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MINISTRY OF HEALTH

Malaysian Study On CANCER SURVIVAL

MySCan

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MALAYSIAN STUDY ON CANCER SURVIVAL (MySCan)

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PREFACE

Malaysian Study on Cancer Survival or MySCan is the first population based cancer survival study done in the country using National Cancer Registry data. Increasingly, all related professionals and policy makers are keen to utilize the cancer survival information as one of the reference in managing various aspects of the cancer treatment and cancer control programme in the country.

Survival is a key factor for any cancer patient, cancer care practitioners and others who provide cancer treatment and programme. While survival information is intuitively a key factor in anticipating the consequences of a cancer diagnosis and treatment, they may or may not be a clear reflection of the quality of care provided by a physician or cancer programme. Many factors beyond treatment affect overall survival of a patient, including the biology of the cancer itself, the demographic characteristic of the patients and the overall health or comorbidity of the patient diagnosed with cancer.

This report will focus on the findings of 5-year relative survival for 15 of the commonest cancers in Malaysia and the factors that may influence them. Information on relative survival from cancer provides an indication of cancer prognosis and the effectiveness of the cancer screening programme. The findings would give some background on the current status of cancer survival in Malaysia and hopefully would significantly contribute to the improvement in the quality of care for cancer patients.

The registry collects and disseminates reliable population-based cancer data such as incidence and survival primarily to assist in the planning and formulating of the national cancer prevention and control strategy. In addition, timely, accurate, reliable and validated information on cancers statistics is crucial in the planning of effective preventive and management strategies for cancer. There will also be research opportunities for those who are interested to study more about cancer epidemiology and trend over the years.

Much time and effort has been put into accuracy, completeness and data quality, in the process of collecting the data and in preparing this report. We sincerely hope that the data in this report would be used as a reference material.

We wish to record our thanks to all participating hospitals, clinics, institutions, and laboratories from government and private sectors for their cooperation and regular notifications to the respective state cancer registries. We also wish to extend our appreciation to Health Informatics Centre (HIC), National Registration Department and Department of Statistics, Malaysia for supporting us with the relevant information and data to assist in the analysis of MySCan.

Thank you all.

FOREWORD

Cancer is the second leading cause of death globally and contributed to 8.8 million deaths in 2015. In Malaysia, cancer is the fourth leading cause of death which contributes to 12.6% of all deaths in government hospitals and 26.7% in private hospitals.

Survival data on cancer have long been recognised globally as crucial for monitoring the effectiveness of cancer control program at population level complementing the information on incidence.

Cancer incidence is an essential measure in the performance on cancer promotion and prevention while cancer survival reflects the effectiveness of the population-based cancer screening programme for early detection and also an indicator to the quality of treatment and cancer care.

The Malaysian Study on Cancer Survival (MySCan) is the first population-based cancer survival report in Malaysia that would provide valuable information on population-based of survival to guide policymakers, public health professionals and clinicians to move forward in formulating better cancer control strategies. It aims to initiate Malaysian surveillance on cancer survival by regularly using the population-based cancer registry data.

One-third of deaths from cancers are due to five leading behavioural and dietary risks; high body mass index, low fruits and vegetable intake, lack of physical activities, tobacco use and alcohol use. Tobacco use is the most common risk factor for cancers and is responsible for approximately 22% of cancer deaths. The National Strategic Plan for Cancer Control Programme (NSPCCP) 2016-2020 was formulated to reduce the negative impact of cancer in Malaysia further. The activities outlined in this strategic plan are intended to operationalise the seven strategies outlined by the World Health Organisation (WHO) in cancer control. Availability of survival data from MySCan will undoubtedly contribute to evaluating the strategies that were implemented through NSPCCP.

I am pleased to present this first Malaysian Study on Cancer Survival report and would like to congratulate and acknowledge the excellent teamwork of MySCan editorial committee members, National Cancer Registry team, state cancer registries and all individuals and organisations that have directly or indirectly contributed to its publication.

We look forward to the continuation of the effort in providing Malaysia with population-based cancer survival surveillance system through MySCan. Thank you.

DATUK DR. NOOR HISHAM ABDULLAH
Director General of Health, MALAYSIA

MESSAGE

First of all, I would like to thank the National Cancer Registry Department and National Cancer Institute (NCI) in publishing this Malaysian Cancer Survival Report (MySCan). I was informed this is the first population-based cancer survival report in Malaysia and I am confident that it would be a stepping stone for the initiation of cancer survival surveillance system in the country.

Malaysia is approaching an epidemiologic transition, like most developed and advanced developing countries, where disease related to lifestyles particularly cardiovascular diseases and cancers have progressively become more prevalent.

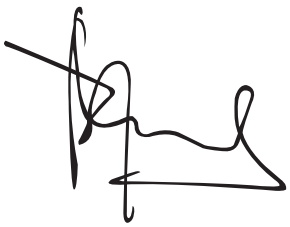
In 2018, WHO reported 30-50% of cancer are currently be prevented by avoiding risk factors and implementing existing evidence based prevention strategies.

The Government recognises cancer as an important health concern among Malaysians. Ministry of Health are committed in cancer control and prevention strategies in reducing incidence, mortality and improving cancer survival. Prevention, control and management of cancers will be made accessible and affordable to the population through collaboration with various stakeholders and integrated into the social, economic and environmental system to establish a robust platform for effective control of cancer in Malaysia.

There is strong evidence to support cancer screening programme in improving cancer survival. In Malaysia, there were established and accessible cancer screening programme for breast, cervix uteri and colorectal cancers. MOH has also introduced Hepatitis B vaccination in prevention of liver cancer in 1989 followed by Human Papillomavirus (HPV) vaccination in 2013 to prevent cervical cancer. In addition to the screening programme, effective health promotion and education campaigns, which demystify cancer and results in early detection and diagnosis will contribute to a better survival.

Finally I would like to record my appreciation to the excellent teamwork of the director of the National Cancer Institute, National Cancer Registry Department and State Cancer Registries for this publication. Last and foremost a greatest gratitude and congratulate to the editorial team for their effort in producing this report. I am looking forward for the future publications on cancer statistic pertaining to cancer survival in this country.

Thank you



Y.B. DR DZULKEFLY BIN AHMAD
Minister of Health, MALAYSIA

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- All specialists from government and private sectors especially the oncologists, pathologists, other disciplines specialists, palliative care professionals, and all other members of the medical profession from various health facilities, universities and non-government organisations.
- Deputy Director of Health Informatics Centre, Ministry Of Health
- Director of National Registration Department, Malaysia
- Chief Statistician of Department of Statistics, Malaysia
- All medical records team and other staff members of the government and private hospitals, institutions, health clinics and private pathology laboratories for continuously contributing data by cancer notifications to the state cancer registries
- Dean of School of Medical Sciences, Universiti Sains Malaysia (USM)
- Head, Department of Public Health, RCSI & UCD Malaysia Campus

We would like to express our gratitude to MySCan team members for their commitment and assistance in preparation of MySCan dataset. (In alphabetical order); **Medical Officers**; Dr. Ayu Zeity Bistari Md Bukhori, Dr. Azhar Ibrahim Omar, Dr. Norazrul Nasri, Dr. Renuga K. Raman and Dr. Sharifah Saffinas Syed Soffian. **Supporting staff**; Noriezatulafida Mohd Ariffin, Mastulu Wahab, Noorshila Shuib and Maslinda Mat Said. Our appreciation also goes to all members of 15 state cancer registries for continuously coordinating data collections and quality control at state level and diligently contributing data to the National Cancer Registry.

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Lastly we wish to record our appreciation to all individuals and organisations that have directly or indirectly contributed to this report.Thank you all for the valuable contributions.

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LIST OF ABBREVIATIONS

Brain & NS	Brain & Nervous system
CI	confidence interval
CRC	Colorectal Cancer
DCO	death certificate only
HR	hazard ratio
IARC	International Agency for Research on Cancer
IC	identification card
ICD-10	International Statistical Classification of Diseases and Related Health Problems 10th Revision
ICD-O3	International Classification of Diseases for Oncology, 3rd edition
KM	Kaplan-Meier
LFU	loss to follow up
Lung, T & B	Lung, trachea and bronchus
MNCR	Malaysian National Cancer Registry
MST	median survival time
MySCan	Malaysian Study on Cancer Survival
NCD	Non-communicable disease
NCI	National Cancer Institute
NCR	National Cancer Registry
NPC	Nasopharynx Cancer
NRD	National Registration Department
NSPCCP	National Strategic Plan for Cancer Control Programme
OS	observed survival
RS	relative survival
WHO	World Health Organization

Malaysian Study on Cancer Survival (MySCan) aims to initiate Malaysian surveillance of cancer survival using population-based data from the National Cancer Registry. This is to ensure availability of evidence based information in monitoring and evaluation the progress of National Cancer Prevention and Control Programme and cancer management in the country. This is the first national cancer survival report using population-based data with wide coverage involving 15 state cancer registries in Malaysia.

This report applies only to Malaysian citizens and residents who were diagnosed from 1st January 2007 until 31st December 2011 with follow-up to 31st December 2016. Survival were analysed for 0-10 years after diagnosis for 15 selected cancers. Total of 72884 cases were included for analysis. Of these 29263 (40.2%) were males and 43621 (59.8%) were females. Majority were Chinese (43.2%) followed by Malays (40.7%), Bumiputera (8.6%), Indians (6.6%) and Other Ethnic groups (0.8%).

The five highest 5-year relative survivals (RS) were in thyroid (82.3%), prostate (73.0%), corpus uteri (70.6%), female breast (66.8%), and colon (56.8%) cancers. The survivals were predominantly higher in women and younger age group.

Survival by staging was done only for cases in which stage was recorded (58%). Out of these, 18% was in stage I, 26% was in stage II and 56% was in late stage (stage III and IV). The 5-year RS was higher at stage I and deteriorated as stage progressed. In comparison to stage I, the hazard ratio (HR) at stage IV was 7.52 (95% CI: 6.83, 8.28) in female breast, 5.45 (95% CI: 4.60, 6.46) in cervix uteri and 3.86 (95% CI: 3.44, 4.32) in colorectal cancer which were statistically significant.

In Malaysia, there were established and accessible cancer screening programmes for breast, cervix uteri and colorectal cancers. Despite of the availability of screening programmes for above cancers, the percentage of cases who presented at late stage (stage III & IV) were 41.3%, 38.5% and 63.8% respectively.

As this study reported diagnosis at late stage was a significant determinant for poor cancer survival, there is an urgent need to strengthen the promotion and awareness on cancer prevention and screening programme in the community. This can be done through collaboration with various stakeholders and integrated into the social, economic and environmental system to establish a robust platform for effective cancer screening programme in Malaysia. Effective programme can then be implemented at various level that include community engagement to address patient behaviour, improving diagnostic and referral capacity and ensuring access to timely, affordable and high-quality treatment. The findings in this report should spur the right impetus among policy makers and programme managers to facilitate timely diagnosis and improved access to cancer treatment for all.

The most worrying cancer with the lowest survival was cancer of the lung, trachea & bronchus with 5-year RS of 11.0% and a median survival time (MST) of 6.8 months. The focus for this rapidly fatal cancer should be driven to constructive preventive strategies rather than treatment. The great deal of policy and programmatic attention should be directed toward youth smoking prevention.

This study also revealed cancer survival estimates in Malaysia was comparable to other Asian country and the patterns are similar with other studies done for the same type of cancer. The survival was lower compared to Australia, New Zealand, USA and most of European countries.

1.0 INTRODUCTION

Ministry of Health has started its population-based cancer registry in 1993. It was started with six regional population-based cancer registries to ensure long term sustainability. Since 2007 all fifteen states in Malaysia had set up their own population-based registries which were headed by National Cancer Registry in the Ministry of Health under the Non-Communicable Disease Sector, Disease Control Division. The secretariat for the NCR has been transferred to the National Cancer Institute (NCI) since 1st January 2015. Along with cancer incidence and mortality data, population-based survival estimates provide further insight to assess the effectiveness of cancer control and prevention programme.

MySCan or Malaysian Study on Cancer Survival aims to initiate Malaysian surveillance on cancer survival using population based cancer registry. This is the first National cancer survival report using population-based data with coverage for all state cancer registries in Malaysia. Population-based cancer survival data is useful for health policy in evaluating the effectiveness of the overall cancer control strategy. Survival estimates of patients registered by population-based cancer registries reflect the average prognosis from a given cancer, since they are based on unselected patients with a variety of natural histories as well as treatment patterns.

1.1 Geographical Background

Malaysia covers an area of about 330,289 sq. km, consisting of Peninsular Malaysia and East Malaysia. It is separated by the South China Sea and has its frontier with Thailand, Singapore, Indonesia and Brunei. Peninsular Malaysia is located south of Thailand, north of Singapore and east of the Indonesian Island of Sumatera. East Malaysia comprises most of the northern part of Borneo and shares borders with Brunei and Indonesia. Located near the equator, Malaysia's climate is categorised as equatorial, being hot and humid throughout the year.

Malaysia is divided into thirteen states and three Federal Territories. Eleven states and two Federal Territories are found in Peninsular Malaysia meanwhile, two states and one Federal Territory are found in East Malaysia. Peninsular Malaysia consists of the following states (from north to south): Perlis, Kedah, Pulau Pinang (Penang), Perak, Selangor, Federal Territory of Kuala Lumpur and Putrajaya (WPKL & Putrajaya), Negeri Sembilan, Melaka, Johor, Pahang, Terengganu and Kelantan. East Malaysia consists of Sabah, Sarawak and the Federal Territory of Labuan (W.P. Labuan).

1.2 Health Status and Cancer Burden

The health status of Malaysia has been enhanced by improvement in health infrastructure and health services. Since Independence in 1957, changes in disease patterns in relation to lifestyle related conditions have occurred. Life expectancy in Malaysia at birth for both sexes has increased over the years, rising from 56 years for males and 58 years for females in 1957 to 72.5 years for males and 77.2 years for females in 2016.

The cancer incidence in Malaysia, 2007-2011 in males was 86.9 and in females was 99.3 per 100,000 populations (MNCR, 2016). Cancer imposes a tremendous economic burden on patients, families and the society they live in. Apart from financial cost, cancer has an important psychosocial effect on patients and their families.

In Malaysia, cancer is the fourth leading cause of death which contributes to 12.6% of all deaths in government hospitals and 26.7% in private hospitals in 2016. There has been an increasing trend from 2007-2016 from 11.3% in 2007 to 12.6% in 2016 (Health Facts, 2017).

1.3 Malaysian Population

The Malaysian population in 2016 was 31.6 million including the non-citizens. The population pyramid and its distribution by sex and age group is shown in Figure 1. Among Malaysian citizens, there were 50.6% males and 49.4% females. Majority were Malays (55.6%), followed by Chinese (23.4%), Bumiputera (13.0%), Indians (7%) and Others (1%).

