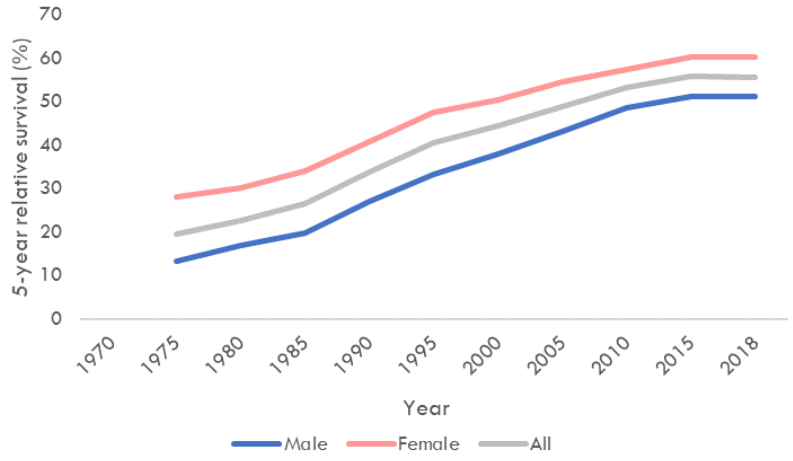


Table 2.1.1 Five-year age-standardised relative survival rate (%) of cancer by gender, 1968-2018

		1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1993-1997
Male	**5-year ASRS**	-	13.2	16.8	19.9	27.1	33.4
	(95% CI)	-	(12.3-14.2)	(15.9-17.7)	(19.0-20.8)	(26.1-28.1)	(32.4-34.3)
Female	**5-year ASRS**	-	28.1	30.0	34.1	40.8	47.6
	(95% CI)	-	(26.6-29.5)	(28.7-31.3)	(32.9-35.3)	(39.8-41.9)	(46.7-48.6)
All	**5-year ASRS**	-	19.5	22.6	26.4	33.8	40.4
	(95% CI)	-	(18.7-20.4)	(21.8-23.4)	(25.7-27.2)	(33.1-34.5)	(39.8-41.1)
		1998-2002	**2003-2007**	**2008-2012**	**2013-2017**	**2018**	**2014-2018**
Male	**5-year ASRS**	38.0	43.0	48.6	51.2	51.1	**52.1**
	((5% CI)	(37.2-38.9)	(42.2-43.8)	(47.9-49.3)	(50.6-51.9)	(49.8-52.4)	**(51.4-52.7)**
Female	**5-year ASRS**	50.5	54.5	57.4	60.2	60.2	**61.1**
	(95% CI)	(49.7-51.3)	(53.8-55.2)	(56.7-58.0)	(59.6-60.8)	(59.0-61.3)	**(60.5-61.6)**
All	**5-year ASRS**	44.4	48.9	53.1	55.9	55.7	**56.7**
	(95% CI)	(43.8-45.0)	(48.4-49.5)	(52.6-53.6)	(55.5-56.3)	(54.8-56.6)	**(56.3-57.2)**

Figure 2.1.2 Five-year age-standardised relative survival rate (%) of cancer by ethnicity, 1968-2018

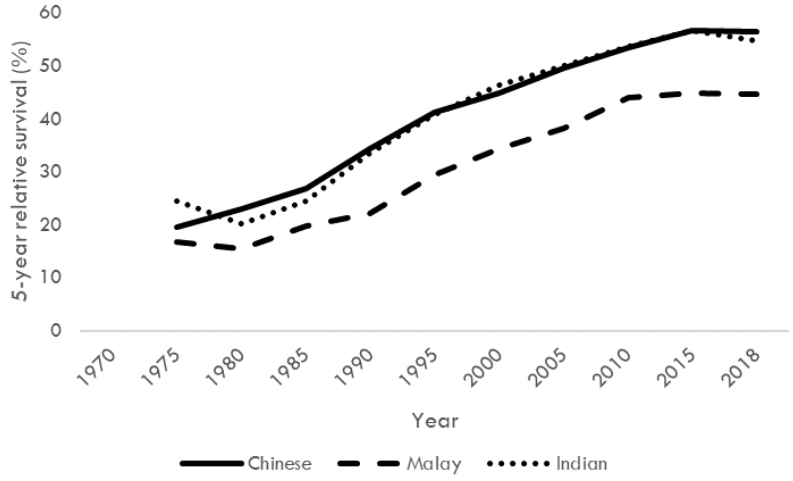


Table 2.1.2 Five-year age-standardised relative survival rate (%) of cancer by ethnicity, 1968-2018

		1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1993-1997
Chinese	**5-year ASRS**	-	19.6	23.0	26.8	34.5	41.2
	(95% CI)	-	(18.8-20.5)	(22.2-23.9)	(26.0-27.6)	(33.7-35.2)	(40.4-41.9)
Malay	**5-year ASRS**	-	16.8	15.4	19.8	22.1	29.5
	(95% CI)	-	(13.5-20.4)	(12.9-18.2)	(17.3-22.4)	(19.8-24.5)	(27.3-31.6)
Indian	**5-year ASRS**	-	24.5	20.1	24.4	33.5	40.8
	(95% CI)	-	(19.8-29.6)	(16.7-23.7)	(20.7-28.2)	(29.8-37.3)	(37.4-44.3)
		1998-2002	**2003-2007**	**2008-2012**	**2013-2017**	**2018**	**2014-2018**
Chinese	**5-year ASRS**	44.9	49.5	53.5	56.6	56.5	**57.6**
	(95% CI)	(44.3-45.6)	(48.9-50.1)	(52.9-54.0)	(56.1-57.1)	(55.5-57.4)	**(57.2-58.1)**
Malay	**5-year ASRS**	34.3	38.2	44.0	44.9	44.6	**45.3**
	(95% CI)	(32.4-36.2)	(36.5-39.9)	(42.5-45.6)	(43.6-46.2)	(42.1-47.2)	**(44.0-46.6)**
Indian	**5-year ASRS**	46.3	50.0	53.7	56.7	54.8	**56.5**
	(95% CI)	(43.4-49.2)	(47.3-52.6)	(51.4-55.9)	(54.8-58.6)	(50.9-58.6)	**(54.6-58.3)**

Figure 2.1.3(a) Five-year age-specific relative survival rate (%) of cancer by age group, 1968-2018

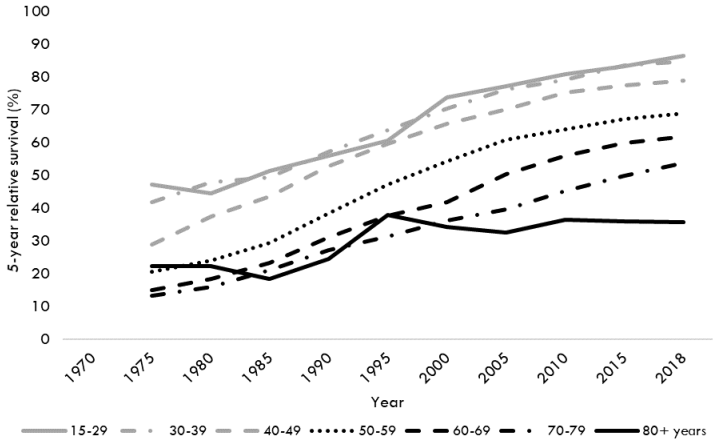


Figure 2.1.3(b) Five-year age-specific relative survival rate (%) of cancer by age group, 2014-2018

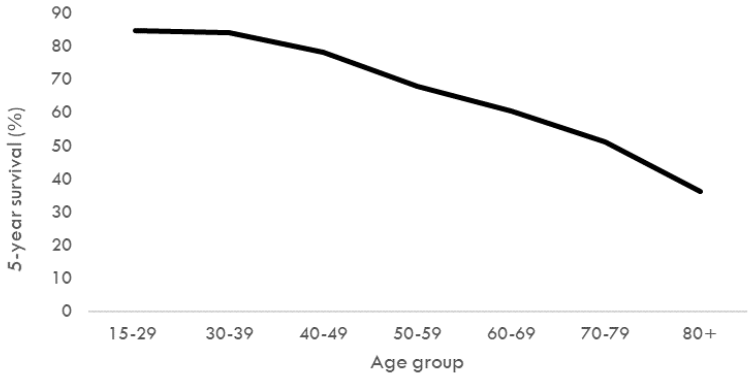


Table 2.1.3 Five-year age-specific relative survival rate (%) of cancer by age group, 2014-2018

		15-29	30-39	40-49	50-59	60-69	70-79	80+
1968-1972	**5-year RS**	-	-	-	-	-	-	-
	(95% CI)	-	-	-	-	-	-	-
1973-1977	**5-year RS**	47.1	41.9	28.8	20.7	15.0	13.3	22.3
	(95% CI)	(42.6-51.5)	(38.2-45.5)	(26.6-31.2)	(19.1-22.3)	(13.8-16.3)	(11.5-15.3)	(14.9-31.6)
1978-1982	**5-year RS**	44.3	48.0	37.4	24.1	18.4	16.0	22.2
	(95% CI)	(40.4-48.2)	(44.7-51.2)	(35.2-39.7)	(22.5-25.7)	(17.1-19.7)	(14.4-17.8)	(16.9-28.5)
1983-1987	**5-year RS**	51.3	49.3	43.4	29.4	23.3	21.0	18.5
	(95% CI)	(47.3-55.2)	(46.5-52.1)	(41.3-45.6)	(27.8-31.0)	(21.9-24.7)	(19.4-22.7)	(15.0-22.5)
1988-1992	**5-year RS**	56.0	57.2	52.8	38.4	31.0	27.2	24.6
	(95% CI)	(52.2-59.7)	(54.8-59.6)	(50.9-54.7)	(36.8-40.0)	(29.6-32.4)	(25.6-28.8)	(21.2-28.3)
1993-1997	**5-year RS**	60.6	63.6	59.7	47.2	37.5	31.3	37.8
	(95% CI)	(56.6-64.3)	(61.5-65.7)	(58.1-61.3)	(45.7-48.7)	(36.2-38.8)	(29.8-32.8)	(34.6-41.2)
1998-2002	**5-year RS**	73.7	70.2	65.7	54.1	41.7	36.1	34.2
	(95% CI)	(70.3-76.8)	(68.3-72.0)	(64.4-67.0)	(52.8-55.4)	(40.6-42.9)	(34.8-37.4)	(32.0-36.5)
2003-2007	**5-year RS**	77.0	76.2	70.0	60.9	50.4	39.5	32.5
	(95% CI)	(74.0-79.8)	(74.4-78.0)	(68.9-71.2)	(59.8-62.0)	(49.3-51.5)	(38.3-40.7)	(30.6-34.5)
2008-2012	**5-year RS**	80.8	79.1	75.1	63.8	55.8	45.2	36.4
	(95% CI)	(78.0-83.2)	(77.4-80.8)	(74.0-76.2)	(62.9-64.8)	(54.8-56.8)	(44.1-46.4)	(34.7-38.2)
2013-2017	**5-year RS**	83.3	83.4	77.5	67.1	59.9	49.8	36.0
	(95% CI)	(80.9-85.4)	(81.8-84.8)	(76.5-78.5)	(66.3-67.9)	(59.0-60.7)	(48.9-50.8)	(34.6-37.4)
2018	**5-year RS**	86.5	84.8	78.8	68.8	61.7	53.8	35.8
	(95% CI)	(81.1-90.4)	(81.3-87.6)	(76.5-80.8)	(67.0-70.6)	(60.0-63.3)	(51.7-55.9)	(32.9-38.7)
2014-2018	**5-year RS**	**84.6**	**84.0**	**78.2**	**68.1**	**60.6**	**51.2**	**36.3**
	(95% CI)	**(82.3-86.6)**	**(82.5-85.4)**	**(77.2-79.1)**	**(67.3-68.9)**	**(59.8-61.4)**	**(50.3-52.2)**	**(34.9-37.7)**

2.1 Five-year relative survival of cancer by gender, ethnicity and age group

KEY POINTS

- The five-year relative survival rate had improved significantly for both males and females; although females consistently had a higher survival rate compared to the males.
- The five-year relative survival rate also improved over the years for all three ethnic groups; however, Malays had the lowest survival rate.
- The five-year relative survival rates decreased with age.