Table 1. Population by sex, ethnic groups and citizenship, Malaysia, 2016

Variables	Characteristics	NO.	(%)
Sex	Male	14,371,900	50.6
	Female	14,031,500	49.4
Ethnic groups	Malays	15,796,400	55.6
	Bumiputera	3,688,900	13.0
	Chinese	6,645,700	23.4
	Indians	1,991,600	7.0
	Others	280,900	1.0
	Total	**28,403,500**	**100.0**
Citizenship	Malaysian	28,403,500	89.8
	Non-Malaysian	3,230,000	10.2
	Total	**31,633,500**	**100.0**

Source: Department of Statistics Malaysia

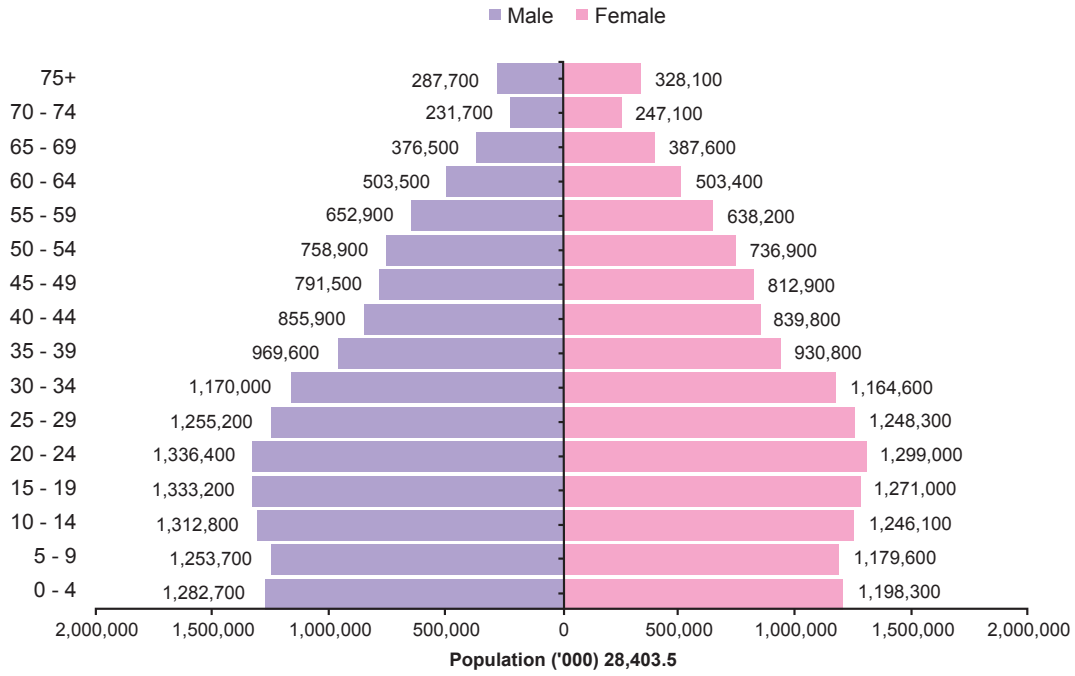


Figure 1. Population pyramid, all residents, Malaysia, 2016

2.0 METHODOLOGY

2.1 Method and Data Source

Data was extracted from the population-based National Cancer Registry (NCR) database. Survival was measured from the date of diagnosis until death, loss to follow-up, or censoring. Cancer survival was analysed for 0-10 year duration after diagnosis.

Data were selected for 15 commonest cancer diagnosed in 2007-2011 and follow-up to 31st December 2016. Data was extracted using Canreg5 software following the **inclusion criteria** as below:

- All confirmed cancer cases with incidence date within the period of 2007-2011
- Malaysian citizenship and residing in Malaysia at the time of diagnosis
- 13 solid cancers defined by topography
- 2 haematological malignancies defined by morphology

Thirteen solid cancers or group of cancers were defined by anatomical site (topography) which were female breast, colorectal, lung, trachea & bronchus, nasopharynx, prostate, brain & nervous systems, stomach, liver, cervix uteri, ovary, corpus uteri, thyroid and pancreas. The haematological malignancies which were leukaemia and lymphoma were defined by morphology.

In addition to colorectal cancer, colon and rectal cancers were also analysed individually. Cases categorised under rectal cancer were defined with topography of recto-sigmoid, rectum (ICD-10: C19-C20), anorectal and anus with histology of adenocarcinoma only (ICD-10: C21).

Collectively, these 15 cancers accounted for about 75% of the estimated number of patients diagnosed with cancer in Malaysia for the period of 2007-2011.

Follow up on vital status of registered cancer cases was done by data linkage with national index of all death registrations provided by the Malaysian National Registration Department (NRD) for all causes of death for the period of 1st January 2007 until 31st December 2016.

Cancer data were matched using Malaysian identification card (IC) numbers to all death data and updated with the date and cause of death. Transcription errors can arise with IC numbers, so variables such as the name, sex, and date of birth were also used to improve the probability of an accurate match between a cancer record and a death registration. Data that could not be identify by NRD, was further matched with list of hospital discharges from the Health Informatics Centre.

Finally for those cases that could not be identified through both processes were recorded as lost to follow-up (LFU) due to unknown eventual death and censored from survival analysis on that date. We considered survival estimates as less reliable if 15% or more of patients were lost to follow-up (LFU) and in this report the percentages of LFU was **4.1%**.

2.2 Data Quality

The methodology for data collections in NCR was stated clearly in MNCR, 2007-2011. Data quality in NCR has used the same common indices as indicated in the Cancer Incidence in Five Continents (CI5) report, provided by the International Agency for Research on Cancer, WHO (IARC, Lyon, France). Topography and morphology were coded to the International Classification of Diseases for Oncology (ICD-O-3) (WHO. 2013). The case definitions, classification, multiple primaries rules of the IARC guidelines were followed.

Cases were checked for **eligibility** by identifying the duplicates, consistencies check and morphology verification as stated below and will be removed from the data set if not eligible;

Consistencies Check: The logical inconsistencies between the variables in each cancer record were checked using IARC tools. The variables in each record were checked for eligibility (e.g. age and cancer behaviour), definite errors (e.g. sex site errors, invalid dates, impossible date sequence, and missing vital status), and possible errors, including a wide range of inconsistencies between age, cancer site, and morphology.

Morphology verification: The proportion of cancer records with morphological verification of the diagnosis were examined, whether from histology of a biopsy or surgical specimen, cytology of a smear or bone marrow aspirate, or from imaging or biomarkers, including tumours with a specific morphology code.

Finally all eligible cases were checked for **exclusion criteria** as below and excluded from the final data set for analysis;

- Cases registered as death certificate only (DCO) or diagnosed at autopsy
- Solid cancers among childhood (0-14 years)
- Person aged more than 99 years due to population life tables for this age group is not available.
- Cases with invalid date of diagnosis - if death occurred within 2 weeks but the patients had treatment (chemotherapy, radiotherapy, hormonal treatment) and histology results recorded.

2.3 Statistical Analysis

Analysis was done using Statistical software Stata version 14 to estimate the survival for 0-10 years after diagnosis for each cancer type as defined earlier. RS was estimated by using life tables stratified by age, sex, and calendar year. Malaysian complete life tables and three major ethnic groups [Bumiputera (Malay & other bumiputera); Chinese, Indians and others] were constructed by IARC based on Malaysian population abridged life tables 2007-2016 (Department of Statistic Malaysia, 2007-2016).

Analysis by ethnicity was done for Malays, Chinese and Indians using respective life tables except for Malays, where Bumiputera life tables were used due to unavailability of life tables for Malay separately. However it's appropriate to use this life table considering majority (82%) of the Bumiputera ethnicity were Malays.

Overall observed survival was estimated by actuarial life tables and Kaplan-Meier method (survival curve) to compare between groups by sex, ethnic and age. Estimation of relative survival (RS) were based on **Ederer II estimator** for overall survival and stratified by sex, ethnicity, age groups and stage at diagnosis by cancer types.

2.3.1 Definition of Statistical Term Used

2.3.1.1 Estimation of Relative Survival

Relative survival is the standard approach used by population-based cancer registries to produce population-level relative survival statistics as it does not require information on cause of death. Observed survival and expected survival are used to estimate relative survival.

i. Observed survival (OS)

The proportion of people alive for a given amount of time after a diagnosis of cancer; it is calculated from population-based cancer data.

ii. Expected survival (ES)

Expected survival is the proportion of people in the general population alive for a given amount of time. These are derived from life-tables for the Malaysian general population which includes deaths from all causes, including cancer.

iii. Relative survival (RS)

Relative survival refers to the probability of being alive for a given amount of time after diagnosis compared with all mortality in the general population. Relative survival is calculated by dividing observed survival by the expected survival for the general population. STATA packages (strs) developed by Paul W. Dickman were used to obtain the relative survival estimates (Dickman et al. 2009).

2.3.1.2 Median Survival Time (MST)

National Cancer Institute, USA defined median survival time as “The length of time from the date of diagnosis of cancer, that half of the patients in a group of patients diagnosed with the disease are still alive”. It is the time expressed in months or years that the chance of surviving beyond that time is 50%. Median survival cannot be estimated if the number of deaths from total number of cancer analysed is less than 50%.

2.3.1.3 Hazard Ratio (HR)

A measure of chance of an event occurring in one group compared to chance of an event occurring in another group, over time. A hazard ratio of one means that there is no difference in survival between the two groups. A hazard ratio of greater than one or less than one means that survival was better in one of the groups (National Cancer Institute, 2018). In this report, simple Cox regression analysis was used to calculate crude hazard ratio. Hazard ratio of more than one indicate increase hazard (risk) to death in a group compared to the reference group.

Table 2. Summary of data quality: Numbers and percentage of eligible, excluded and included cases by cancer types, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Cancer types	Extracted from NCR	Ineligible		Eligible	Excluded		Included	Present status of cases included			
	NO.	NO.	%	NO.	NO.	%	NO.	Death	Alive	LFU	% of LFU
Female Breast	18206	716	3.9	17490	481	2.8	17009	7372	9077	560	3.3
Colorectal	13683	852	6.2	12831	738	5.8	12093	7630	4041	422	3.5
Lung, T & B	10606	976	9.2	9630	1609	16.7	8021	7287	514	220	2.7
Nasopharynx	5051	182	3.6	4869	172	3.5	4697	2896	1621	180	3.8
Lymphoma	5374	353	6.6	5021	312	6.2	4709	2668	1709	332	7.1
Cervix Uteri	4352	189	4.3	4163	148	3.6	4015	2247	1579	189	4.7
Leukaemia	4573	372	8.1	4201	328	7.8	3873	2208	1252	413	10.7
Ovary	3414	149	4.4	3265	181	5.5	3084	1631	1351	102	3.3
Prostate	3132	95	3.0	3037	124	4.1	2913	1719	1104	90	3.1
Stomach	3459	260	7.5	3199	381	11.9	2818	2267	449	102	3.6
Liver	4085	527	12.9	3558	792	22.3	2766	2470	201	95	3.4
Thyroid	2248	73	3.2	2175	117	5.4	2058	545	1440	73	3.5
Corpus Uteri	2181	78	3.6	2103	65	3.1	2038	778	1164	96	4.7
Brain & NS	1876	336	17.9	1540	188	12.2	1352	877	428	47	3.5
Pancreas	1829	121	6.6	1708	270	15.8	1438	1263	129	46	3.2
TOTAL	**84069**	**5279**	**6.3**	**78790**	**5906**	**7.5**	**72884**	**43858**	**26059**	**2967**	**4.1**

3.0 RESULTS

A total of 72884 cases were analysed which consist of 64302 of solid cancers and 8582 of haematological malignancies. For quick and better comparison some of the findings in this report will be presented by cancer category according to the cancer domain by speciality.

3.1 Sociodemographic Characteristic of Cases

Majority of the cases were Chinese (43.2%) followed by Malays (40.7%), Bumiputera (8.6%), Indians (6.6%) and Other Ethnic groups (0.8%). Most of the cases were females 43621 (59.8%) and 29263 (40.2%) were males. Adults were 98% of the total cases with majority of patients between 45- 64 years old.

Table 3. Characteristic of cases by sex and ethnic groups

Sex	All cases		Malay		Chinese		Indian		Bumiputera		Others	
	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
Male	29263	40.2	11174	37.7	13658	43.3	1459	30.2	2712	43.2	260	44.0
Female	43621	59.8	18497	62.3	17864	56.7	3369	69.8	3560	56.8	331	56.0
Total	**72884**		**29671**		**31522**		**4828**		**6272**		**591**	

Table 4. Number and percentage of cancers by age groups in adults

Cancer types	15-44 years		45-54 years		55-64 years		65-74 years		75+ years		Total
	NO.	(%)	NO.	(%)	NO.	(%)	NO.	(%)	NO.	(%)	
Female Breast	4435	(26.1)	5936	(34.9)	4152	(24.4)	1829	(10.8)	657	(3.9)	**17009**
Cervix Uteri	971	(24.2)	1244	(31.0)	969	(24.1)	602	(15.0)	229	(5.7)	**4015**
Ovary	934	(30.3)	989	(32.1)	692	(22.4)	354	(11.5)	115	(3.7)	**3084**
Corpus Uteri	363	(17.8)	626	(30.7)	673	(33.0)	279	(13.7)	97	(4.8)	**2038**
Stomach	304	(10.8)	480	(17.0)	689	(24.4)	800	(28.4)	545	(19.3)	**2818**
Colon	731	(11.7)	1131	(18.0)	1772	(28.2)	1618	(25.8)	1021	(16.3)	**6273**
Rectum	592	(10.2)	1069	(18.4)	1682	(28.9)	1636	(28.1)	841	(14.5)	**5820**
Liver	349	(12.6)	610	(22.1)	888	(32.1)	638	(23.1)	281	(10.2)	**2766**
Pancreas	140	(9.7)	284	(19.7)	455	(31.6)	382	(26.6)	177	(12.3)	**1438**
Lung, T & B	657	(8.2)	1473	(18.4)	2308	(28.8)	2452	(30.6)	1131	(14.1)	**8021**
Prostate	24	(0.8)	114	(3.9)	661	(22.7)	1328	(45.6)	786	(27.0)	**2913**
Nasopharynx	1459	(31.1)	1433	(30.5)	1101	(23.4)	568	(12.1)	136	(2.9)	**4697**
Thyroid	868	(42.2)	472	(22.9)	370	(18.0)	273	(13.3)	75	(3.6)	**2058**
Brain & NS	556	(41.1)	304	(22.5)	266	(19.7)	176	(13.0)	50	(3.7)	**1352**
Lymphoma	1468	(32.9)	885	(19.8)	1019	(22.8)	767	(17.2)	326	(7.3)	**4465**
Leukaemia	1235	(45.8)	510	(18.9)	495	(18.4)	317	(11.8)	137	(5.1)	**2694**
All cancers	**15086**	**(21.1)**	**17560**	**(24.6)**	**18192**	**(25.5)**	**14019**	**(19.6)**	**6604**	**(9.2)**	**71461**

Table 5. Number and percentage of cancers by age groups in childhood

Cancer types	0-4 years		5-9 years		10-14 years		Total
	NO.	(%)	NO.	(%)	NO.	(%)	
Lymphoma	46	(18.9)	81	(33.2)	117	(48.0)	**244**
Leukaemia	586	(49.7)	330	(28.0)	263	(22.3)	**1179**
Both cancers	**632**	**(44.4)**	**411**	**(28.9)**	**380**	**(26.7)**	**1423**

3.2 Cancer Survival in Malaysia

3.2.1 Overall Cancer Survival

The five highest for overall 5-year RS were in thyroid (82.3%), prostate (73.0%), corpus uteri (70.6%), female breast (66.8%), and colon (56.8%) cancers. The lowest cancer survival was in lung, trachea & bronchus (11.0%). Survivals in haematological malignancies were higher in childhood compared to adults.