2.2 Five-year age-standardised relative survival rate (%) for ten most frequent incident cancers by gender, 2014-2018

Of the ten most frequent incident cancers in 2014-2018, non-melanoma skin cancer had the best five-year ASRS, at 95.7% and 99.1% respectively for males and females (Figure 2.2(a), Figure 2.2(b)). Prostate cancer in males, and breast and thyroid cancers in females also had high survival rates that exceeded 80%. Cancers of the stomach, liver, and pancreas had a poorer survival rate on the whole – of the ten most frequent incident cancers among males, pancreatic cancer had the lowest five-year ASRS at 11.4% followed by lung and liver cancers at 14.4% and 25.8% respectively. Lung cancer had the lowest five-year ASRS among the common cancers diagnosed in females at 26.5%, followed by stomach and ovarian cancers at 37.4% and 42.7% respectively.

Figure 2.2(a) Five-year age-standardised relative survival rate (%) for ten most frequent incident cancers in males, 2014-2018

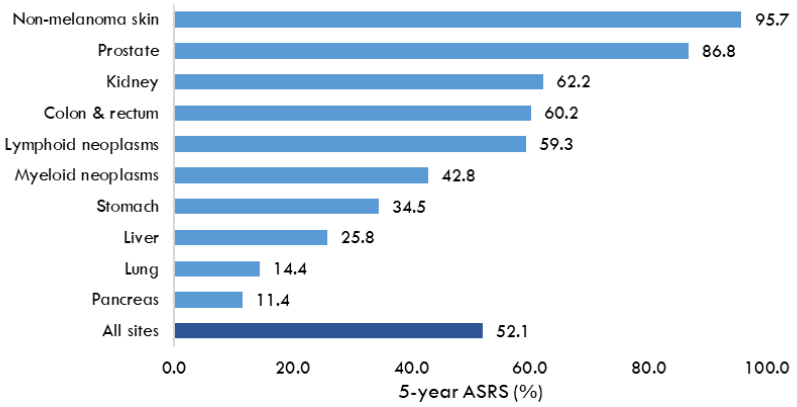
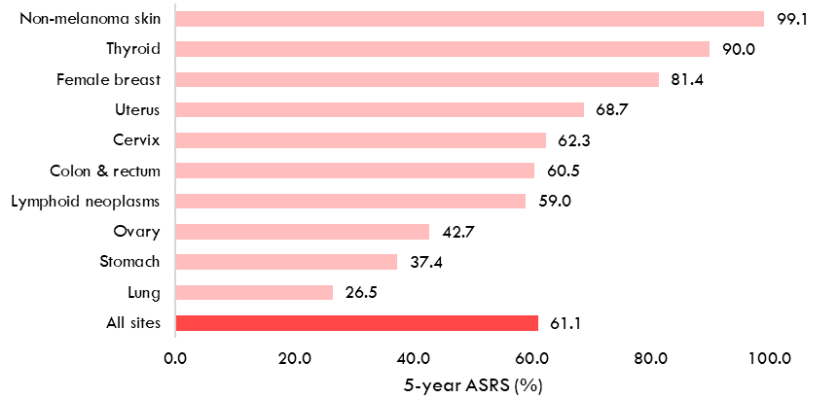


Figure 2.2(b) Five-year age-standardised relative survival rate (%) for ten most frequent incident cancers in females, 2014-2018



2.2 Five-year relative survival of ten most frequent incident cancers by gender

KEY POINTS

- Non-melanoma skin cancer had the highest five-year survival rates among the most common incident cancers in both males and females for the period 2014-2018.
- Prostate cancer in males and thyroid and breast cancers in females were among the common incident cancers of 2014-2018 with the highest survival rates.
- Among the most common incident cancers for 2014-2018, pancreatic, lung, and liver cancers had the poorest survival rates for males; for females, the three cancers with the lowest survival rates were lung, stomach, and ovarian cancers.

2.3 Age-standardised relative survival rate (%) five years following diagnosis for ten most frequent incident cancers by gender, 2014-2018

The ASRS of cancer decreased with every year post-diagnosis, and the survival for some cancers deteriorated more rapidly in comparison to others. Among males, the one-year survival rate for all cancers was 72.1%, and by the five-year mark, this had decreased gradually to 52.1% (Figure 2.3(a), Table 2.3(a)). Non-melanoma skin and prostate cancers had the highest survival rate at every one-year interval after diagnosis. Pancreatic, lung, and liver cancers had the poorest survival rates among males at every year after diagnosis, with the most rapid deterioration occurring between the first and second year.

The survival with every one year following diagnosis for all cancers was better among females compared to males – the ASRS declined gradually from 78.5% at the one-year mark to 61.1% after five years (Figure 2.3(b), Table 2.3(b)). Among females, non-melanoma skin, thyroid, and breast cancers consistently had the best survival rates out of the most frequent incident cancers, with the survival rate being consistently high for non-melanoma skin cancer over the five years following diagnosis. However, lung and stomach cancers had consistently poorer survival rates than other commonly-diagnosed cancers in women in the five years following diagnosis, with the most rapid declines observed between the first and second year.

Figure 2.3(a) Age-standardised relative survival rate (%) five years following diagnosis for ten most frequent incident cancers in males, 2014-2018

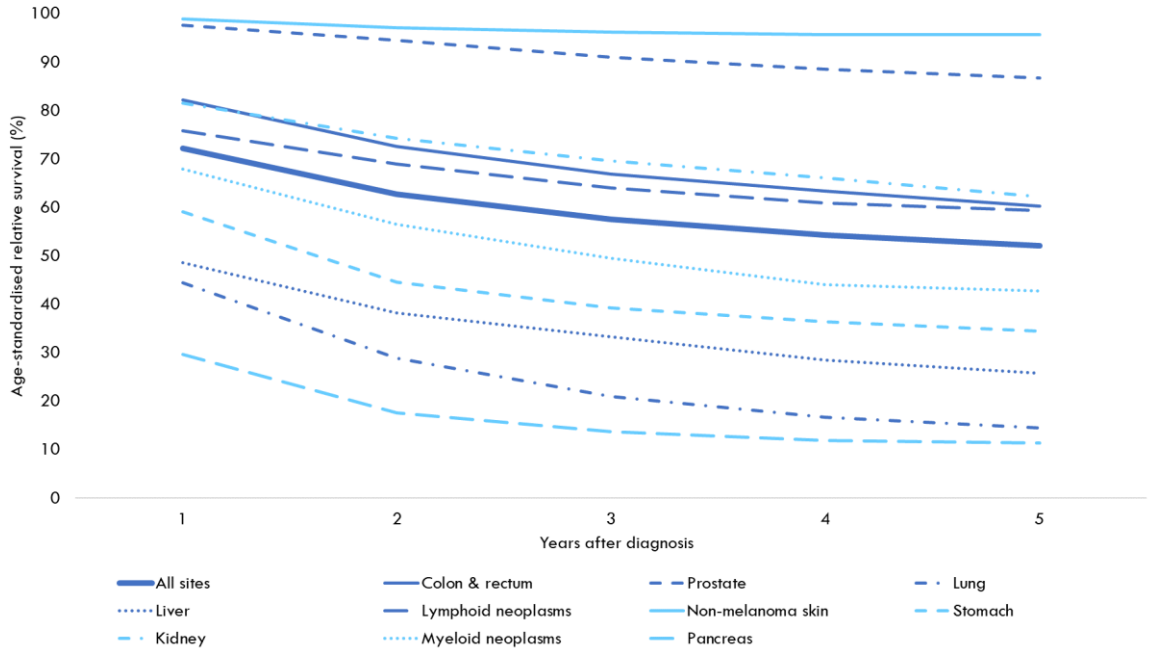


Figure 2.3(b) Age-standardised relative survival rate (%) five years following diagnosis for ten most frequent incident cancers in females, 2014-2018

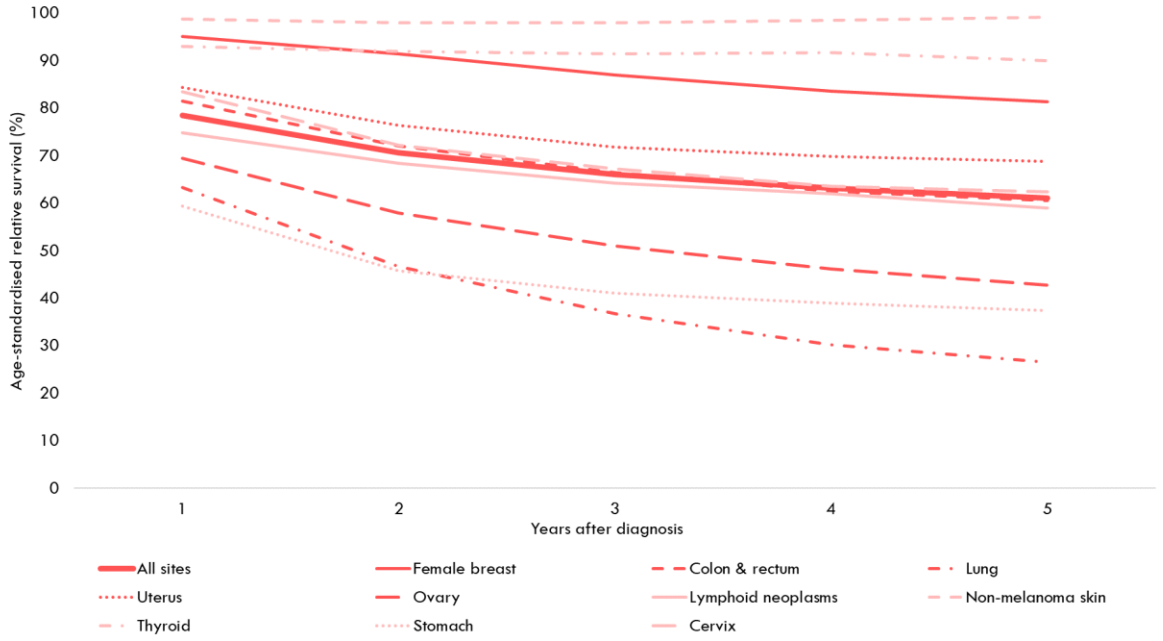


Table 2.3(a) Age-standardised relative survival rate (%) five years following diagnosis for ten most frequent incident cancers in males, 2014-2018