Table 6. Overall cancer survival by cancer types, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Cancer types	5-year cancer survival (%)			
	OS	95% CI	RS	95% CI
Women's Cancers				
Female Breast	61.9	(61.1, 62.6)	66.8	(66.0, 67.6)
Cervix Uteri	46.9	(45.4, 48.5)	51.6	(49.8, 53.3)
Ovary	51.2	(49.3, 52.9)	54.5	(52.6, 56.4)
Corpus Uteri	65.1	(62.9, 67.2)	70.6	(68.2, 72.8)
Gastrointestinal Cancers				
Stomach	20.2	(18.7, 21.7)	25.7	(23.8, 27.6)
Colorectal	40.8	(40.0, 41.7)	51.1	(50.0, 52.3)
Colon	45.3	(44.1, 46.6)	56.8	(55.2, 58.3)
Rectum	36.0	(34.7, 37.3)	45.1	(43.5, 46.6)
Liver	11.1	(9.9, 12.3)	12.8	(11.5, 14.3)
Pancreas	11.9	(10.3, 13.7)	14.0	(12.1, 16.1)
Other Cancers				
Lung, T & B	9.0	(8.4, 9.7)	11.0	(10.3, 11.9)
Prostate	49.1	(47.2, 50.9)	73.0	(70.2, 75.7)
Nasopharynx	42.7	(41.3, 44.1)	46.0	(44.4, 47.5)
Thyroid	77.1	(75.2, 78.9)	82.3	(80.2, 84.2)
Brain & NS	38.2	(35.5, 40.8)	40.8	(38.0, 43.6)
Haematological Malignancies				
Lymphoma overall	44.9	(43.4, 46.3)	49.3	(47.7, 50.9)
Lymphoma (adults)	40.1	(38.7, 41.6)	48.5	(46.9, 50.2)
Lymphoma (children)	46.3	(40.0, 52.4)	63.3	(56.3, 69.4)
Leukaemia overall	41.9	(40.3, 43.5)	44.0	(42.3, 45.7)
Leukaemia (adults)	31.1	(29.4, 32.9)	36.5	(34.5, 38.5)
Leukaemia (children)	44.1	(41.3, 46.9)	62.3	(59.3, 65.3)

Note* OS: Observed survival, RS: Relative survival

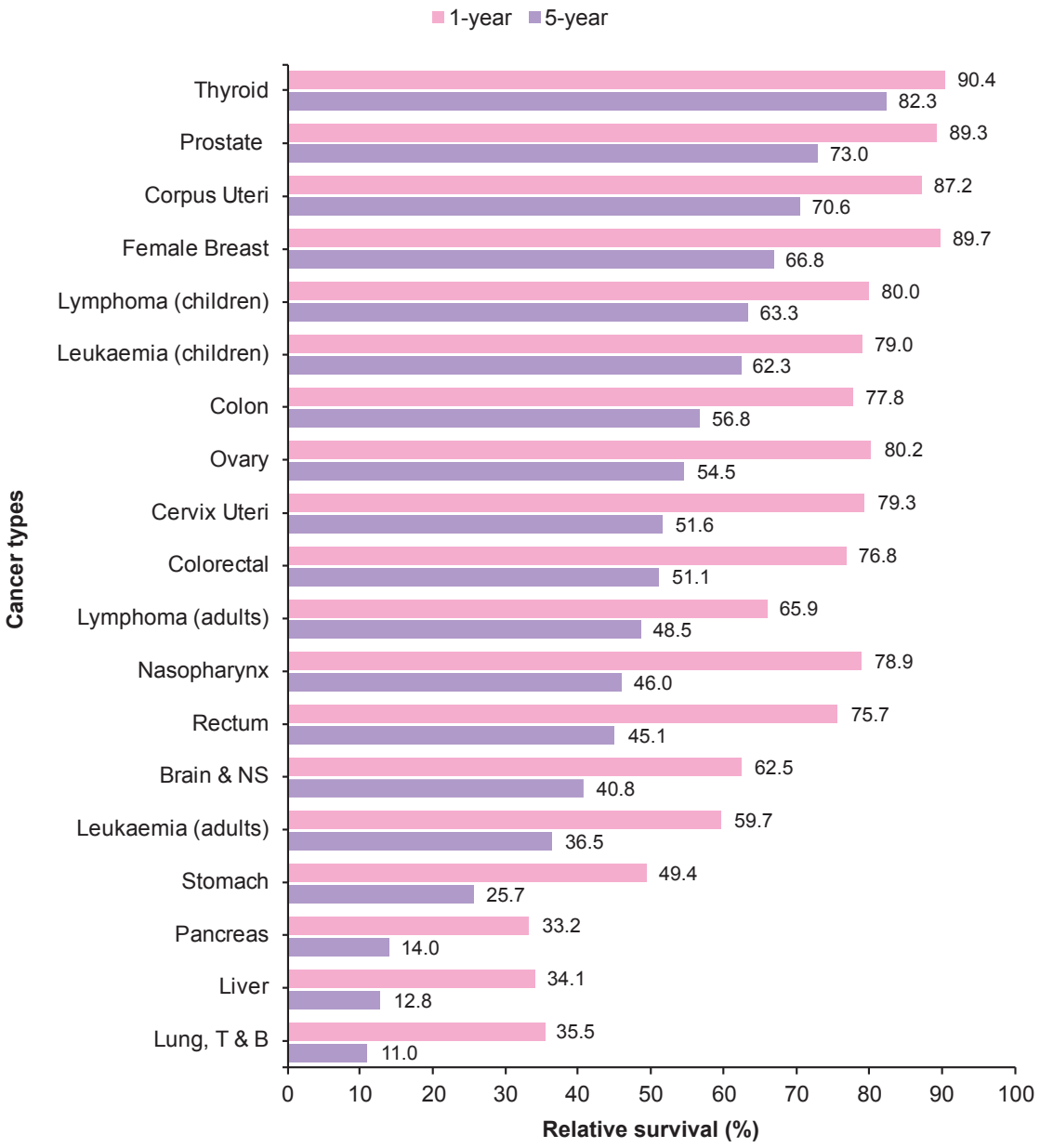


Figure 2. Relative survival at 1-year and 5-year by cancer types, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

3.2.1.1. Median Survival Time

Median survival time (MST) was estimated in all cancers except in cancer with total death of less than 50%, i.e. female breast (43.3%), thyroid (26.5%), corpus uteri (38.2%), childhood leukaemia (34.3%) and childhood lymphoma (34.0%). Median survival cannot be estimated if the number of deaths from total number of cancer analysed is less than 50%.

Table 7. Median survival time by cancer types, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Cancer types	Total cases	Total death		MST (years)	95% CI	MST (months)	95% CI
		NO.	%				
Women's Cancers							
Female Breast	17009	7372	43.3	-	-	-	-
Cervix Uteri	4015	2247	56.0	3.84	(3.47, 4.37)	46.09	(41.59, 52.44)
Ovary	3084	1631	52.9	5.38	(4.68, 6.14)	64.56	(56.21, 73.63)
Corpus Uteri	2038	778	38.2	-	-	-	-
Gastrointestinal Cancers							
Stomach	2818	2267	80.4	0.87	(0.80, 0.94)	10.38	(9.63, 11.30)
Colorectal	12093	7630	63.1	2.99	(2.84, 3.13)	35.91	(34.14, 37.59)
Colon	6273	3687	58.8	3.77	(3.50, 4.02)	45.24	(42.05, 48.20)
Rectum	5820	3943	67.7	2.47	(2.37, 2.61)	29.63	(28.42, 31.28)
Liver	2766	2470	89.3	0.45	(0.42, 0.49)	5.42	(5.06, 5.88)
Pancreas	1438	1263	87.8	0.54	(0.50, 0.58)	6.54	(6.01, 6.97)
Other Cancers							
Lung, T & B	8021	7287	90.8	0.57	(0.55, 0.59)	6.83	(6.57, 7.10)
Prostate	2913	1719	59.0	4.84	(4.47, 5.14)	58.02	(53.62, 61.73)
Nasopharynx	4697	2896	61.7	3.38	(3.17, 3.68)	40.57	(38.01, 44.16)
Thyroid	2058	545	26.5	-	-	-	-
Brain & NS	1352	877	64.9	1.97	(1.65, 2.56)	23.69	(19.78, 30.75)
Haematological Malignancies							
Lymphoma overall	4709	2668	56.7	3.05	(2.71, 3.45)	36.57	(32.56, 41.43)
Lymphoma (adults)	4465	2585	57.9	2.79	(2.48, 3.15)	33.45	(29.86, 37.85)
Lymphoma (children)	244	83	34.0	-	-	-	-
Leukaemia overall	3873	2208	57.0	2.34	(2.03, 2.63)	28.02	(24.34, 31.57)
Leukaemia (adults)	2694	1804	67.0	1.48	(1.35, 1.64)	17.71	(16.23, 19.68)
Leukaemia (children)	1179	404	34.3	-	-	-	-

3.2.1.2. Cancer Survival by Sex

Females had higher 5-year RS compared to males. The five highest 5-year RS in females were thyroid (85.4%), corpus uteri (70.6%), female breast (66.8%), colon (58.3%), and ovarian (54.5%) cancers. Whereas in males were prostate (73.0%), thyroid (72.1%), colon (55.4%), lymphoma (47.3%) and nasopharynx (44.8%) cancers.

Table 8. Relative survival by cancer types and sex, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Cancer types	Male			Female		
	NO.	5-year RS (%)	95% CI	NO.	5-year RS (%)	95% CI
Women's Cancers						
Female Breast	-	-	-	17009	66.8	(66.0, 67.6)
Cervix Uteri	-	-	-	4015	51.6	(49.8, 53.3)
Ovary	-	-	-	3084	54.5	(52.6, 56.4)
Corpus Uteri	-	-	-	2038	70.6	(68.2, 72.8)
Gastrointestinal Cancers						
Stomach	1644	24.4	(22.0, 27.0)	1174	27.4	(24.4, 30.5)
Colorectal	6678	49.0	(47.5, 50.5)	5415	53.8	(52.1, 55.4)
Colon	3297	55.4	(53.2, 57.5)	2976	58.3	(56.0, 60.5)
Rectum	3381	42.8	(40.8, 44.8)	2439	48.2	(45.8, 50.7)
Liver	2042	11.3	(9.8, 12.9)	724	17.3	(14.3, 20.5)
Pancreas	799	11.6	(9.3, 14.3)	639	17.1	(13.9, 20.5)
Other Cancers						
Lung, T & B	5543	10.4	(9.5, 11.3)	2478	12.5	(11.1, 14.1)
Prostate	2913	73.0	(70.2, 75.7)	-	-	-
Nasopharynx	3486	44.8	(43.0, 46.6)	1211	49.2	(46.2, 52.2)
Thyroid	491	72.1	(67.1, 76.6)	1567	85.4	(83.2, 87.3)
Brain & NS	748	35.2	(31.5, 38.9)	604	47.7	(43.4, 51.9)
Haematological Malignancies						
Lymphoma overall	2767	47.3	(45.2, 49.4)	1942	52.1	(49.6, 54.6)
Lymphoma (adults)	2609	46.4	(44.2, 48.6)	1856	51.5	(49.0, 54.0)
Lymphoma (children)	158	62.0	(53.2, 69.7)	86	65.6	(53.6, 75.2)
Leukaemia overall	2152	42.4	(40.1, 44.7)	1721	46.0	(43.4, 48.5)
Leukaemia (adults)	1484	34.8	(32.2, 37.5)	1210	38.5	(35.6, 41.4)
Leukaemia (children)	668	60.3	(56.2, 64.2)	511	65.0	(60.3, 69.3)

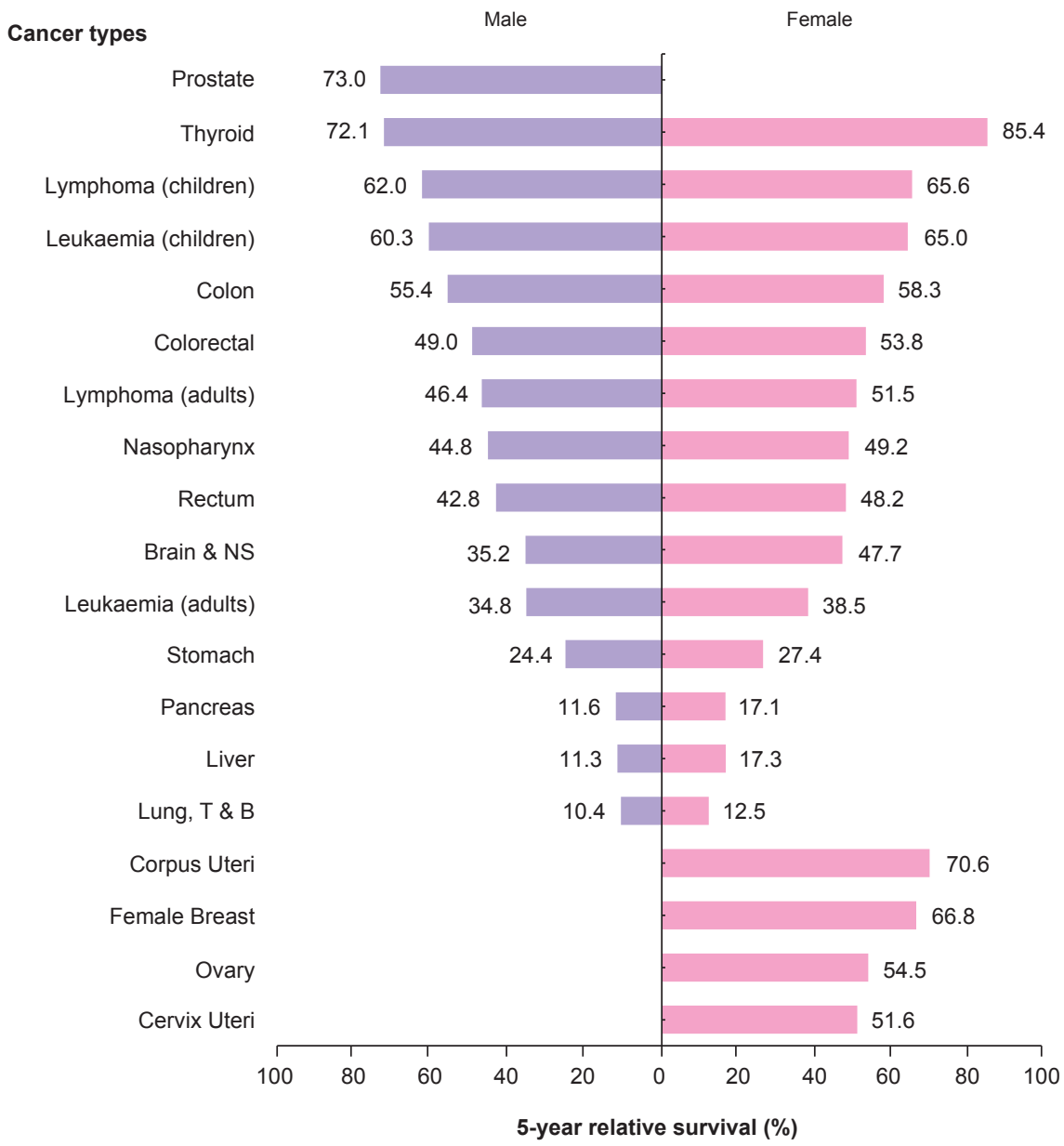


Figure 3. Relative survival by cancer types and sex, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

3.2.2 Cancer Survival by Ethnic Groups

Indians had higher survivals for most of the cancers, followed by Chinese and Malays. Indians had the highest survival in thyroid (87.6%), corpus uteri (79.5%), colorectal (58.3%), pancreas (19.8%), lung, trachea & bronchus (19.3%) and both haematological malignancies.

Malays had the highest survival in ovarian cancers (54.8%), brain & nervous system (43.0%), and stomach (27.6%). Chinese had the highest survival in prostate (81.9%), female breast (76.5%), cervix uteri (57.7%) and nasopharynx (52.2%).

Table 9. Relative survival by major ethnic groups and cancer types, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Cancer types	5-year relative survival by major ethnic groups (%)					
	Malay	95% CI	Chinese	95% CI	Indian	95% CI
Women's Cancers						
Female Breast	57.9	(56.7, 59.1)	76.5	(75.3, 77.6)	70.5	(67.8, 73.1)
Cervix Uteri	44.8	(41.9, 47.7)	57.7	(54.9, 60.4)	47.0	(40.5, 53.5)
Ovary	54.8	(52.1, 57.4)	51.4	(48.0, 54.6)	52.9	(45.9, 59.6)
Corpus Uteri	64.5	(60.9, 67.8)	75.5	(71.8, 79.0)	79.5	(71.8, 85.9)
Gastrointestinal Cancers						
Stomach	27.6	(23.5, 31.9)	26.9	(24.2, 29.8)	23.5	(18.0, 29.7)
Colorectal	44.9	(43.1, 46.6)	55.5	(53.9, 57.1)	58.3	(53.4, 63.1)
Colon	51.4	(48.8, 54.0)	60.1	(57.9, 62.2)	60.4	(53.5, 66.9)
Rectum	39.2	(36.9, 41.6)	49.8	(47.4, 52.1)	56.2	(49.1, 63.0)
Liver	11.6	(9.6, 13.8)	12.9	(11.0, 15.0)	17.4	(9.7, 27.5)
Pancreas	17.7	(14.1, 21.7)	10.7	(8.4, 13.3)	19.8	(11.9, 29.3)
Other Cancers						
Lung, T & B	10.9	(9.7, 12.2)	10.0	(8.9, 11.1)	19.3	(14.4, 24.8)
Prostate	60.4	(55.7, 65.0)	81.9	(78.2, 85.4)	73.9	(62.6, 84.5)
Nasopharynx	37.9	(35.0, 40.8)	52.2	(50.1, 54.2)	37.0	(23.4, 51.2)
Thyroid	81.4	(78.8, 83.9)	86.2	(82.0, 89.8)	87.6	(79.7, 93.3)
Brain & NS	43.0	(39.0, 46.9)	37.9	(33.1, 42.6)	39.1	(29.4, 48.7)
Haematological Malignancies						
Lymphoma overall	48.0	(45.8, 50.1)	52.7	(49.7, 55.6)	57.9	(51.2, 64.2)
Lymphoma (adults)	47.2	(44.9, 49.4)	52.4	(49.4, 55.4)	56.8	(49.9, 63.3)
Lymphoma (children)	60.5	(51.6, 68.3)	63.9	(42.9, 78.9)	76.9	(43.2, 92.3)
Leukaemia overall	43.3	(41.0, 45.5)	44.2	(40.9, 47.5)	51.6	(45.1, 57.8)
Leukaemia (adults)	36.6	(33.9, 39.3)	36.8	(33.2, 40.5)	43.4	(36.0, 50.6)
Leukaemia (children)	56.9	(53.0, 60.6)	72.3	(65.5, 78.1)	75.6	(63.1, 84.4)

The five highest 5-year RS among Malays were thyroid, corpus uteri, prostate, female breast and ovary, among Chinese were thyroid, prostate, female breast, corpus uteri and colon cancers and among Indians were thyroid, corpus uteri, prostate, female breast and colon cancers.

In children, the 5-year RS was highest in Indians, followed by Chinese and Malays both in lymphoma and leukaemia.

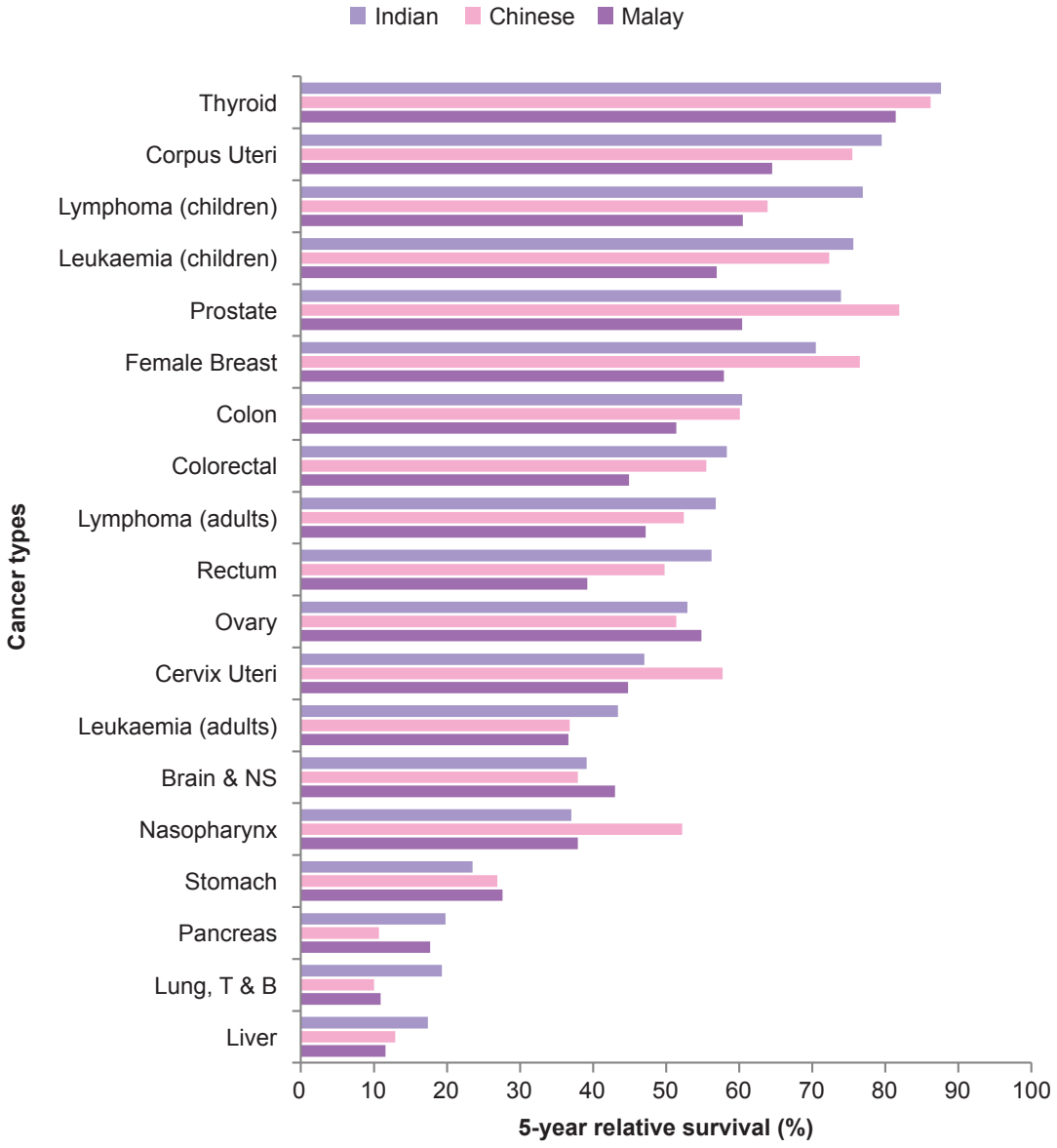


Figure 4. Comparison of 5-year relative survival by 3 major ethnic groups, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

3.2.3 Cancer Survival by Age Groups

The 5-year RS by age in adults were analysed in two age groups (15 to < 50 and ≥ 50 years old). In children the 5-year RS was analysed in three age groups (0-4, 5-9, 10-14 years old).

Table 10. Relative survival by cancer types and age groups (adults), period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Cancer types	5-year relative survival by age groups (%)			
	15 to < 50 years old	95% CI	≥ 50 years old	95% CI
Women's Cancers				
Female Breast	65.9	(64.8, 67.0)	67.6	(66.5, 68.8)
Cervix Uteri	56.2	(53.7, 58.7)	48.3	(46.0, 50.6)
Ovary	61.5	(58.9, 64.1)	48.3	(45.6, 51.0)
Corpus Uteri	78.5	(74.9 ,81.7)	66.8	(63.8, 69.7)
Gastrointestinal Cancers				
Stomach	28.0	(24.1, 32.1)	25.2	(23.0, 27.4)
Colorectal	46.6	(44.5, 48.7)	52.4	(51.1, 53.7)
Colon	53.7	(50.7, 56.5)	57.7	(55.9, 59.6)
Rectum	38.2	(35.1, 41.3)	46.8	(45.0, 48.6)
Liver	17.5	(14.5, 20.9)	11.5	(10.0, 13.1)
Pancreas	21.1	(16.2, 26.5)	12.4	(10.3, 14.7)
Other Cancers				
Lung, T & B	15.4	(13.4, 17.5)	10.2	(9.3, 11.0)
Prostate	43.6	(29.1, 57.3)	73.6	(70.8, 76.4)
Nasopharynx	51.6	(49.4, 53.8)	40.8	(38.7, 43.0)
Thyroid	94.8	(93.1, 96.1)	67.0	(63.3, 70.6)
Brain & NS	47.5	(43.7, 51.3)	33.6	(29.6, 37.7)
Haematological Malignancies				
Lymphoma	58.4	(56.0, 60.7)	41.3	(39.0, 43.5)
Leukaemia	43.8	(41.2, 46.4)	27.1	(24.3, 30.0)

Table 11. Relative survival by cancer types and age groups (children), period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Cancer types	5-year relative survival by age groups (%)					
	0-4 years old	95% CI	5-9 years old	95% CI	10-14 years old	95% CI
Lymphoma	66.3	(50.3, 78.2)	67.0	(53.5, 77.5)	60.0	(50.0, 68.7)
Leukaemia	69.3	(65.0, 73.1)	62.1	(56.0, 67.6)	47.5	(40.9, 53.9)

In adults aged 15 to less than 50 years, five highest 5-year RS were in cancer of thyroid, corpus uteri, female breast, ovary and lymphoma whereas for aged 50 years and above were prostate, female breast, thyroid, corpus uteri and colon cancers.

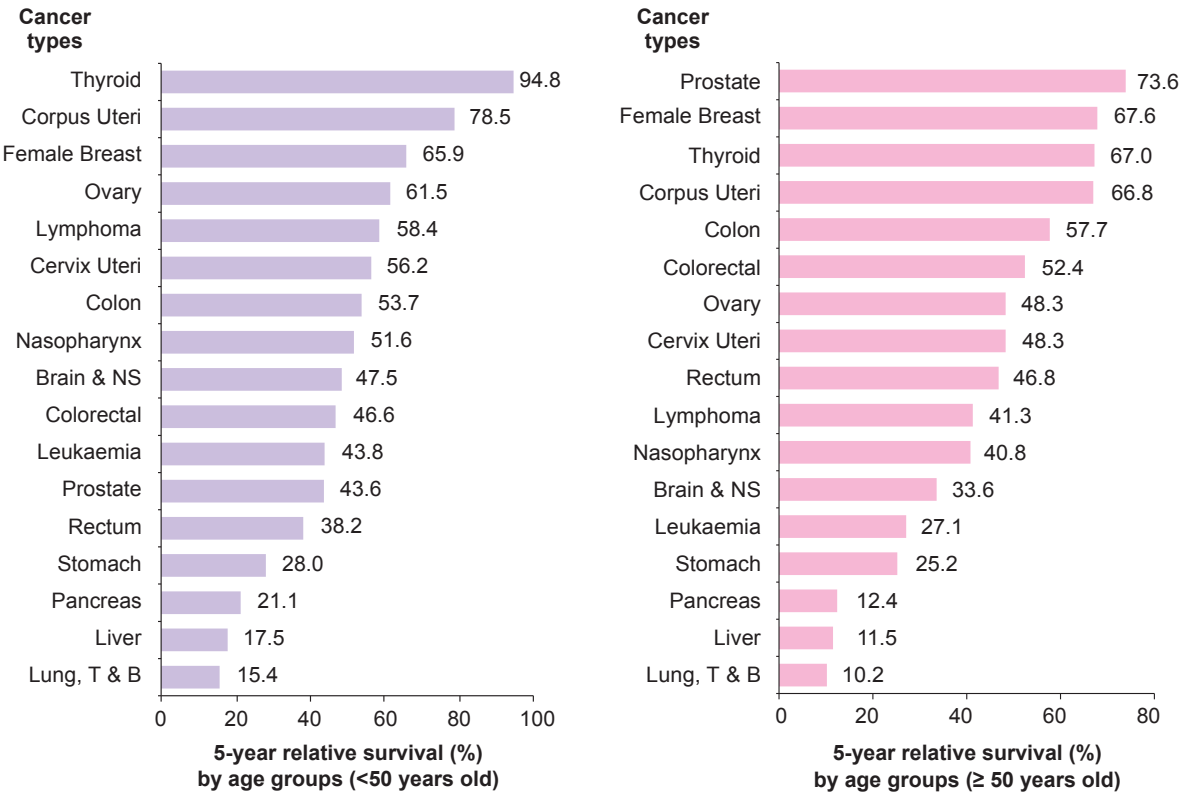


Figure 5. Relative survival by cancer types and age groups (adults), period of diagnosis 2007-2011 and followed up to 2016, Malaysia

In children, the 5-year RS in leukaemia was higher at 0-4 years old and reduced as the age progressed, whereas in lymphoma the survival was highest at 5-9 years old.

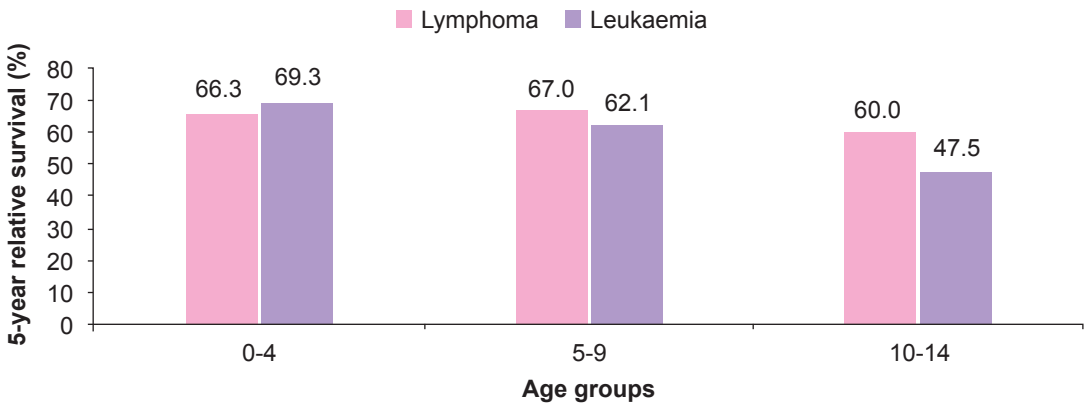


Figure 6. Relative survival by age groups in childhood lymphoma & leukaemia, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

3.2.4 Cancer Survival by Stage at Diagnosis

Survival analysis was done for all cancer types except for leukaemia (staging not applicable). Analysis was done only for cases with staging recorded which were 39,976 (58%) from total of 69,011 cases. Out of these, 18% was in stage I, 26% was in stage II and 56% was in late stage (stage III and IV).