		Years after diagnosis				
		1	2	3	4	5
Male	Colon & rectum	82.2 (81.2-83.3)	72.6 (71.3-73.8)	66.8 (65.5-68.2)	63.4 (61.9-64.8)	60.2 (58.7-61.7)
	Prostate	97.6 (97.0-98.2)	94.5 (93.6-95.4)	91.0 (89.8-92.2)	88.5 (87.1-89.8)	86.8 (85.2-88.3)
	Lung	44.5 (43.1-45.9)	28.9 (27.6-30.2)	20.9 (19.7-22.1)	16.7 (15.6-17.9)	14.4 (13.4-15.5)
	Liver	48.6 (46.7-50.6)	38.2 (36.3-40.1)	33.3 (31.4-35.2)	28.5 (26.7-30.4)	25.8 (24.0-27.7)
	Lymphoid neoplasms	75.8 (73.9-77.6)	68.9 (66.8-70.9)	64.0 (61.8-66.2)	61.0 (58.6-63.2)	59.3 (56.9-61.7)
	Non-melanoma skin	98.9 (97.8-99.8)	97.1 (95.6-98.5)	96.2 (94.4-97.9)	95.6 (93.5-97.6)	95.7 (93.3-97.9)
	Stomach	59.1 (56.4-61.6)	44.5 (41.8-47.2)	39.2 (36.5-41.9)	36.4 (33.7-39.2)	34.5 (31.7-37.2)
	Kidney	81.6 (79.4-83.6)	74.2 (71.7-76.6)	69.5 (66.8-72.2)	66.1 (63.2-68.9)	62.2 (59.1-65.2)
	Myeloid neoplasms	67.9 (65.1-70.6)	56.4 (53.4-59.4)	49.5 (46.4-52.6)	44.0 (40.8-47.1)	42.8 (39.6-46.0)
	Pancreas	29.7 (27.0-32.4)	17.6 (15.4-19.9)	13.8 (11.7-16.0)	11.9 (9.9-14.0)	11.4 (9.5-13.6)
	All sites	**72.1 (71.6-72.6)**	**62.7 (62.2-63.3)**	**57.6 (57.0-58.2)**	**54.3 (53.7-54.9)**	**52.1 (51.4-52.7)**

Table 2.3(b) Age-standardised relative survival rate (%) five years following diagnosis for ten most frequent incident cancers in females, 2014-2018

		Years after diagnosis				
		1	2	3	4	5
Female	Female breast	95.1 (94.7-95.5)	91.4 (90.8-92.0)	86.9 (86.2-87.6)	83.5 (82.7-84.3)	81.4 (80.4-82.3)
	Colon & rectum	81.5 (80.3-82.6)	72.1 (70.7-73.4)	66.5 (65.0-67.9)	62.5 (60.9-64.0)	60.5 (58.8-62.1)
	Lung	63.3 (61.4-65.2)	46.7 (44.7-48.6)	36.7 (34.8-38.7)	30.1 (28.2-32.1)	26.5 (24.6-28.4)
	Uterus	84.3 (83.0-85.6)	76.4 (74.8-78.0)	71.9 (70.1-73.6)	69.8 (67.9-71.6)	68.7 (66.8-70.6)
	Ovary	69.4 (67.4-71.4)	57.9 (55.7-60.1)	51.0 (48.7-53.2)	46.1 (43.9-48.4)	42.7 (40.4-45.0)
	Lymphoid neoplasms	74.8 (72.6-76.9)	68.4 (66.0-70.6)	64.3 (61.8-66.7)	62.0 (59.4-64.5)	59.0 (56.3-61.6)
	Non-melanoma skin	98.7 (97.5-99.7)	98.0 (96.3-99.4)	98.0 (96.0-99.7)	98.5 (96.2-100.5)	99.1 (96.6-101.4)
	Thyroid	93.0 (91.6-94.2)	92.0 (90.4-93.3)	91.4 (89.8-92.9)	91.8 (90.0-93.3)	90.0 (88.0-91.8)
	Stomach	59.4 (56.3-62.3)	45.8 (42.7-48.9)	41.1 (38.0-44.2)	38.9 (35.8-42.1)	37.4 (34.2-40.6)
	Cervix	83.4 (81.2-85.4)	72.3 (69.6-74.8)	67.3 (64.4-69.9)	63.6 (60.6-66.4)	62.3 (59.3-65.2)
	All sites	**78.5 (78.0-78.9)**	**70.7 (70.2-71.1)**	**66.1 (65.6-66.6)**	**63.1 (62.6-63.6)**	**61.1 (60.5-61.6)**

2.3 Age-standardised relative survival five years following diagnosis for ten most frequent incident cancers by gender, 2014-2018

KEY POINTS

- Survival rates of cancer decreased with every year after diagnosis; but the rates for some cancers decreased faster than the rest.
- Among males, non-melanoma skin and prostate cancers had the highest survival rates with every year post-diagnosis, while pancreatic, lung, and liver cancers had the lowest survival rates.
- Among females, non-melanoma skin, thyroid, and breast cancers had the highest survival rates with every year post-diagnosis; while lung and stomach cancers had the poorest survival rates at every one-year interval post-diagnosis.

(3) TRENDS IN INCIDENCE, MORTALITY AND SURVIVAL OF SELECTED CANCERS, 1968-2018

3.1 Age-standardised incidence, age-standardised mortality, and five-year age-standardised relative survival for selected cancers in males and females, 1968-2018

Males

Among the ten most frequent incident cancers in males for the period 2014-2018, there had been an overall increase in the five-year age-standardised survival rates over the years from 1968-2018; however, differing trends can be observed for the incidence and mortality rates of these cancers (Figure 3.1(a), Table 3.1(a)). There was a notable rise in the ASIR of colorectal cancer from 19.4 per 100,000 population in 1968-1972 to 38.7 per 100,000 population in 2014-2018; while that for prostate cancer had jumped more than 8 times from 4.0 per 100,000 population in 1968-1972, to 33.4 per 100,000 population in 2014-2018. However, there were also significant decreases in the incidence of other cancers. For instance, the ASIR of lung cancer dropped from 47.3 per 100,000 population in 1968-1972 to 31.7 per 100,000 population in 2014-2018. The ASIR of liver cancer had also fallen by about half over this period, from 28.7 to 17.4 per 100,000 population; while that of stomach cancer dropped drastically from 37.7 per 100,000 population in 1968-1972 to 9.8 per 100,000 population in 2014-2018.

Correspondingly, the ASMR of stomach cancer also fell from 26.4 per 100,000 population in 1968-1972 to 5.3 per 100,000 population in 2014-2018. Unfortunately, pancreatic cancer, which has a low survival rate, has exhibited an increasing mortality rate over the years as it became more common. The ASMR of pancreatic cancer rose from 1.7 per 100,000 population in 1968-1972 to 5.7 in 2018 – an increase of more than threefold. The ASMR of colorectal cancer in males, likewise, had risen alongside the incidence rate from 8.9 per 100,000 population in 1968-1972 to 13.9 per 100,000 population in 2014-2018.

Despite exhibiting differing trends in incidence and mortality over the years, there had been improvements in the survival across all ten commonly diagnosed cancers. For instance, while the five-year ASRS of colorectal cancer was 24.3% in 1973-1977, it climbed to 60.2% in 2014-2018. Likewise, the survival of prostate cancer had increased from 47.0% to 86.8% during this period. Even among cancers with generally poorer survival rates, there had been significant improvements in the five-year ASRS over the years – in 1973-1977, the five-year ASRS of lung and liver cancers were 2.9% and 0.2% respectively, but in 2014-2018, these figures had climbed to 14.4% and 25.8% respectively.

Females

As with the males, the ten most frequent incident cancers of 2014-2018 had also displayed differing incidence and mortality trends over the years from 1968-2018. However, there had been a consistent pattern of an overall increase in survival rates for all ten common cancers (Figure 3.1(b), Table 3.1(b)).

Notably, the ASIR of breast cancer, which is the most common cancer diagnosis in women, had risen about 3.5 times between 1968-1972 to 2014-2018, from 20.1 per 100,000 population to 70.7 per 100,000 population. Similarly, the ASIR of uterine and ovarian cancers had also risen significantly, from 4.9 to 17.5 per 100,000 population and 6.0 to 12.9 per 100,000 population – registering approximately fourfold and twofold increases respectively. However, as with males, the ASIR of stomach cancer in females had also decreased significantly, from 17.4 per 100,000 population in 1968-1972 to 6.0 per 100,000 population in 2014-2018. The ASIR of cervical cancer had also fallen drastically from 18.0 per 100,000 population in 1968-1972 to 7.0 per 100,000 population in 2014-2018.

The mortality rate of many common cancers in women had risen or fallen alongside the incidence rates. For example, the ASMR of breast cancer rose from 5.7 per 100,000 population in 1968-1972 to 12.6

per 100,000 population in 2014-2018. The ASMR of ovarian cancer had also increased from 1.4 per 100,000 population to 3.7 per 100,000 population, in tandem with an increasing incidence rate. On the other hand, the ASMR of stomach cancer had fallen drastically from 11.9 per 100,000 population in 1968-1972 to 3.3 per 100,000 population in 2014-2018. Similarly, the ASMR of cervical cancer had also decreased from 4.9 to 2.1 per 100,000 population over the same period.

Significant improvements were observed in the survival rates for many common cancers. The five-year ASRS of the most common incident cancer in females – breast cancer – had improved from 50.4% in 1973-1977 to 81.4% in 2014-2018. Similarly, that for uterine cancer had also increased from 48.4% to 68.7% during this period. As with males, improvements were also observed for other common cancers with generally poorer survival rates such as lung and stomach cancers, whose five-year ASRS improved from 5.3% to 26.5% and 6.6% to 37.4% respectively.

Figure 3.1(a) Age-standardised incidence rate (per 100,000 population), age-standardised mortality rate (per 100,000 population) and five-year age-standardised relative survival rate (%) of selected cancers in males, 1968-2018

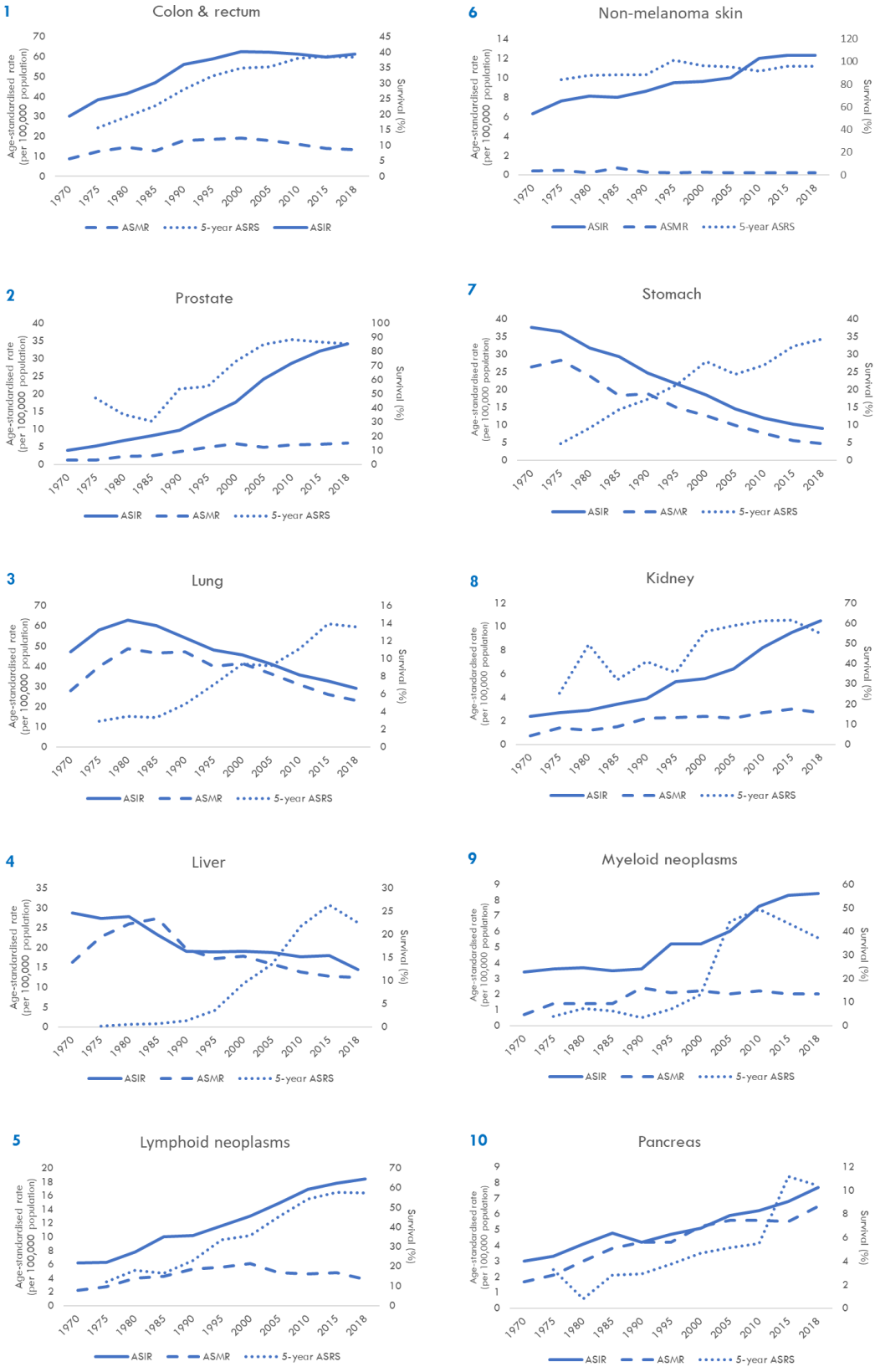


Table 3.1(a) Incidence number and age-standardised incidence rate (per 100,000 population), age-standardised mortality rate (per 100,000 population) and five-year age-standardised relative survival rate (%) of selected cancers in males, 1968-2018

		Number	ASIR (95% CI)*	ASMR (95% CI)*	ASRS (95% CI)
Colon & rectum	1968-1972	563	19.4 (17.6-21.2)	8.9 (7.7-10.1)	
	1973-1977	824	24.6 (22.8-26.4)	12.6 (11.4-13.9)	24.3 (20.1-28.9)
	1978-1982	1057	26.7 (25.0-28.4)	14.6 (13.4-15.9)	29.7 (26.0-33.6)
	1983-1987	1435	30.2 (28.6-31.8)	12.9 (11.9-14.0)	35.2 (31.7-38.8)
	1988-1992	2052	36.0 (34.4-37.6)	18.1 (16.9-19.2)	43.5 (40.4-46.6)
	1993-1997	2552	37.7 (36.2-39.2)	18.5 (17.5-19.6)	50.4 (47.7-53.1)
	1998-2002	3252	40.1 (38.7-41.5)	19.1 (18.1-20.0)	54.1 (51.8-56.4)
	2003-2007	3849	40.0 (38.7-41.3)	17.9 (17.0-18.7)	54.7 (52.7-56.6)
	2008-2012	4789	39.3 (38.2-40.4)	16.0 (15.3-16.7)	58.9 (57.1-60.7)
	2013-2017	5811	38.3 (37.3-39.3)	14.1 (13.5-14.7)	60.0 (58.4-61.6)
	2018	1348	39.3 (37.2-41.4)	13.5 (12.3-14.8)	59.6 (56.3-62.8)
	2014-2018	6129	38.7 (37.7-39.7)	13.9 (13.3-14.5)	60.2 (58.7-61.7)
Prostate	1968-1972	94	4.0 (3.1-4.8)	1.2 (0.8-1.7)	
	1973-1977	144	5.2 (4.3-6.0)	1.3 (0.9-1.7)	47.0 (33.3-61.4)
	1978-1982	240	6.8 (5.9-7.7)	2.2 (1.7-2.7)	35.4 (25.6-46.2)
	1983-1987	356	8.2 (7.4-9.1)	2.5 (2.1-3.0)	30.8 (24.1-38.1)
	1988-1992	529	9.7 (8.9-10.6)	3.6 (3.1-4.1)	53.4 (46.0-60.7)
	1993-1997	901	13.8 (12.8-14.7)	4.8 (4.3-5.4)	55.3 (49.9-60.6)
	1998-2002	1359	17.6 (16.7-18.5)	5.9 (5.4-6.5)	72.9 (68.8-76.8)
	2003-2007	2210	24.2 (23.2-25.2)	4.8 (4.3-5.2)	85.0 (82.2-87.7)
	2008-2012	3336	28.6 (27.6-29.6)	5.6 (5.2-6.0)	88.5 (86.5-90.4)
	2013-2017	4888	32.0 (31.1-32.9)	5.7 (5.3-6.1)	86.9 (85.2-88.4)
	2018	1224	34.2 (32.3-36.1)	6.0 (5.2-6.8)	85.4 (82.0-88.6)
	2014-2018	5368	33.4 (32.5-34.3)	5.6 (5.2-5.9)	86.8 (85.2-88.3)
Lung	1968-1972	1361	47.3 (44.6-49.9)	28.0 (25.9-30.0)	
	1973-1977	1920	57.9 (55.3-60.6)	39.9 (37.7-42.2)	2.9 (2.1-4.0)
	1978-1982	2440	63.0 (60.4-65.5)	48.8 (46.5-51.0)	3.5 (2.7-4.4)
	1983-1987	2770	60.1 (57.9-62.4)	46.6 (44.6-48.6)	3.3 (2.7-4.1)
	1988-1992	2971	54.1 (52.1-56.0)	47.3 (45.5-49.2)	4.9 (4.0-5.8)
	1993-1997	3168	48.1 (46.4-49.8)	40.0 (38.4-41.5)	7.1 (6.0-8.2)
	1998-2002	3598	45.8 (44.3-47.3)	41.6 (40.1-43.0)	9.4 (8.4-10.5)
	2003-2007	3863	41.3 (39.9-42.6)	36.2 (34.9-37.4)	9.2 (8.2-10.3)
	2008-2012	4292	35.7 (34.6-36.8)	30.9 (29.9-31.9)	11.1 (10.1-12.2)
	2013-2017	5032	32.8 (31.9-33.8)	26.2 (25.4-27.0)	13.9 (12.9-15.0)
	2018	1020	29.0 (27.2-30.8)	23.1 (21.5-24.6)	13.6 (11.4-16.0)
	2014-2018	5083	31.7 (30.8-32.6)	25.1 (24.3-25.9)	14.4 (13.4-15.5)
Liver	1968-1972	898	28.7 (26.7-30.6)	16.3 (14.8-17.8)	
	1973-1977	965	27.4 (25.6-29.3)	22.7 (21.0-24.3)	0.2 (0.1-0.4)
	1978-1982	1126	27.8 (26.1-29.4)	25.9 (24.3-27.5)	0.5 (0.3-1.0)
	1983-1987	1095	23.2 (21.8-24.5)	27.4 (25.9-29.0)	0.8 (0.4-1.3)
	1988-1992	1089	19.0 (17.8-20.1)	19.6 (18.4-20.8)	1.4 (0.7-2.4)
	1993-1997	1302	18.9 (17.9-20.0)	17.2 (16.2-18.2)	3.6 (2.5-5.0)
	1998-2002	1554	19.1 (18.1-20.0)	17.9 (16.9-18.8)	9.4 (7.8-11.2)
	2003-2007	1788	18.7 (17.8-19.6)	15.9 (15.1-16.7)	13.6 (11.7-15.6)
	2008-2012	2136	17.6 (16.8-18.4)	13.8 (13.1-14.5)	21.8 (19.7-23.9)
	2013-2017	2743	18.0 (17.3-18.7)	12.7 (12.1-13.3)	26.3 (24.5-28.3)
	2018	507	14.5 (13.2-15.8)	12.4 (11.3-13.6)	22.5 (18.9-26.3)
	2014-2018	2758	17.4 (16.7-18.0)	12.7 (12.1-13.2)	25.8 (24.0-27.7)
Lymphoid neoplasms	1968-1972	253	6.2 (5.4-7.1)	2.2 (1.7-2.7)	
	1973-1977	267	6.3 (5.5-7.1)	2.8 (2.3-3.4)	12.0 (7.5-17.9)
	1978-1982	352	7.8 (6.9-8.6)	4.0 (3.4-4.7)	17.9 (12.5-24.2)
	1983-1987	511	10.0 (9.1-10.9)	4.3 (3.7-4.8)	16.5 (12.1-21.5)
	1988-1992	613	10.2 (9.4-11.0)	5.3 (4.7-5.9)	23.0 (19.0-27.4)
	1993-1997	825	11.6 (10.8-12.4)	5.6 (5.0-6.2)	33.6 (29.2-38.1)
	1998-2002	1047	13.0 (12.2-13.8)	6.1 (5.5-6.6)	35.5 (32.0-39.2)
	2003-2007	1348	14.9 (14.0-15.7)	4.8 (4.3-5.2)	45.3 (42.0-48.6)
	2008-2012	1842	16.9 (16.0-17.7)	4.6 (4.2-5.0)	54.1 (51.3-56.9)
	2013-2017	2268	17.8 (17.0-18.6)	4.8 (4.4-5.1)	57.7 (55.2-60.1)
	2018	534	18.4 (16.7-20.2)	3.8 (3.1-4.5)	57.4 (52.3-62.3)
	2014-2018	2358	17.9 (17.1-18.7)	4.4 (4.1-4.8)	59.3 (56.9-61.7)
Non-melanoma skin	1968-1972	167	6.3 (5.2-7.4)	0.4 (0.2-0.6)	
	1973-1977	247	7.6 (6.6-8.6)	0.5 (0.2-0.9)	84.2 (71.3-95.8)
	1978-1982	319	8.1 (7.1-9.0)	0.2 (0.1-0.3)	87.7 (79.1-95.4)
	1983-1987	371	8.0 (7.1-8.8)	0.7 (0.5-1.0)	88.1 (79.6-95.9)
	1988-1992	501	8.6 (7.9-9.4)	0.3 (0.2-0.5)	88.1 (79.6-95.9)
	1993-1997	667	9.5 (8.8-10.3)	0.2 (0.1-0.3)	101.3 (95.7-106.4)
	1998-2002	790	9.6 (8.9-10.3)	0.3 (0.1-0.4)	96.5 (91.8-100.8)
	2003-2007	954	10.0 (9.3-10.6)	0.2 (0.1-0.3)	95.1 (91.3-98.6)
	2008-2012	1469	12.0 (11.4-12.7)	0.2 (0.1-0.3)	91.3 (88.1-94.2)
	2013-2017	1866	12.3 (11.7-12.8)	0.2 (0.1-0.2)	95.8 (93.3-98.0)
	2018	427	12.3 (11.1-13.5)	0.2 (0.0-0.4)	95.6 (90.1-100.4)
	2014-2018	1975	12.4 (11.9-13.0)	0.2 (0.1-0.3)	95.7 (93.3-97.9)