Table 12. Relative survival by stage of diagnosis and cancer types, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Cancer types	Total numbers of cases	Cases with staging recorded		5-year relative survival (%)			
		NO.	%	Stage I	Stage II	Stage III	Stage IV
Women's Cancers							
Female Breast	17009	11444	67.3	87.5	80.7	59.7	23.3
Cervix Uteri	4015	2631	65.5	75.3	52.3	32.1	23.0
Ovary	3084	2164	70.2	82.8	59.7	37.1	20.7
Corpus Uteri	2038	1374	67.4	91.3	74.9	50.2	19.5
Gastrointestinal Cancers							
Stomach	2818	1261	44.7	54.6	50.3	28.2	8.8
Colorectal	12093	6962	57.6	75.8	72.5	55.6	17.3
Colon	6273	3641	58.0	79.3	77.4	62.5	18.8
Rectum	5820	3321	57.1	72.2	66.3	47.9	15.8
Liver	2766	1178	42.6	20.4	21.8	12.8	9.2
Pancreas	1438	744	51.7	19.6	29.3	10.0	5.7
Other Cancers							
Lung, T & B	8021	4715	58.8	37.1	17.4	7.5	6.3
Prostate	2913	1495	51.3	97.3	92.1	93.0	43.2
Nasopharynx	4697	2563	54.6	63.7	59.1	50.2	26.9
Thyroid	2058	837	40.7	96.0	93.1	81.2	40.9
Brain & NS	1352	528	39.1	68.3	50.5	32.8	17.0
Haematological Malignancies							
Lymphoma overall	4709	2080	44.2	65.8	66.7	50.0	36.3
Lymphoma (adults)	4465	1989	44.5	65.8	66.6	49.4	35.5
Lymphoma (children)	244	91	37.3	63.8	68.9	61.0	51.6

At stage I: The highest 5-year RS was 97.3% and the lowest was 19.6%. The five highest 5-year RS were prostate, thyroid, corpus uteri, female breast, ovarian cancers and the lowest survival was in pancreas.

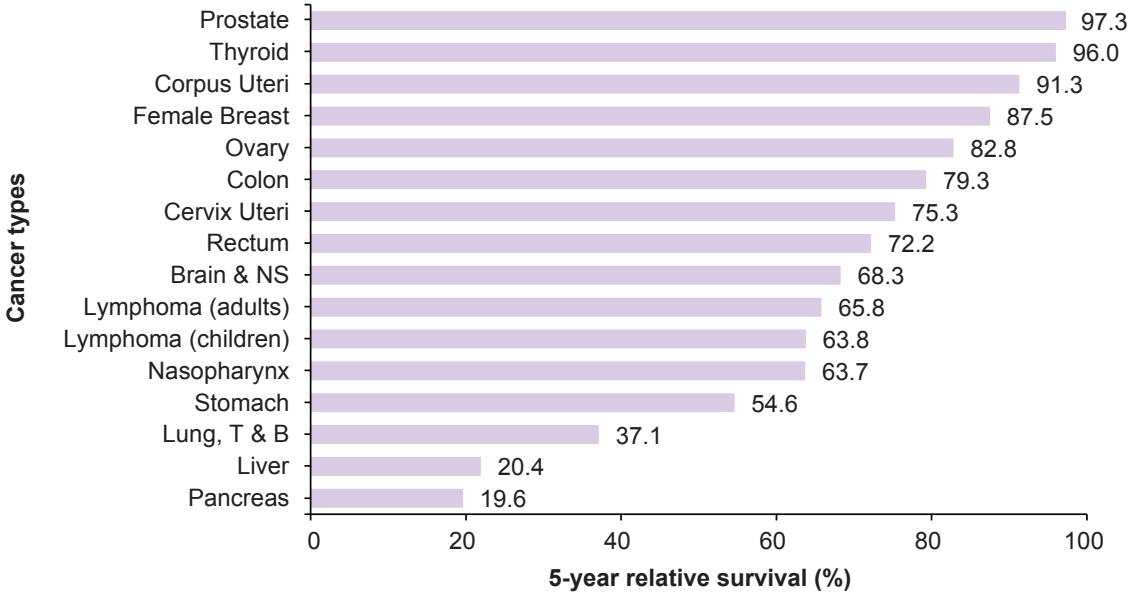


Figure 7. Stage I: Relative survival by cancer types, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

At stage II: The highest 5-year RS was 93.1% and the lowest was 17.4%. The five highest 5-year RS were thyroid, prostate, female breast, colon, corpus uteri cancers and the lowest survival was in lung, trachea & bronchus.

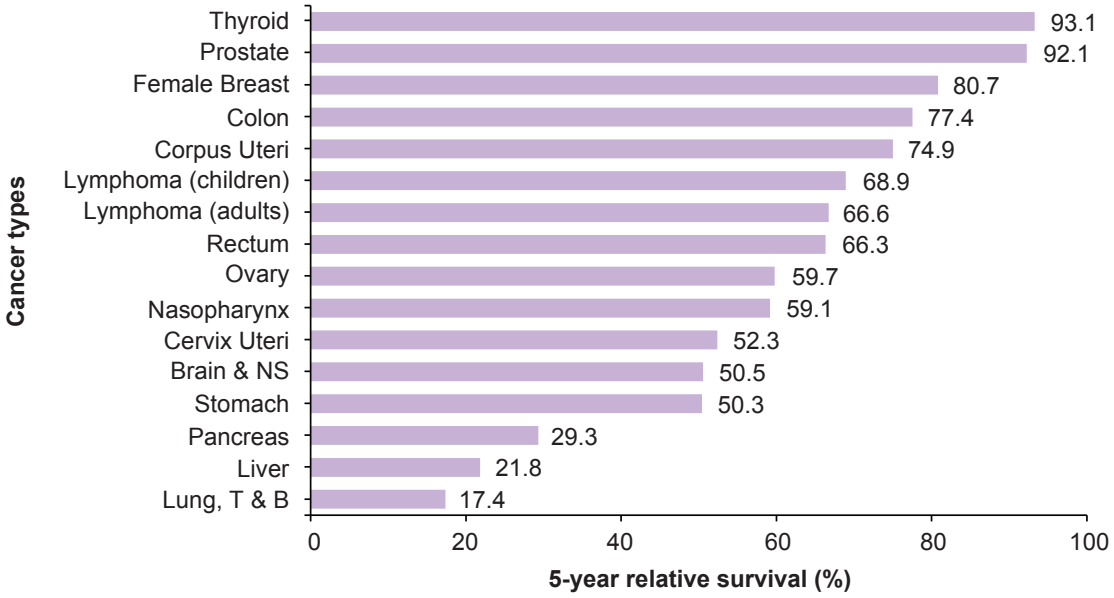


Figure 8. Stage II: Relative survival by cancer types, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

At stage III: The highest 5-year RS was 93.0% and the lowest was 7.5%. The five highest 5-year RS were prostate, thyroid, colon, lymphoma (children), female breast and the lowest survival was in lung, trachea & bronchus.

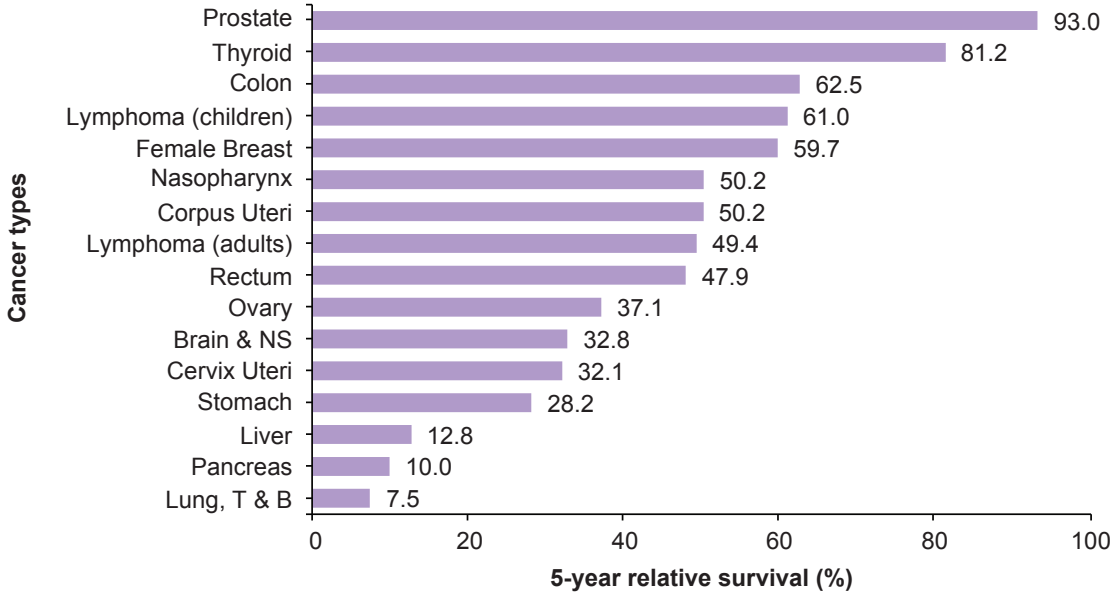


Figure 9. Stage III: Relative survival by cancer types, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

At stage IV: The highest 5-year RS was 51.6% and the lowest was 5.7%. The five highest 5-year RS were lymphoma (children), prostate, thyroid, lymphoma (adults), nasopharynx and the lowest survival was in pancreas.

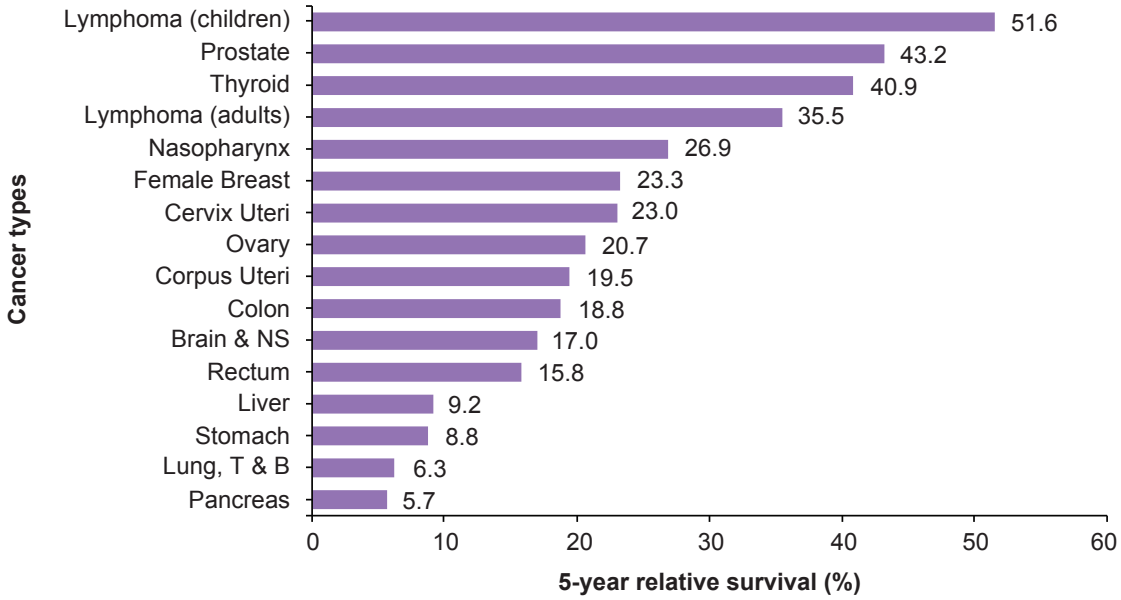


Figure 10. Stage IV: Relative survival by cancer types, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

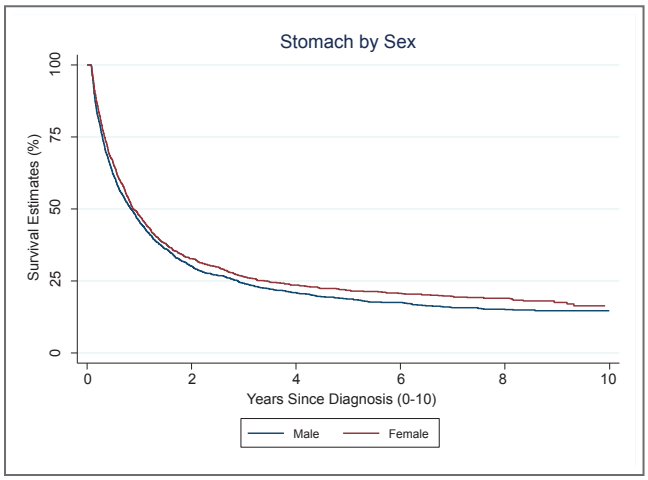
KM GRAPH

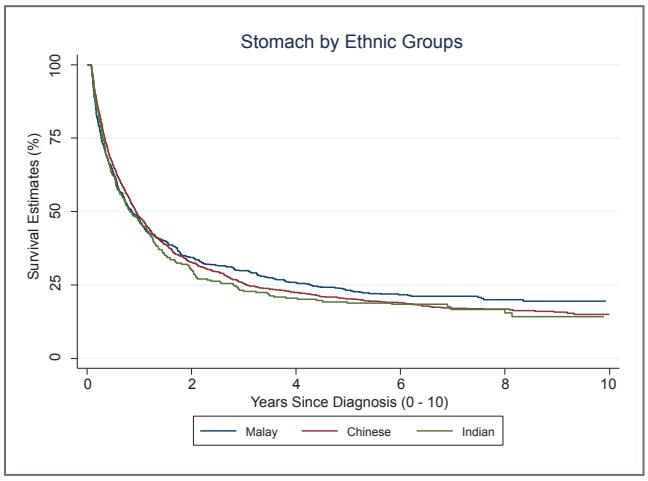
3.3 Kaplan- Meier (KM) Survival Curve

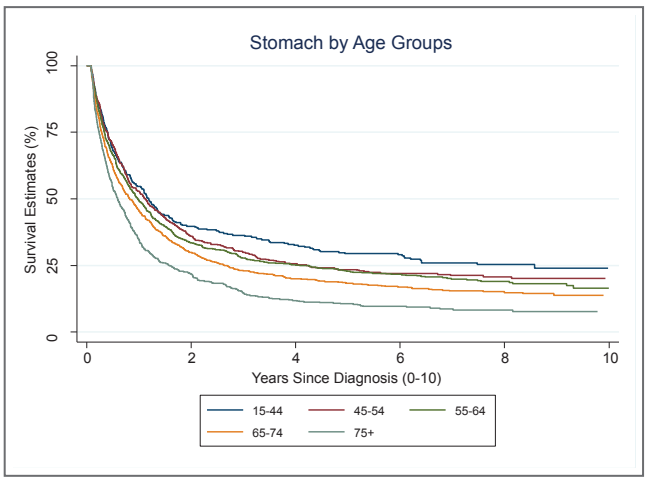
3.3.1 Gastrointestinal Cancers – Observed survival by ethnicity and age groups

KM graph up to 10 years after diagnosis: Period of diagnosis 2007-2011 and followed up to 2016, Malaysia

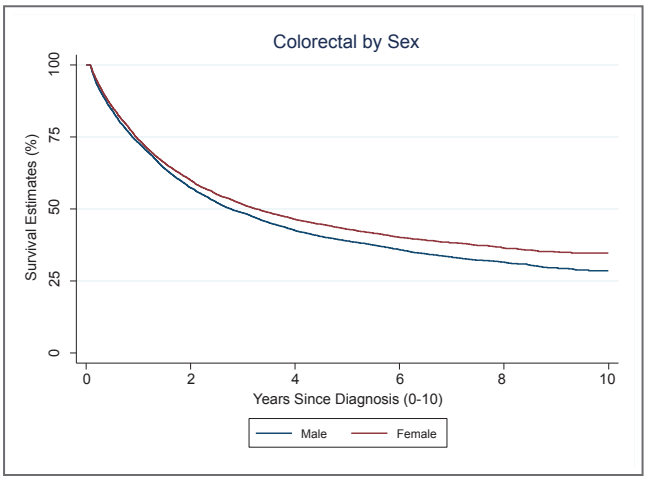
Stomach (ICD-10: C16)

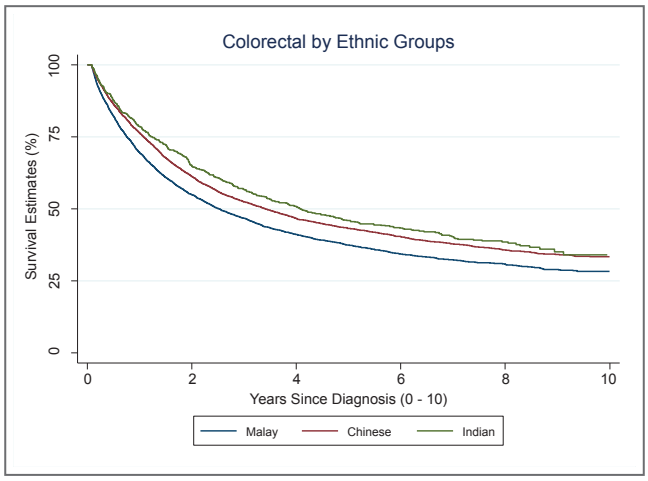


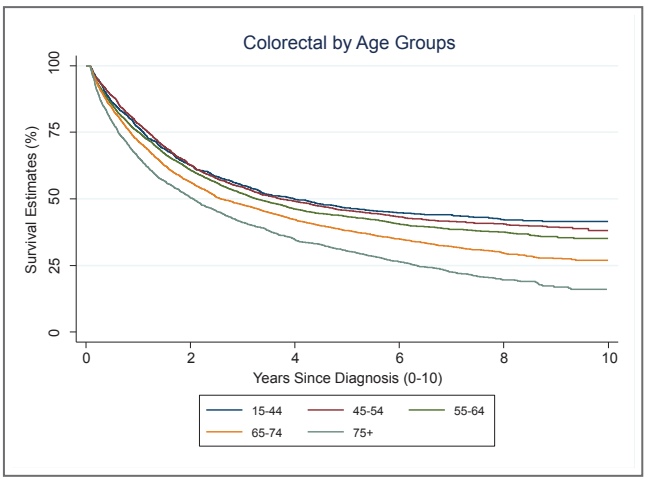




Colorectal (ICD-10: C18-21)

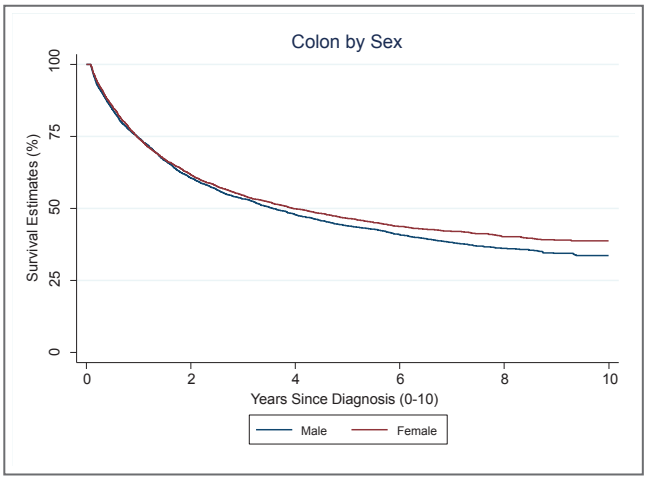




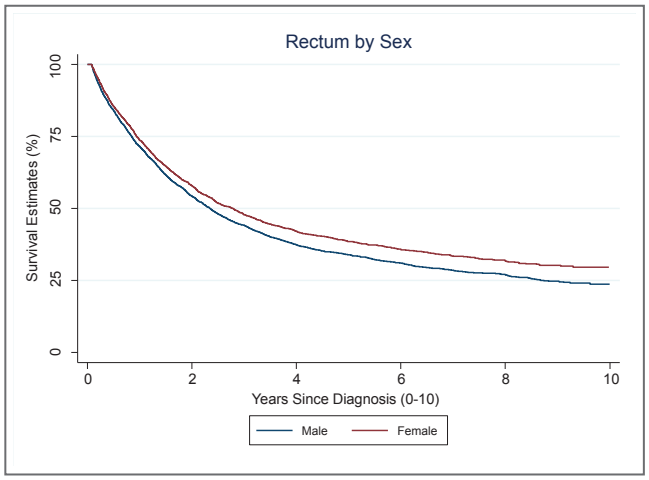


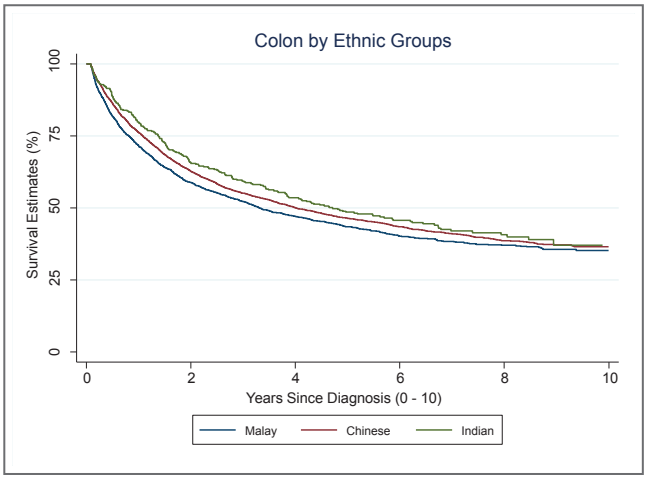
KM graph up to 10 years after diagnosis: Period of diagnosis 2007-2011 and followed up to 2016, Malaysia

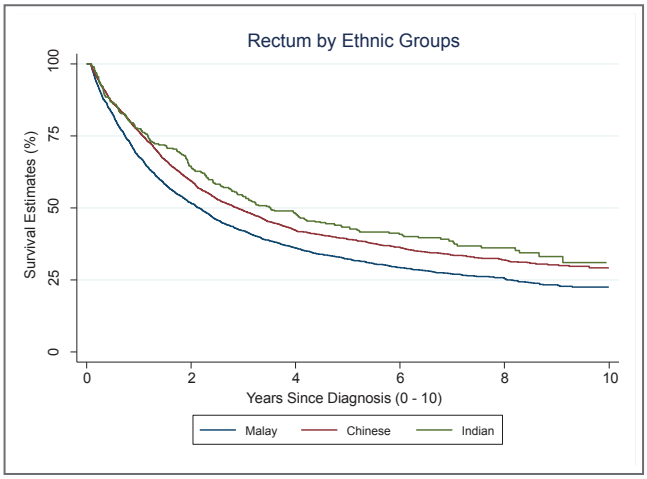
Colon (ICD-10: C18)

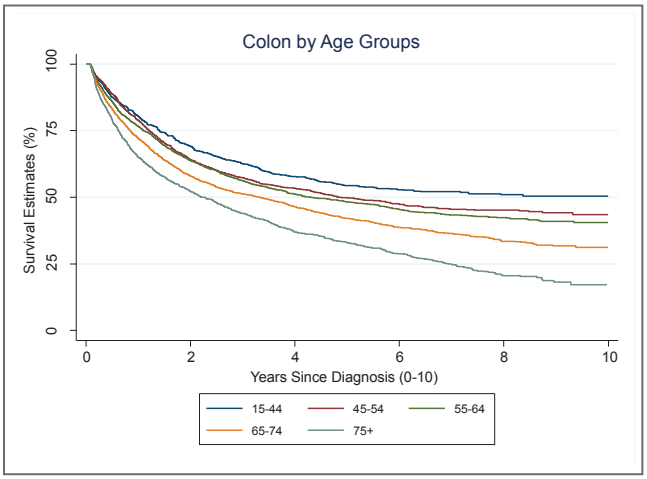


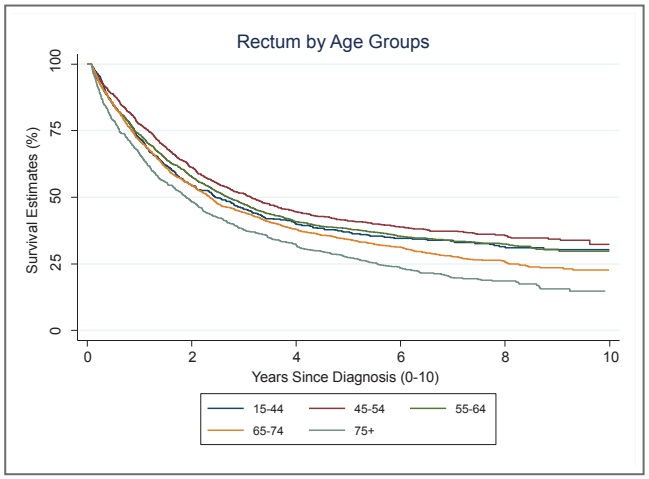
Rectum (ICD-10: C19-21)









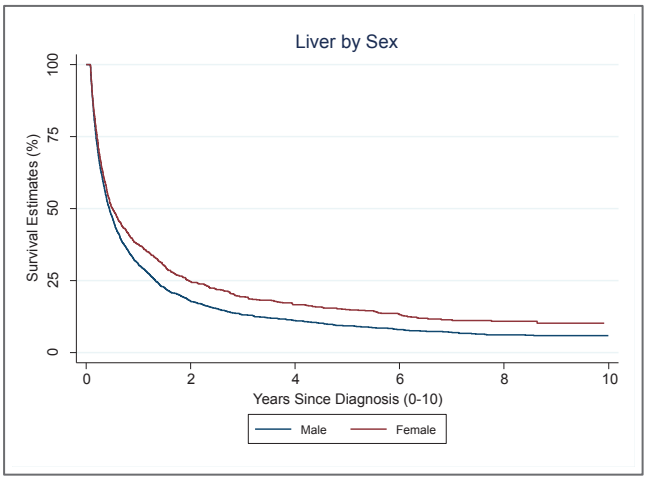


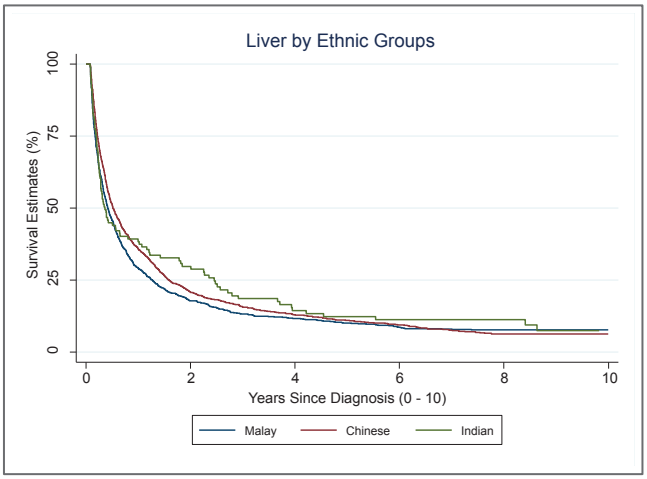
KM GRAPH

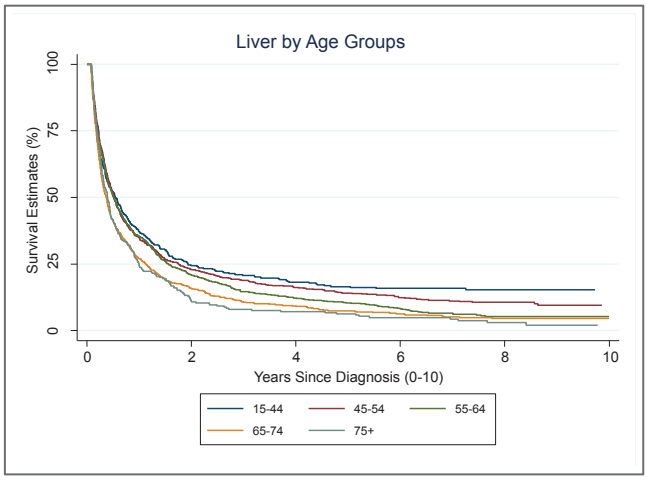
KM GRAPH

KM graph up to 10 years after diagnosis: Period of diagnosis 2007-2011 and followed up to 2016, Malaysia

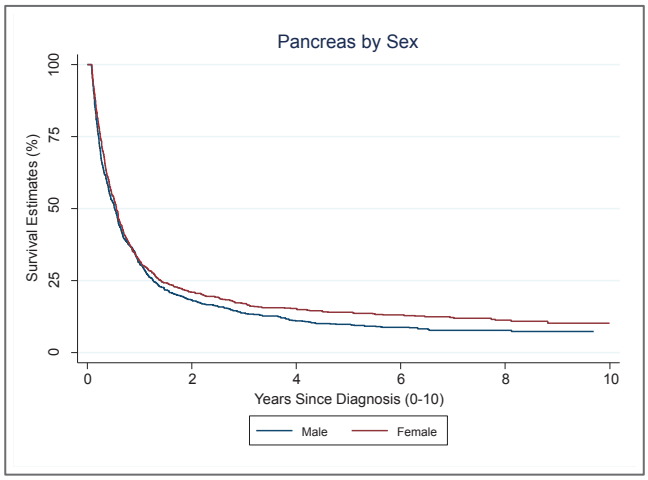
Liver (ICD-10: C22)

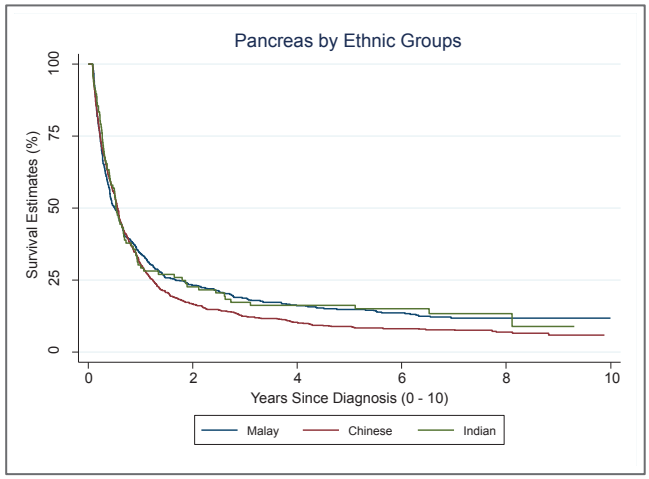


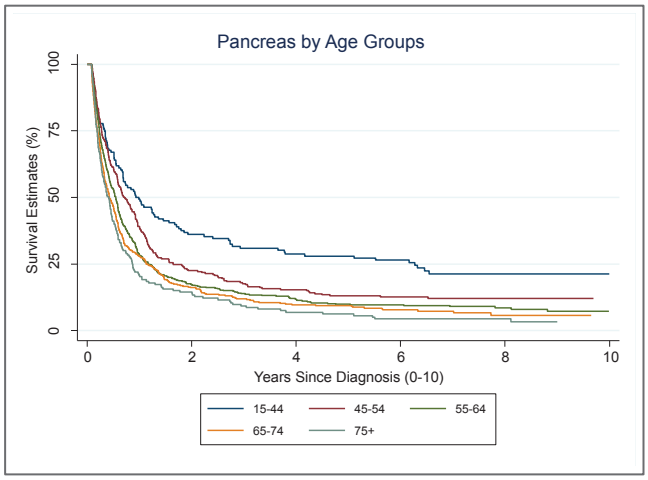




Pancreas (ICD-10: C25)