		Number	ASIR (95% CI)*	ASMR (95% CI)*	ASRS (95% CI)
Stomach	**1968-1972**	1094	37.7 (35.3-40.2)	26.4 (24.4-28.4)	
	1973-1977	1216	36.5 (34.3-38.6)	28.3 (26.4-30.2)	4.7 (3.4-6.2)
	1978-1982	1233	31.8 (29.9-33.6)	23.8 (22.2-25.4)	9.2 (7.4-11.3)
	1983-1987	1334	29.3 (27.7-30.9)	18.3 (17.1-19.6)	14.4 (12.2-16.8)
	1988-1992	1374	24.8 (23.4-26.1)	18.9 (17.7-20.0)	17.3 (15.1-19.8)
	1993-1997	1442	21.7 (20.5-22.8)	14.9 (13.9-15.8)	21.4 (18.9-24.1)
	1998-2002	1452	18.5 (17.5-19.4)	12.6 (11.8-13.4)	28.0 (25.4-30.6)
	2003-2007	1380	14.6 (13.8-15.4)	9.9 (9.2-10.5)	24.4 (21.9-27.1)
	2008-2012	1450	12.0 (11.4-12.6)	7.7 (7.2-8.3)	27.0 (24.4-29.7)
	2013-2017	1557	10.2 (9.7-10.7)	5.6 (5.2-6.0)	32.3 (29.6-35.0)
	2018	317	9.0 (8.0-10.0)	4.7 (3.9-5.4)	34.4 (28.7-40.4)
	2014-2018	**1605**	**9.8 (9.3-10.3)**	**5.3 (4.9-5.6)**	**34.5 (31.7-37.2)**
Kidney	**1968-1972**	77	2.4 (1.8-3.0)	0.7 (0.4-1.0)	
	1973-1977	100	2.7 (2.2-3.3)	1.4 (1.0-1.9)	25.5 (15.3-37.5)
	1978-1982	118	2.9 (2.3-3.4)	1.2 (0.9-1.6)	49.4 (33.7-65.5)
	1983-1987	161	3.4 (2.8-3.9)	1.5 (1.2-1.9)	32.1 (22.5-42.7)
	1988-1992	223	3.9 (3.4-4.5)	2.2 (1.8-2.5)	41.1 (32.4-49.9)
	1993-1997	366	5.3 (4.7-5.9)	2.3 (1.9-2.7)	35.7 (29.2-42.6)
	1998-2002	468	5.6 (5.1-6.1)	2.4 (2.1-2.8)	55.8 (50.0-61.5)
	2003-2007	644	6.4 (5.9-6.9)	2.2 (1.9-2.5)	58.9 (53.7-63.8)
	2008-2012	1006	8.2 (7.7-8.7)	2.7 (2.4-3.0)	61.3 (57.3-65.2)
	2013-2017	1394	9.5 (8.9-10.0)	3.0 (2.7-3.3)	61.6 (58.4-64.8)
	2018	339	10.5 (9.3-11.6)	2.7 (2.2-3.3)	55.0 (48.8-61.0)
	2014-2018	**1494**	**9.8 (9.3-10.3)**	**2.9 (2.6-3.1)**	**62.2 (59.1-65.2)**
Myeloid neoplasms	**1968-1972**	144	3.4 (2.8-4.0)	0.7 (0.5-1.0)	
	1973-1977	166	3.6 (3.0-4.2)	1.4 (1.0-1.7)	4.0 (1.5-8.5)
	1978-1982	179	3.7 (3.1-4.3)	1.4 (1.0-1.7)	7.2 (3.7-12.4)
	1983-1987	192	3.5 (3.0-4.0)	1.4 (1.1-1.8)	6.2 (2.9-11.5)
	1988-1992	230	3.6 (3.1-4.1)	2.4 (2.0-2.8)	3.4 (1.6-6.1)
	1993-1997	375	5.2 (4.7-5.8)	2.1 (1.7-2.4)	7.1 (4.1-11.2)
	1998-2002	434	5.2 (4.7-5.7)	2.2 (1.9-2.5)	13.1 (9.2-17.8)
	2003-2007	573	6.0 (5.5-6.5)	2.0 (1.7-2.3)	44.2 (38.5-49.8)
	2008-2012	890	7.6 (7.1-8.2)	2.2 (1.9-2.5)	49.5 (45.2-53.7)
	2013-2017	1155	8.3 (7.8-8.8)	2.0 (1.7-2.2)	43.4 (40.0-46.7)
	2018	270	8.4 (7.3-9.4)	2.0 (1.5-2.5)	37.3 (31.3-43.5)
	2014-2018	**1232**	**8.4 (7.9-8.9)**	**1.9 (1.7-2.1)**	**42.8 (39.6-46.0)**
Pancreas	**1968-1972**	92	3.0 (2.4-3.7)	1.7 (1.2-2.2)	
	1973-1977	112	3.3 (2.7-3.9)	2.1 (1.6-2.6)	3.3 (0.9-8.3)
	1978-1982	161	4.1 (3.4-4.7)	3.0 (2.5-3.6)	0.8 (0.2-2.6)
	1983-1987	224	4.8 (4.1-5.4)	3.8 (3.2-4.4)	2.8 (0.9-6.7)
	1988-1992	239	4.2 (3.7-4.8)	4.2 (3.7-4.7)	2.9 (1.1-6.2)
	1993-1997	310	4.7 (4.1-5.2)	4.2 (3.7-4.7)	3.8 (1.7-7.2)
	1998-2002	410	5.1 (4.6-5.6)	5.2 (4.7-5.7)	4.7 (2.9-7.0)
	2003-2007	579	5.9 (5.4-6.4)	5.6 (5.1-6.0)	5.1 (3.4-7.5)
	2008-2012	749	6.2 (5.7-6.6)	5.6 (5.1-6.0)	5.5 (3.9-7.6)
	2013-2017	1052	6.8 (6.4-7.2)	5.5 (5.1-5.9)	11.2 (9.2-13.4)
	2018	265	7.7 (6.7-8.6)	6.5 (5.7-7.4)	10.4 (6.8-14.9)
	2014-2018	**1119**	**7.0 (6.5-7.4)**	**5.7 (5.4-6.1)**	**11.4 (9.5-13.6)**

* per 100,000 resident population

Figure 3.1(b) Incidence number and age-standardised incidence rate (per 100,000 population), age-standardised mortality rate (per 100,000 population) and five-year age-standardised relative survival rate (%) of selected cancers in females, 1968-2018

Table 3.1(b) Incidence number and age-standardised incidence rate (per 100,000 population), age-standardised mortality rate (per 100,000 population) and five-year age-standardised relative survival rate (%) of selected cancers in females, 1968-2018

		Number	ASIR (95% CI)*	ASMR (95% CI)*	ASRS (95% CI)
Female breast	1968-1972	672	20.1 (18.5-21.6)	5.7 (4.9-6.6)	
	1973-1977	862	22.1 (20.6-23.6)	8.5 (7.5-9.4)	50.4 (45.6-55.2)
	1978-1982	1237	26.9 (25.3-28.4)	11.6 (10.6-12.6)	50.8 (46.7-54.9)
	1983-1987	1737	31.1 (29.6-32.6)	8.6 (7.8-9.4)	55.4 (52.0-58.8)
	1988-1992	2633	38.6 (37.1-40.1)	12.9 (12.0-13.8)	63.7 (61.1-66.2)
	1993-1997	3600	43.5 (42.0-45.0)	12.6 (11.8-13.3)	74.9 (72.8-76.9)
	1998-2002	5581	55.7 (54.2-57.2)	13.9 (13.1-14.7)	76.6 (75.0-78.1)
	2003-2007	6857	58.9 (57.5-60.4)	13.6 (12.9-14.3)	76.1 (74.8-77.4)
	2008-2012	8564	63.0 (61.7-64.4)	14.2 (13.6-14.9)	79.4 (78.3-80.5)
	2013-2017	10837	69.9 (68.5-71.2)	13.0 (12.4-13.5)	80.7 (79.7-81.6)
	2018	2351	70.2 (67.2-73.1)	12.5 (11.3-13.7)	81.8 (79.9-83.6)
	2014-2018	**11232**	**70.7 (69.4-72.0)**	**12.6 (12.1-13.1)**	**81.4 (80.4-82.3)**
Colon & rectum	1968-1972	478	15.4 (14.0-16.8)	6.7 (5.7-7.6)	
	1973-1977	715	19.6 (18.1-21.1)	10.1 (9.0-11.1)	26.1 (21.7-30.7)
	1978-1982	1084	24.6 (23.1-26.1)	13.4 (12.3-14.5)	28.3 (24.8-32.0)
	1983-1987	1393	26.1 (24.7-27.5)	11.4 (10.4-12.3)	36.4 (33.1-39.8)
	1988-1992	1848	28.3 (27.0-29.6)	14.0 (13.1-14.9)	43.6 (40.6-46.6)
	1993-1997	2300	29.5 (28.2-30.7)	13.0 (12.2-13.8)	54.2 (51.5-56.9)
	1998-2002	2795	29.1 (28.0-30.2)	13.9 (13.1-14.6)	52.5 (50.2-54.7)
	2003-2007	3350	28.8 (27.8-29.8)	12.0 (11.4-12.7)	57.0 (54.9-59.1)
	2008-2012	3921	27.1 (26.2-27.9)	10.5 (10.0-11.1)	60.6 (58.8-62.5)
	2013-2017	4849	27.3 (26.5-28.0)	9.9 (9.4-10.3)	60.5 (58.8-62.1)
	2018	1126	28.4 (26.6-30.1)	9.7 (8.7-10.6)	56.8 (53.4-60.2)
	2014-2018	**5109**	**27.7 (26.9-28.5)**	**9.7 (9.2-10.1)**	**60.5 (58.8-62.1)**
Lung	1968-1972	489	16.2 (14.7-17.6)	9.2 (8.1-10.2)	
	1973-1977	663	18.5 (17.1-19.9)	13.2 (12.0-14.4)	5.3 (3.6-7.4)
	1978-1982	893	20.8 (19.4-22.2)	15.9 (14.7-17.1)	4.1 (2.8-5.8)
	1983-1987	1072	20.4 (19.2-21.6)	18.5 (17.4-19.7)	5.1 (3.7-6.8)
	1988-1992	1174	18.0 (16.9-19.1)	15.9 (14.9-16.9)	5.9 (4.5-7.6)
	1993-1997	1444	18.3 (17.3-19.2)	14.9 (14.0-15.7)	8.1 (6.5-10.0)
	1998-2002	1603	16.4 (15.6-17.2)	14.6 (13.8-15.4)	11.0 (9.4-12.8)
	2003-2007	1906	16.3 (15.6-17.1)	13.0 (12.3-13.7)	13.9 (12.1-15.8)
	2008-2012	2263	15.4 (14.8-16.1)	12.2 (11.7-12.8)	16.3 (14.5-18.1)
	2013-2017	2815	15.5 (14.9-16.1)	10.5 (10.0-10.9)	24.2 (22.4-26.1)
	2018	564	14.2 (13.0-15.4)	8.6 (7.7-9.5)	29.5 (25.4-33.8)
	2014-2018	**2862**	**15.2 (14.7-15.8)**	**9.9 (9.4-10.3)**	**26.5 (24.6-28.4)**
Uterus	1968-1972	159	4.9 (4.1-5.7)	1.9 (1.4-2.4)	
	1973-1977	154	4.1 (3.5-4.8)	2.0 (1.6-2.5)	48.4 (37.8-58.9)
	1978-1982	217	4.9 (4.3-5.6)	1.4 (1.1-1.8)	59.4 (49.9-68.5)
	1983-1987	314	6.0 (5.3-6.7)	1.5 (1.1-1.8)	65.0 (57.3-72.2)
	1988-1992	435	6.8 (6.2-7.5)	1.9 (1.5-2.2)	56.8 (51.2-62.2)
	1993-1997	609	7.8 (7.2-8.4)	1.5 (1.2-1.8)	66.2 (61.2-71.0)
	1998-2002	908	9.5 (8.9-10.1)	1.8 (1.5-2.1)	66.4 (62.6-70.0)
	2003-2007	1357	11.9 (11.3-12.6)	1.8 (1.5-2.0)	68.1 (65.0-71.0)
	2008-2012	1787	13.1 (12.5-13.7)	2.1 (1.8-2.3)	72.7 (70.2-75.1)
	2013-2017	2617	17.0 (16.3-17.6)	2.5 (2.2-2.7)	68.6 (66.6-70.6)
	2018	620	18.8 (17.2-20.3)	2.5 (2.0-3.0)	71.7 (67.9-75.3)
	2014-2018	**2769**	**17.5 (16.8-18.1)**	**2.5 (2.3-2.7)**	**68.7 (66.8-70.6)**
Ovary	1968-1972	222	6.0 (5.2-6.8)	1.4 (1.0-1.8)	
	1973-1977	262	6.2 (5.5-7.0)	2.3 (1.8-2.7)	32.6 (25.5-40.0)
	1978-1982	414	8.7 (7.8-9.5)	3.9 (3.3-4.4)	33.1 (27.4-39.1)
	1983-1987	504	8.8 (8.0-9.6)	3.3 (2.8-3.8)	29.5 (24.6-34.7)
	1988-1992	703	10.4 (9.6-11.2)	3.5 (3.1-4.0)	39.3 (34.7-44.0)
	1993-1997	886	11.0 (10.2-11.7)	4.0 (3.6-4.5)	45.1 (41.1-49.1)
	1998-2002	1061	11.1 (10.4-11.8)	4.0 (3.6-4.5)	43.6 (40.4-46.8)
	2003-2007	1349	12.2 (11.5-12.9)	4.1 (3.7-4.5)	43.1 (40.3-46.0)
	2008-2012	1634	12.7 (12.1-13.4)	3.9 (3.5-4.2)	42.1 (39.5-44.7)
	2013-2017	1888	13.1 (12.5-13.8)	3.8 (3.5-4.1)	42.7 (40.3-45.0)
	2018	387	12.3 (11.0-13.6)	3.2 (2.6-3.8)	35.7 (31.7-39.8)
	2014-2018	**1897**	**12.9 (12.3-13.5)**	**3.7 (3.4-4.0)**	**42.7 (40.4-45.0)**
Lymphoid neoplasms	1968-1972	153	3.7 (3.1-4.4)	1.7 (1.3-2.2)	
	1973-1977	180	4.2 (3.6-4.9)	1.6 (1.2-2.0)	21.2 (12.1-32.5)
	1978-1982	218	4.6 (4.0-5.3)	2.0 (1.6-2.4)	19.6 (13.3-27.0)
	1983-1987	349	6.5 (5.8-7.2)	2.2 (1.8-2.6)	33.2 (26.5-40.3)
	1988-1992	457	7.3 (6.6-8.0)	3.5 (3.0-4.0)	26.7 (21.8-31.9)
	1993-1997	552	7.2 (6.6-7.8)	3.1 (2.7-3.5)	36.0 (31.0-41.0)
	1998-2002	715	8.1 (7.5-8.7)	3.1 (2.7-3.5)	43.7 (39.4-48.0)
	2003-2007	1009	10.3 (9.6-11.0)	3.0 (2.7-3.4)	48.4 (44.6-52.2)
	2008-2012	1247	10.5 (9.8-11.1)	2.7 (2.4-3.0)	58.1 (54.9-61.2)
	2013-2017	1737	12.4 (11.7-13.1)	2.7 (2.5-3.0)	59.5 (56.7-62.2)
	2018	393	11.9 (10.6-13.2)	2.9 (2.3-3.4)	58.3 (52.9-63.5)
	2014-2018	**1809**	**12.3 (11.7-13.0)**	**2.8 (2.5-3.0)**	**59.0 (56.3-61.6)**

		Number	ASIR (95% CI)*	ASMR (95% CI)*	ASRS (95% CI)
Non-melanoma skin	1968-1972	153	5.2 (4.3-6.0)	0.2 (0.1-0.4)	
	1973-1977	198	5.4 (4.7-6.2)	0.3 (0.1-0.5)	104.0 (93.6-112.2)
	1978-1982	328	7.3 (6.5-8.1)	0.4 (0.2-0.5)	92.1 (83.2-99.9)
	1983-1987	374	6.9 (6.2-7.6)	0.3 (0.2-0.4)	91.3 (83.6-98.0)
	1988-1992	526	7.6 (7.0-8.3)	0.4 (0.2-0.5)	89.7 (83.7-94.9)
	1993-1997	666	8.1 (7.5-8.7)	0.3 (0.2-0.4)	101.6 (96.8-105.8)
	1998-2002	790	7.9 (7.4-8.5)	0.3 (0.2-0.4)	92.7 (88.7-96.2)
	2003-2007	800	6.7 (6.2-7.2)	0.1 (0.0-0.1)	96.0 (92.2-99.4)
	2008-2012	1218	8.0 (7.5-8.5)	0.1 (0.1-0.1)	97.5 (94.4-100.3)
	2013-2017	1508	8.0 (7.6-8.4)	0.1 (0.1-0.2)	97.7 (95.0-100.1)
	2018	328	7.5 (6.6-8.3)	0.2 (0.0-0.3)	101.7 (95.9-106.2)
	2014-2018	1568	7.9 (7.4-8.3)	0.1 (0.1-0.2)	99.1 (96.6-101.4)
Thyroid	1968-1972	163	4.4 (3.7-5.1)	0.8 (0.5-1.1)	
	1973-1977	169	3.8 (3.2-4.4)	0.6 (0.4-0.9)	57.2 (46.7-67.0)
	1978-1982	226	4.2 (3.6-4.7)	0.9 (0.6-1.2)	54.9 (46.7-62.7)
	1983-1987	370	5.8 (5.2-6.4)	0.6 (0.4-0.8)	71.2 (65.0-76.8)
	1988-1992	436	6.0 (5.4-6.5)	0.9 (0.7-1.1)	68.0 (63.0-72.6)
	1993-1997	492	5.7 (5.2-6.2)	0.7 (0.5-0.9)	81.9 (77.6-85.8)
	1998-2002	655	6.7 (6.2-7.2)	0.7 (0.6-0.9)	76.7 (72.9-80.1)
	2003-2007	661	6.0 (5.5-6.4)	0.6 (0.5-0.8)	78.4 (75.0-81.6)
	2008-2012	994	7.9 (7.4-8.4)	0.5 (0.4-0.6)	84.0 (81.3-86.5)
	2013-2017	1434	10.3 (9.8-10.9)	0.4 (0.3-0.5)	89.7 (87.7-91.6)
	2018	314	10.7 (9.5-12.0)	0.3 (0.2-0.5)	84.8 (80.2-88.7)
	2014-2018	1483	10.5 (9.9-11.0)	0.4 (0.3-0.5)	90.0 (88.0-91.8)
Stomach	1968-1972	542	17.4 (15.9-18.8)	11.9 (10.6-13.1)	
	1973-1977	610	16.6 (15.3-18.0)	13.3 (12.1-14.5)	6.6 (4.5-9.4)
	1978-1982	643	14.6 (13.4-15.7)	11.5 (10.5-12.5)	11.1 (8.4-14.1)
	1983-1987	772	14.3 (13.3-15.4)	9.4 (8.6-10.2)	13.6 (10.9-16.6)
	1988-1992	826	12.5 (11.6-13.3)	9.6 (8.8-10.3)	17.2 (14.4-20.2)
	1993-1997	917	11.4 (10.7-12.2)	8.1 (7.4-8.7)	22.6 (19.5-26.0)
	1998-2002	969	10.0 (9.3-10.6)	7.0 (6.5-7.6)	24.4 (21.5-27.4)
	2003-2007	890	7.4 (6.9-7.9)	5.0 (4.6-5.4)	25.6 (22.5-28.9)
	2008-2012	1077	7.1 (6.7-7.5)	4.4 (4.0-4.7)	26.6 (23.6-29.7)
	2013-2017	1152	6.2 (5.9-6.6)	3.5 (3.2-3.8)	35.4 (32.2-38.7)
	2018	234	5.6 (4.9-6.4)	3.0 (2.5-3.5)	39.3 (32.4-46.3)
	2014-2018	1160	6.0 (5.7-6.4)	3.3 (3.1-3.6)	37.4 (34.2-40.6)
Cervix	1968-1972	603	18.0 (16.6-19.5)	4.9 (4.2-5.7)	
	1973-1977	676	17.6 (16.3-18.9)	7.0 (6.2-7.9)	47.5 (42.9-52.0)
	1978-1982	751	16.6 (15.4-17.8)	7.3 (6.5-8.1)	48.3 (44.1-52.5)
	1983-1987	897	16.2 (15.1-17.3)	6.0 (5.4-6.7)	47.3 (43.3-51.3)
	1988-1992	1002	15.3 (14.3-16.2)	6.0 (5.4-6.6)	55.5 (52.0-58.9)
	1993-1997	1128	13.9 (13.0-14.7)	5.4 (4.9-6.0)	59.9 (56.6-63.0)
	1998-2002	1038	10.7 (10.0-11.4)	4.5 (4.0-4.9)	63.8 (60.6-66.8)
	2003-2007	1015	8.9 (8.3-9.5)	3.4 (3.1-3.8)	61.5 (58.3-64.5)
	2008-2012	926	6.8 (6.4-7.3)	2.5 (2.2-2.8)	60.5 (57.3-63.6)
	2013-2017	1080	7.1 (6.7-7.5)	2.1 (1.9-2.3)	60.4 (57.3-63.3)
	2018	219	6.6 (5.7-7.5)	1.7 (1.3-2.2)	63.6 (57.1-69.6)
	2014-2018	1088	7.0 (6.5-7.4)	2.1 (1.8-2.3)	62.3 (59.3-65.2)

* per 100,000 resident population

3.1 Trends in age-standardised incidence, mortality, and survival of selected cancers in males and females, 1968-2018

KEY POINTS

- Survival rates had increased over the years for the common cancers diagnosed in males and females; however, differing trends were observed for their incidence and mortality rates.
- In males, there were notable rises in the incidence of colorectal and prostate cancers; but also significant falls in that of lung, liver, and stomach cancers.
- While there was a noteworthy fall in the mortality of stomach cancer in males, that of pancreatic and colorectal cancers had risen.
- In females, the ASIR of breast, uterine, and ovarian cancers had risen significantly; while there had been noteworthy falls in the incidence of stomach and cervical cancers.
- Breast and ovarian cancer mortality had risen significantly, whereas that of stomach and cervical cancers had fallen.
- Noteworthy increases in cancer survival included that of colorectal, prostate, lung, and liver cancers for males, and breast, uterine, lung, and stomach cancers in females.