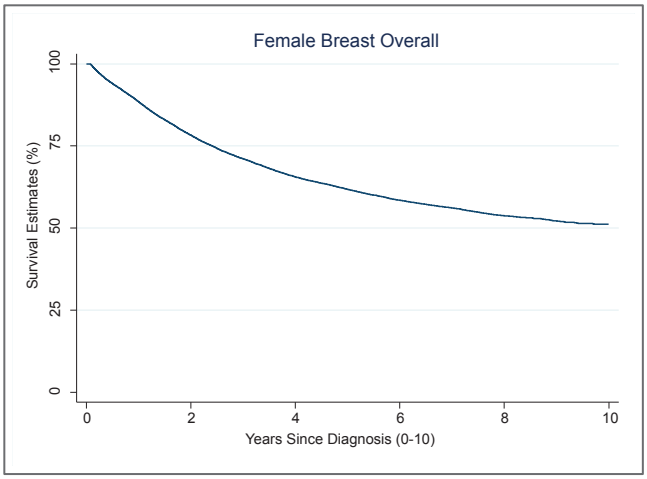


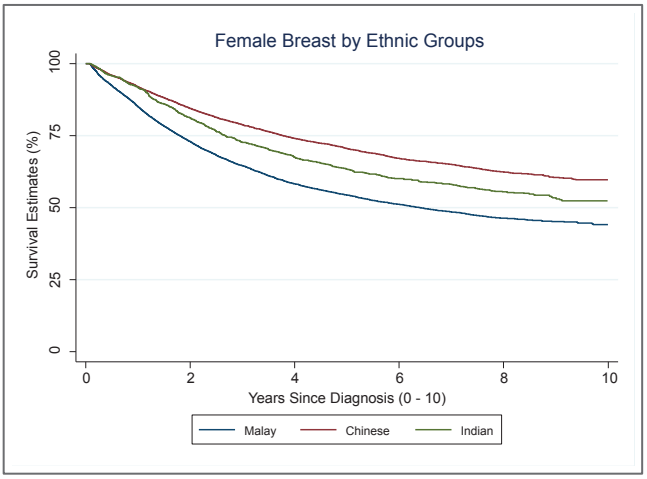


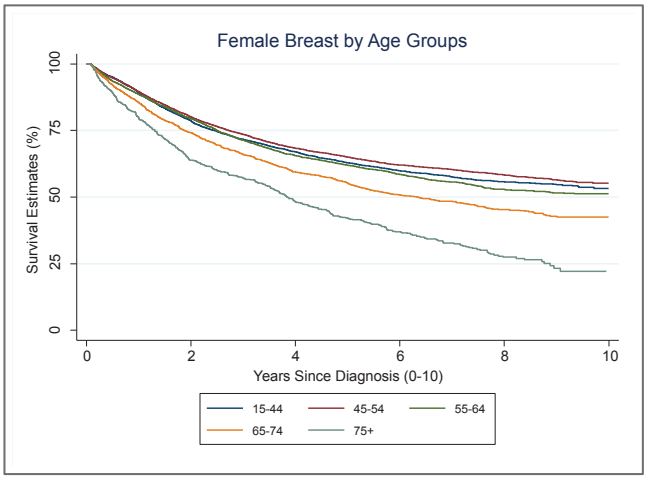
3.3.2 Women's Cancers - Observed survival by ethnicity and age groups

KM graph up to 10 years after diagnosis: Period of diagnosis 2007-2011 and followed up to 2016, Malaysia

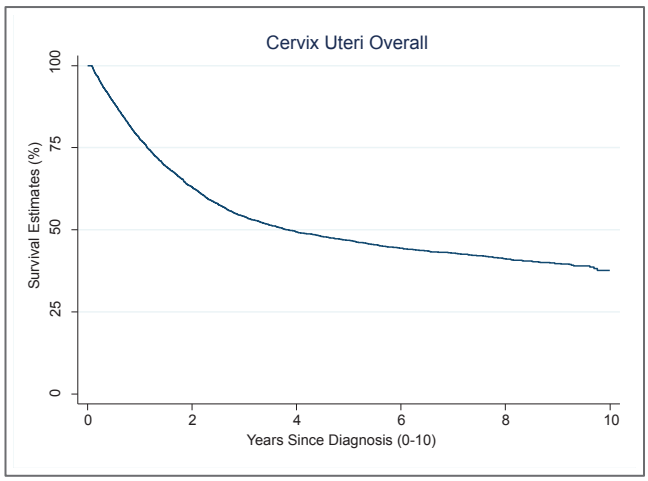
Female Breast (ICD-10: C50)

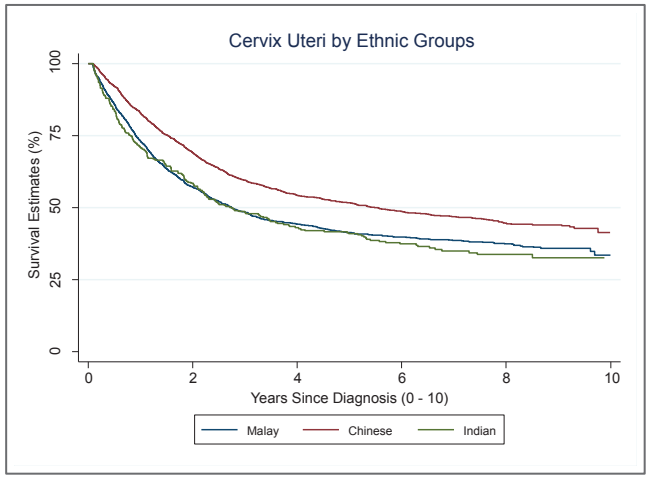


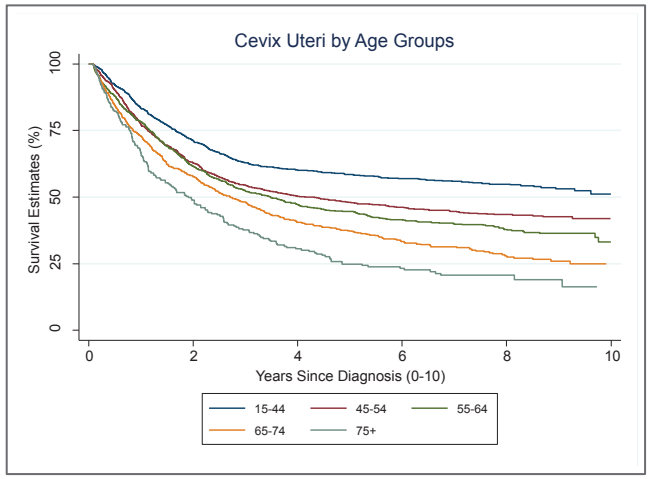




Cervix Uteri (ICD-10: C53)





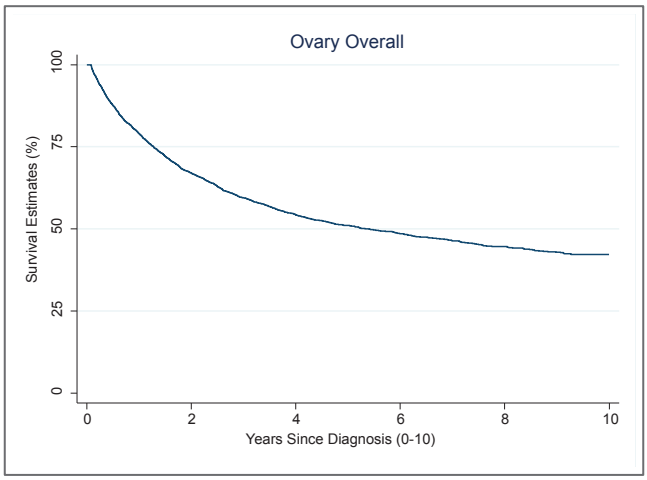


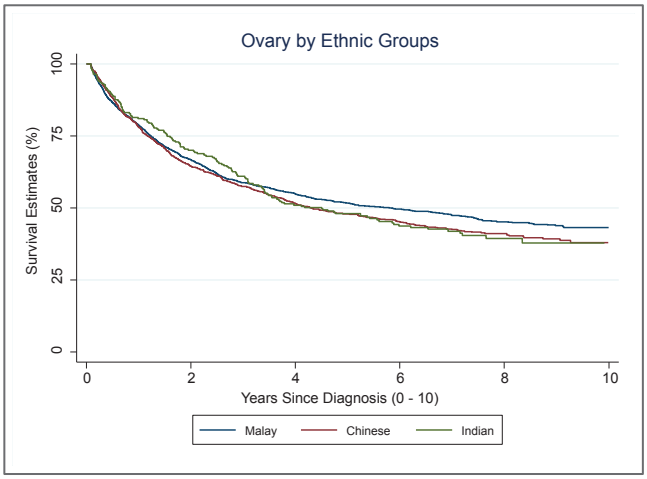
KM GRAPH

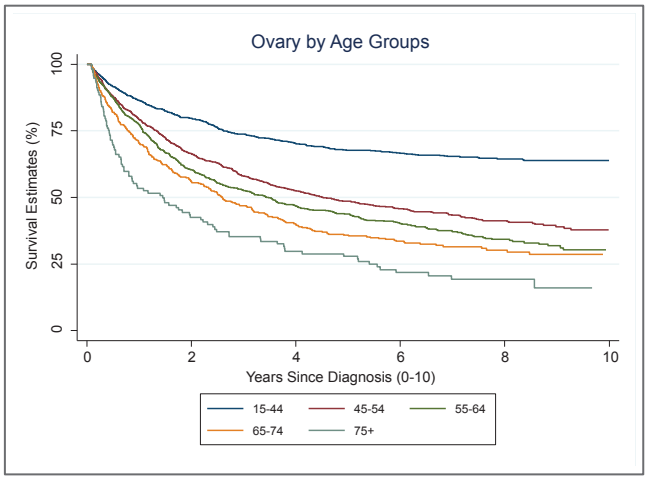
KM GRAPH

KM graph up to 10 years after diagnosis: Period of diagnosis 2007-2011 and followed up to 2016, Malaysia

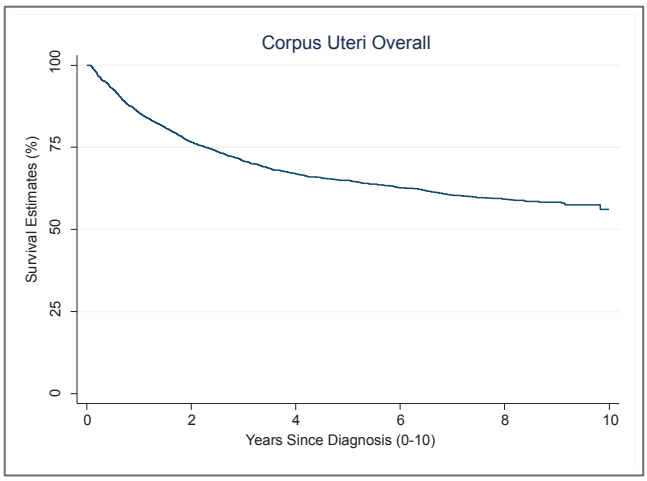
Ovary (ICD-10: C56)

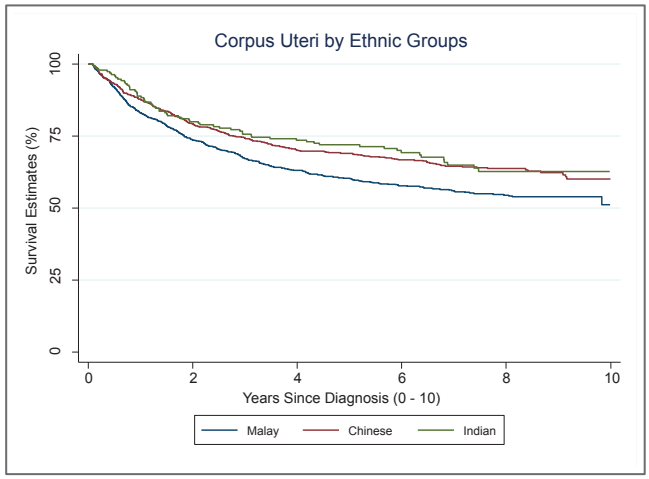


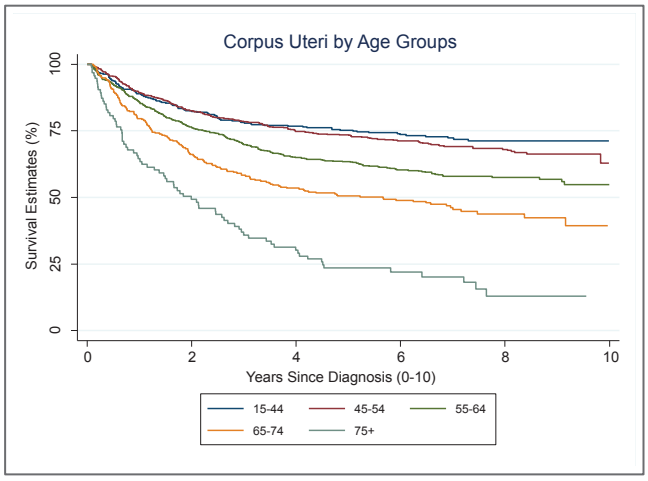




Corpus Uteri (ICD-10: C54)



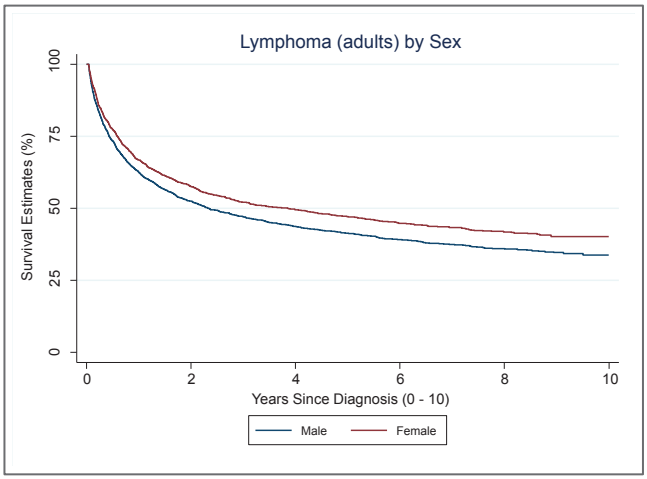




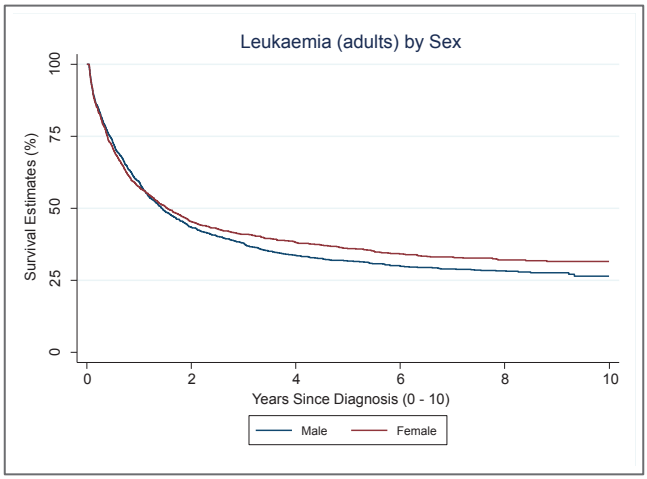
3.3.3 Haematological Malignancies - Observed survival by ethnicity and age groups