3.2 Stage distribution for selected cancers, 2009-2013 and 2014-2018

Cancer survival and mortality are linked in part to the distribution of stage at diagnosis, as the prognosis for late stage cancer tends to be poorer and survival rates are lower. Of the ten most frequent incident cancers in males and females, those which exhibited poorer survival rates tended to also have a higher proportion of diagnoses at later stages (Stages III and IV) (Figures 3.2.1(a)-3.2.2(b)). Fortunately, comparing the staging distribution of the ten most frequent incident cancers in males and females for 2014-2018, there had been a slight increase in the proportion of early-stage diagnoses (Stages I and II) from 2009-2013 to 2014-2017 (both periods staged based on AJCC 7) for the majority of the cancers with a few exceptions. For males, the proportion of early-stage colorectal cancers over the two periods remained about the same and that for prostate cancer dropped by about 10 percentage points from 2009-2013 to 2014-2017 (Table 3.2(a)). For females, the proportion of colorectal and uterine cancers diagnosed at Stages I and II remained similar across the two periods, and there was a decrease of about 7 percentage points from 2009-2013 to 2014-2017 for thyroid cancer (Table 3.2(b)).

Among males, lung, pancreatic and stomach cancers had the highest proportion of late-stage diagnoses, with over 80% of diagnoses of lung cancer occurring at Stages III and IV in both 2009-2013 and 2014-2018 (Figures 3.2.1(a)-3.2.1(b), Table 3.2(a)). These three cancers, along with liver cancer, had the poorest 5-year relative survival rates among the ten most frequent incident cancers in males for 2014-2018 (Figure 2.2(a)). On the other hand, non-melanoma skin, prostate and kidney cancers had the highest proportion of diagnoses occurring at Stages I and II for both 2009-2013 and 2014-2018, with over 95% of non-melanoma skin cancers being diagnosed early – consequently, these three cancers had the best five-year relative survival rates among the ten most frequent cancers diagnosed in males for 2014-2018 (Figure 2.2(a)).

Among females, a similar pattern can be observed in terms of the stage distribution and survival rates. Lung, stomach, and colorectal cancers had the highest proportion of late-stage diagnoses (Figures 3.2.2(a)-3.2.2(b), Table 3.2(b)). Along with ovarian cancer and lymphoid neoplasms, these were the five cancers with poorer survival rates for females in the period 2014-2018 (Figure 2.2(b)). Conversely, non-melanoma skin, uterine, and breast cancers had the highest proportion of early-stage diagnoses, and along with thyroid cancer, had the four highest five-year ASRS among the ten most frequent incident cancers among females for 2014-2018 (Figure 2.2(b)).

Figure 3.2.1(a) Stage distribution (%) of selected cancers in males, 2009-2013

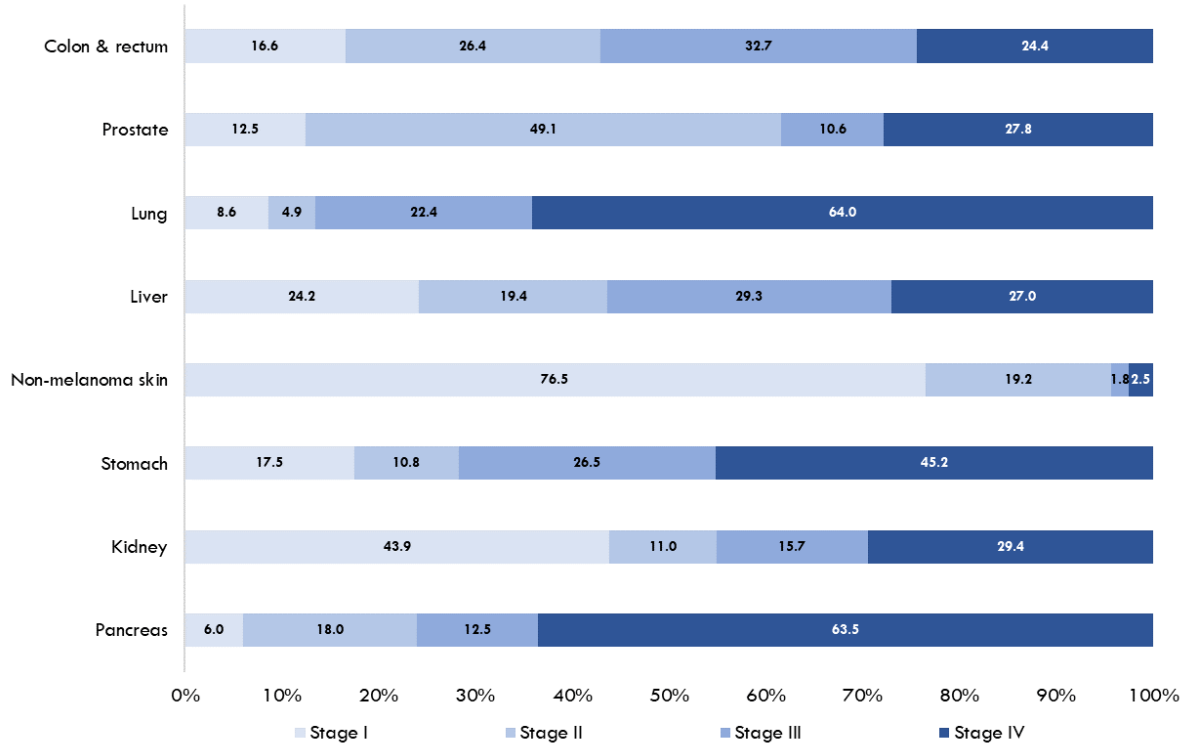
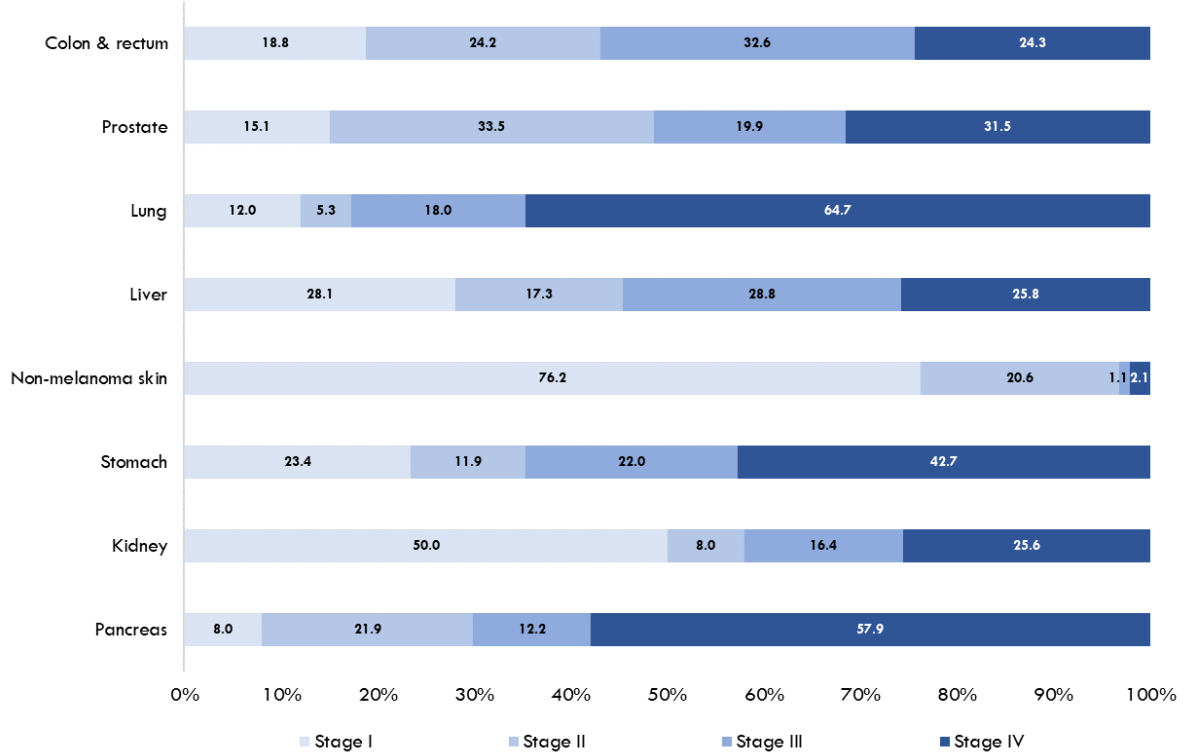


Figure 3.2.1(b) Stage distribution (%) of selected cancers in males, 2014-2018*



*cases diagnosed from 2014-2017 were staged based on AJCC 7; cases diagnosed in 2018 were staged based on AJCC 8

Figure 3.2.2(a) Stage distribution (%) of selected cancers in females, 2009-2013

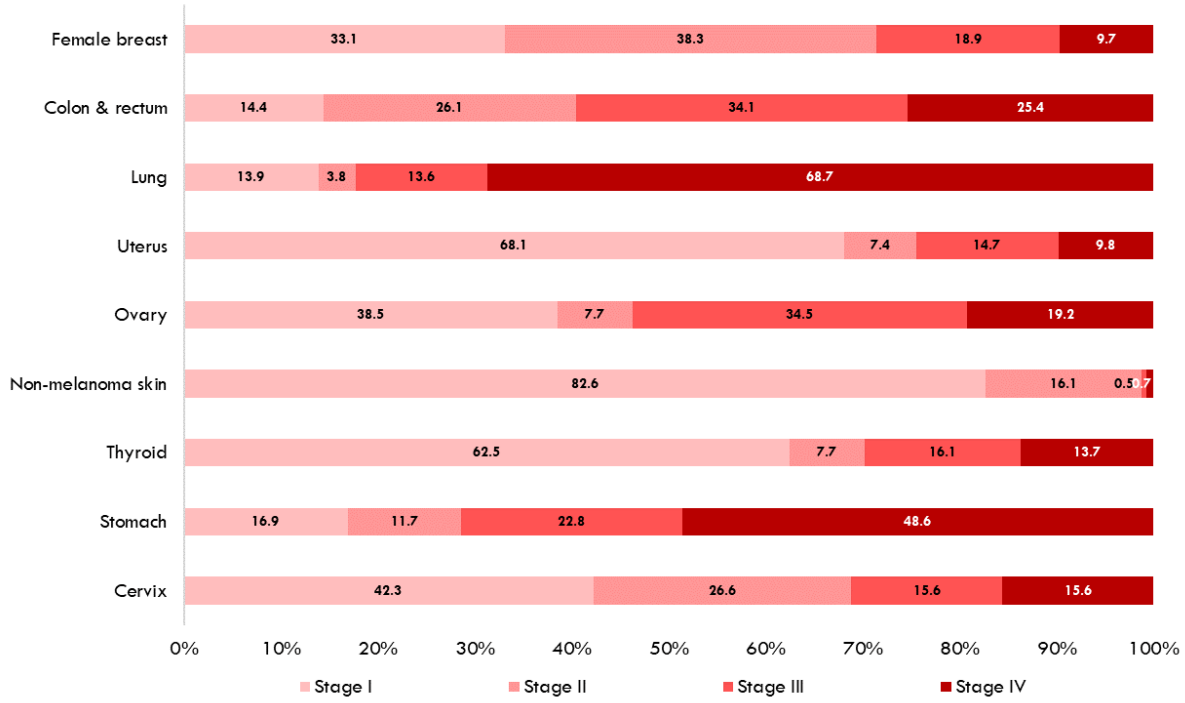
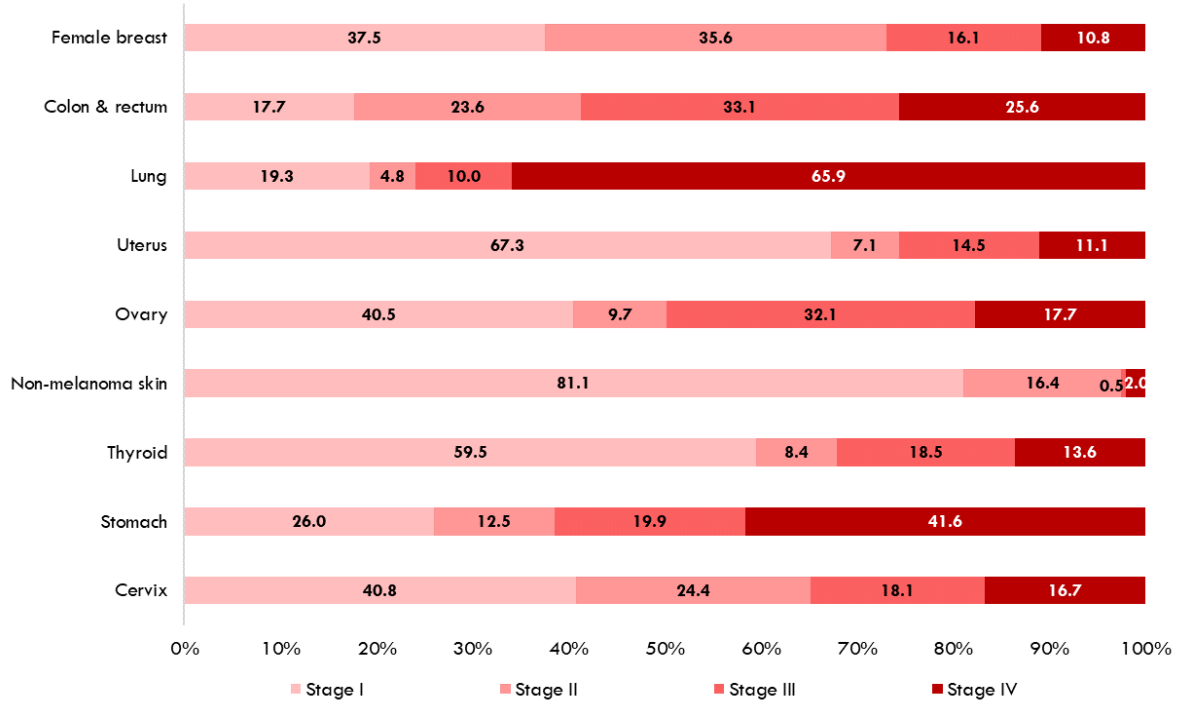


Figure 3.2.2(b) Stage distribution (%) of selected cancers in females, 2014-2018*



*cases diagnosed from 2014-2017 were staged based on AJCC 7; cases diagnosed in 2018 were staged based on AJCC 8

Table 3.2(a) Stage distribution (%) of selected cancers in males, 2009-2018

	2009-2013 (AJCC 7)				2014-2017 (AJCC 7)				2018 (AJCC 8)			
-	Stage I	Stage II	Stage III	Stage IV	Stage I	Stage II	Stage III	Stage IV	Stage I	Stage II	Stage III	Stage IV
Colon & rectum	16.6	26.4	32.7	24.4	18.4	24.5	33.1	24.0	20.2	23.3	30.7	25.7
Prostate	12.5	49.1	10.6	27.8	15.7	35.5	17.2	31.6	13.2	26.2	29.5	31.1
Lung	8.6	4.9	22.4	64.0	11.7	5.1	18.1	65.1	13.6	5.9	17.8	62.7
Liver	24.2	19.4	29.3	27.0	26.5	18.0	29.2	26.3	35.6	13.7	27.2	23.5
Non-melanoma skin	76.5	19.2	1.8	2.5	76.2	20.6	1.2	2.0				
Stomach	17.5	10.8	26.5	45.2	22.8	12.4	22.0	42.8	26.1	9.8	22.0	42.0
Kidney	43.9	11.0	15.7	29.4	51.0	7.8	16.4	24.8	37.2	10.3	16.7	35.9
Pancreas	6.0	18.0	12.5	63.5	8.4	22.9	12.2	56.5	4.1	11.0	12.3	72.6

Table 3.2(b) Stage distribution (%) of selected cancers in females, 2009-2018

	2009-2013 (AJCC 7)				2014-2017 (AJCC 7)				2018 (AJCC 8)			
-	Stage I	Stage II	Stage III	Stage IV	Stage I	Stage II	Stage III	Stage IV	Stage I	Stage II	Stage III	Stage IV
Female breast	33.1	38.3	18.9	9.7	33.5	39.2	16.5	10.8	55.5	19.4	13.8	11.2
Colon & rectum	14.4	26.1	34.1	25.4	17.5	23.3	34.0	25.2	18.6	24.8	29.3	27.4
Lung	13.9	3.8	13.6	68.7	18.3	4.9	9.7	67.2	23.7	4.7	11.3	60.2
Uterus	68.1	7.4	14.7	9.8	68.0	7.1	13.9	11.1	65.1	7.2	16.7	11.0
Ovary	38.5	7.7	34.5	19.2	39.5	10.9	32.7	16.9	44.6	5.0	29.5	20.9
Non-melanoma skin	82.6	16.1	0.5	0.7	81.0	16.5	0.5	2.0				
Thyroid	62.5	7.7	16.1	13.7	56.4	6.3	22.1	15.2	73.0	17.7	2.8	6.5
Stomach	16.9	11.7	22.8	48.6	26.6	13.1	21.1	39.2	23.7	10.1	14.8	51.5
Cervix	42.3	26.6	15.6	15.6	41.4	21.7	19.9	17.0	38.6	35.9	10.3	15.2

* Under the AJCC 8 staging system, only non-melanoma of the head & neck and trunk are staged; therefore, staging information for non-melanoma skin in 2018 is omitted

3.2 Stage distribution for selected cancers by gender, 2009-2013 and 2014-2018

KEY POINTS

- Survival and mortality rates are linked in part to the distribution of stage at diagnosis as cancers diagnosed at later stages tend to have poorer prognosis – cancers with more late-stage diagnoses also tend to have lower survival rates.
- From 2009-2013 to 2014-2018, there had been a slight increase in the proportion of diagnoses at early stages for most of the common cancers diagnosed in males and females.
- Cancers with higher proportions of late-stage diagnoses tend to have poorer survival rates
    - Lung, pancreatic, and stomach cancers had the highest percentages of late-stage diagnoses in males and had among the lowest survival rates
    - The same was observed for lung, stomach, and colorectal cancers in females.
- In males, non-melanoma skin, prostate, and kidney cancers had the highest percentages of early-stage diagnoses and consequently the highest survival rates. Similarly, in females, non-melanoma skin, uterine, and breast cancers had the highest proportion of early-stage diagnoses and had among the best survival rates.

APPENDIX 1

CANCER SITES AND GROUPS USED IN REPORT BY ICD-10 CODES

ICD-10 description	ICD-10	Label in report
Stomach	C16	Stomach
Colon	C18	Colon & rectum
Rectum including rectosigmoid	C19-C20	
Liver & intrahepatic bile ducts	C22	Liver
Pancreas	C25	Pancreas
Trachea, bronchus & lung	C33-C34	Lung
Skin (non-melanoma)	C44	Non-melanoma skin
Breast	C50	Female breast
Cervix uteri	C53	Cervix
Corpus uteri	C54	Uterus
Ovary & fallopian tube	C56	Ovary
Fallopian tube	C57.0	
Prostate	C61	Prostate
Kidney	C64	Kidney
Renal pelvis	C65	
Ureter	C66	
Urethra	C68	
Thyroid	C73	Thyroid
Lymphoid neoplasms	C81-C85, C90-C91, C96	Lymphoid neoplasms
Myeloid neoplasms	C92-C94	Myeloid neoplasms

HAEMATOLOGICAL MALIGNANCY GROUPS USED IN THIS REPORT

Lymphoid Neoplasms
Precursor Lymphoid Neoplasms
B Mature Neoplasms
T/NK Mature Neoplasms
Immunodeficiency -associated lymphoproliferative disorders
Histiocytic and Dendritic Cell Neoplasm
Malignant Lymphoma NOS
Myeloid Neoplasms and Acute Leukaemia
Acute leukaemia of ambiguous lineage
Acute Myeloid Leukaemia and related Precursor Neoplasm
Myeloproliferative Neoplasm
Myelodysplastic / Myeloproliferative Neoplasm

REFERENCES

[1] World Health Organisation, Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death 10th edition, Geneva.

[2] C. Percy, L. Thomas and J. Berg, Manual of Tumour Nomenclature and Coding (MOTNAC), 1968 edition, American Cancer Society Inc., 1968.

[3] C. Percy, V. Van Holten and C. Muir, International Classification of Diseases for Oncology, Second Edition, Geneva: WHO, 1990.

[4] A. Fritz, C. Percy, A. Jack, K. Shanmugaratnam and L. Sobin, International Classification of Diseases for Oncology, Third Edition, Geneva: WHO, 2000.

[5] International Agency for Research on Cancer, WHO Classification of Tumours the 4th edition, [Online]. Available: https://whobluebooks.iarc.fr. [Accessed Jan 2019].

[6] F. Greene, D. Page, I. Fleming, A. Fritz, C. Balch and D. Haller, AJCC Cancer Staging Manual 6th edition, New York: Springer, 2002.

[7] S. Edge , D. Byrd, C. Compton, A. Fritz, F. Greene and A. Trotti, AJCC Cancer Staging Manual 7th Edition, New York: Springer, 2010.

[8] M. Amin, S. Edge, F. Greene, D. Byrd, R. Brookland, M. Washington, J. Gershewald, C. Compton, K. Hess, et al, AJCC Cancer Staging Manual 8th Edition, New York: Springer, 2017.

[9] Department of Statistics, Singapore, "Singstat Table Builder," 2019. [Online]. Available: http://www.tablebuilder.singstat.gov.sg. [Accessed 21 March 2019].

[10] EUROCARE, EUROCARE-6 Protocol for updating population-based cancer survival in, 2015.

[11] C. Allemani, T. Matsuda, V. Di Carlo, et al., "Global surveillance of trends in cancer survival 2000-14 (CONCORD-3): analysis of individual records for 37 513 025 patients diagnosed with one of 18 cancers from 322 population-based registries in 71 countries," *Lancet,* vol. 391, no. 10125, pp. 1023-1075, 2018.

[12] Department of Economic and Social Affairs, United Nations, MortPak-The United Nations, https://un.org/en/development/desa/population/publications/mortality/mortpak.shtml.

[13] Department of Statistics, Singapore, "Life Tables from 2003," [Online]. Available: https://www.singstat.gov.sg/publications/population/complete-life-table.

[14] H. Brenner , V. Arndt , O. Gefeller and T. Hakulinen , "An alternative approach to age adjustment of cancer survival rates," *Eur J Cancer,* vol. 40, no. 15, pp. 2317-22, 2004.

[15] I. Corazziari , M. Quinn and R. Capocaccia , "Standard cancer patient population for age standardising survival ratios," *Eur J Cancer,* vol. 40, no. 15, pp. 2307-16, 2004.