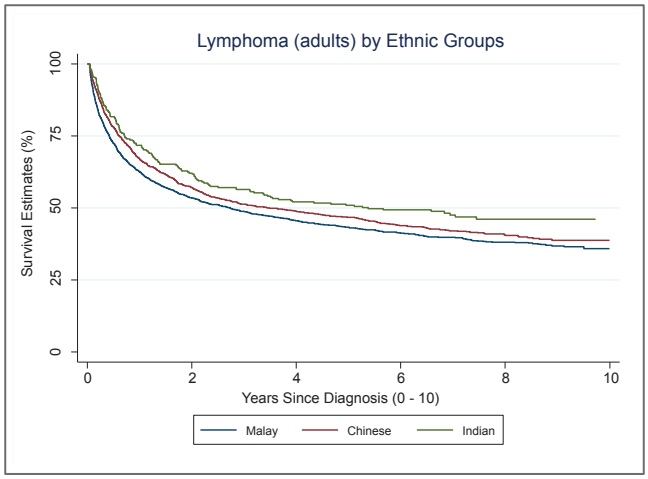
KM graph up to 10 years after diagnosis: Period of diagnosis 2007-2011 and followed up to 2016, Malaysia

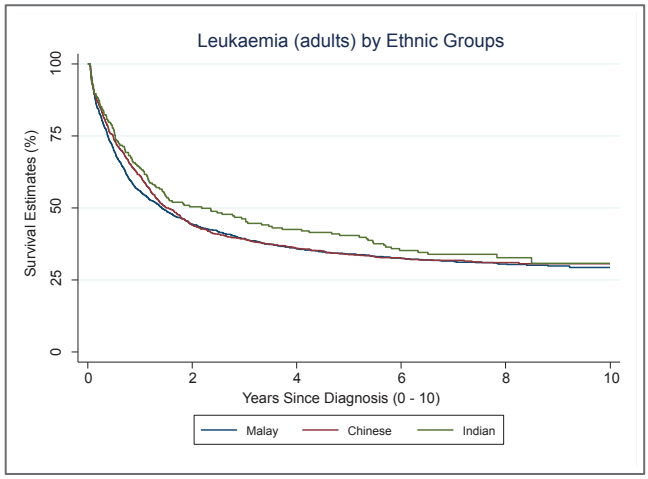
Lymphoma (adults) (ICD-10: C81-85; C96)

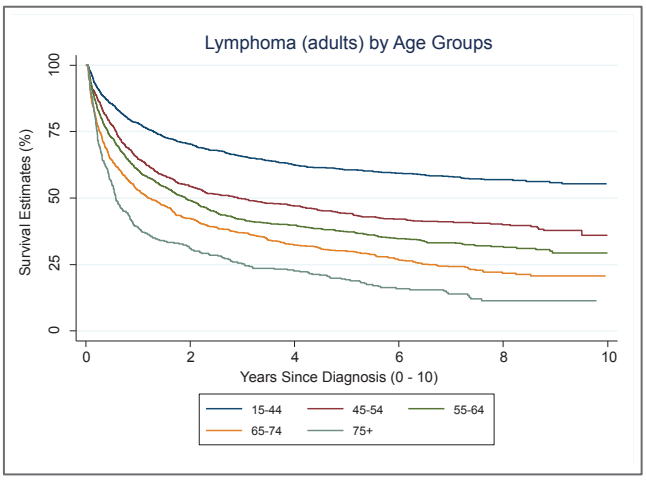


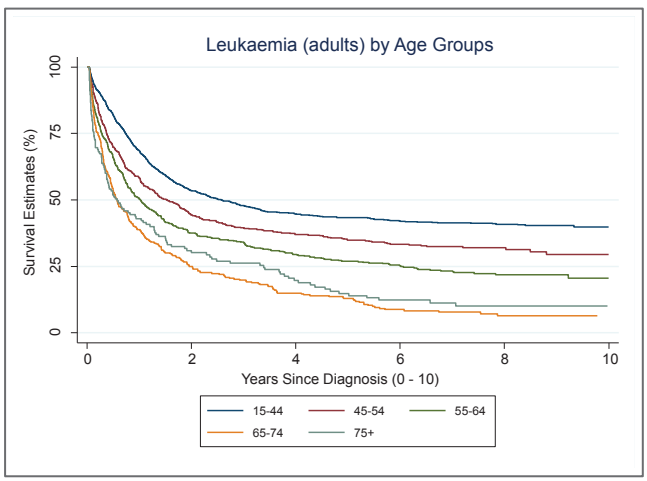
Leukaemia (adults) (ICD-10: C91-95)









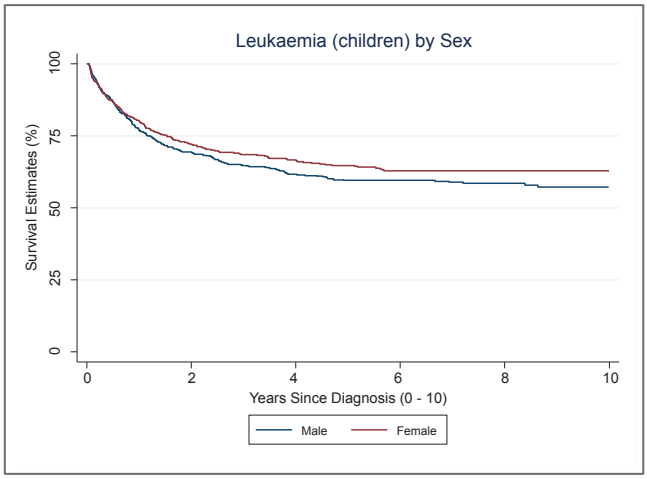


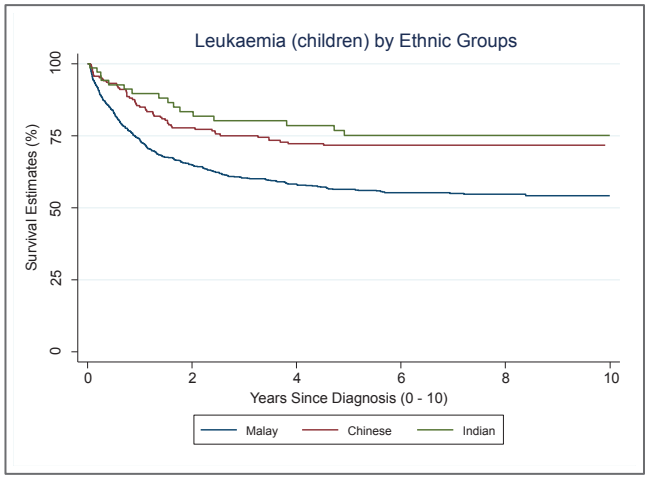
KM GRAPH

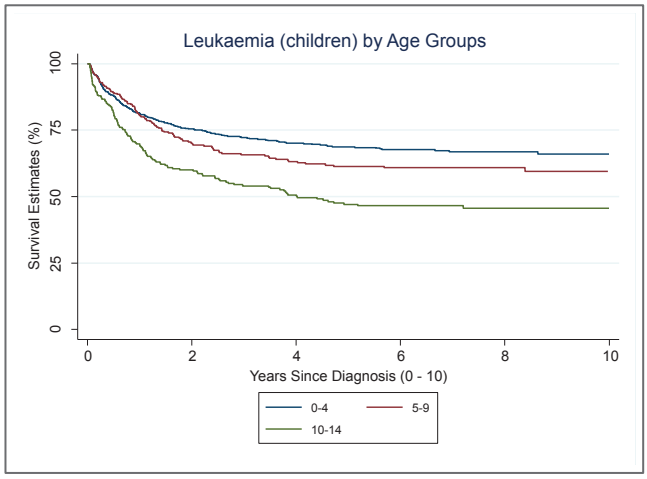
KM GRAPH

KM graph up to 10 years after diagnosis: Period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Leukaemia (children) (ICD-10: C91-95)



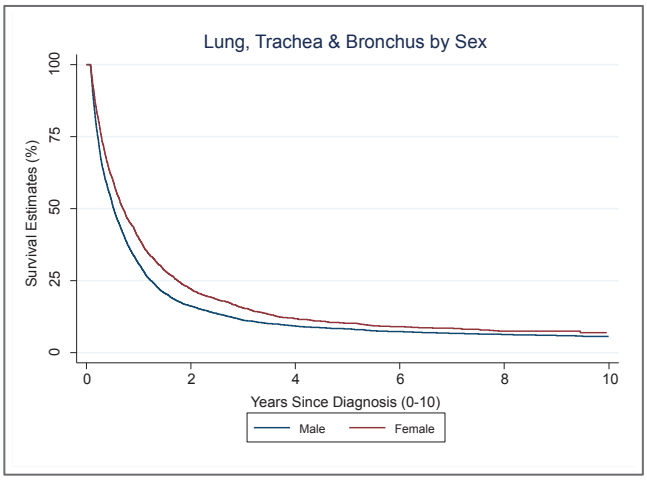


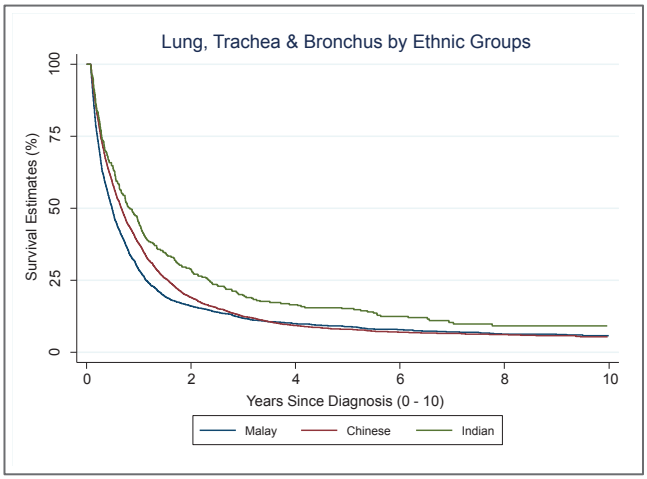


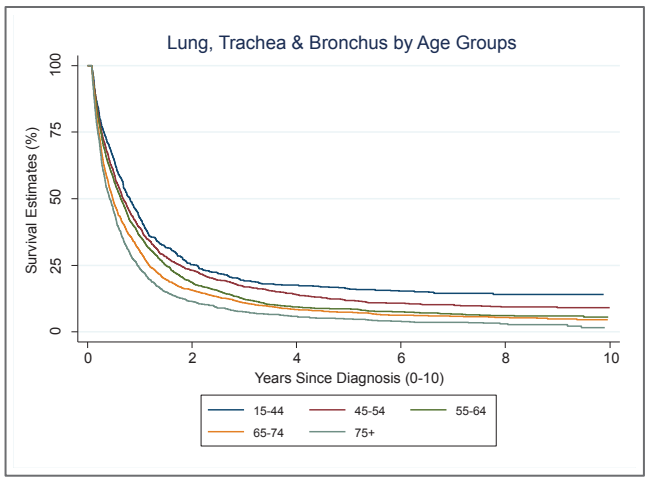
3.3.4 Other Cancers - Observed survival by ethnicity and age groups

KM graph up to 10 years after diagnosis: Period of diagnosis 2007-2011 and followed up to 2016, Malaysia

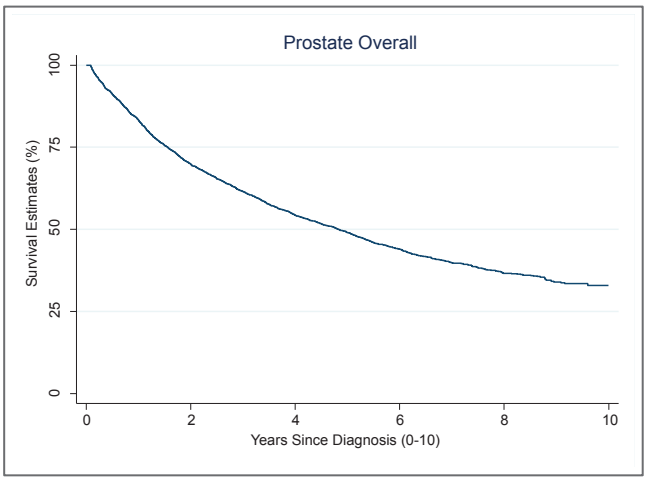
Lung, Trachea & Bronchus (ICD-10: C33-34)

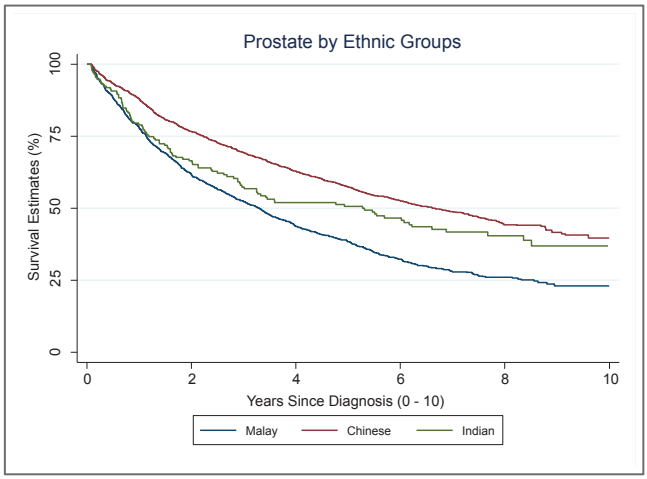


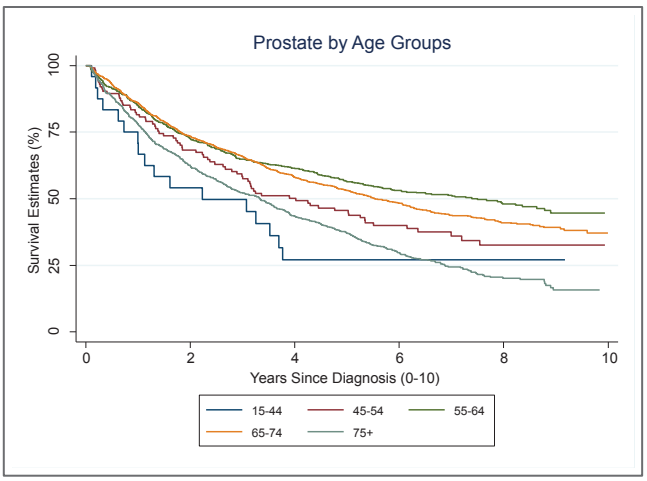




Prostate (ICD-10: C61)





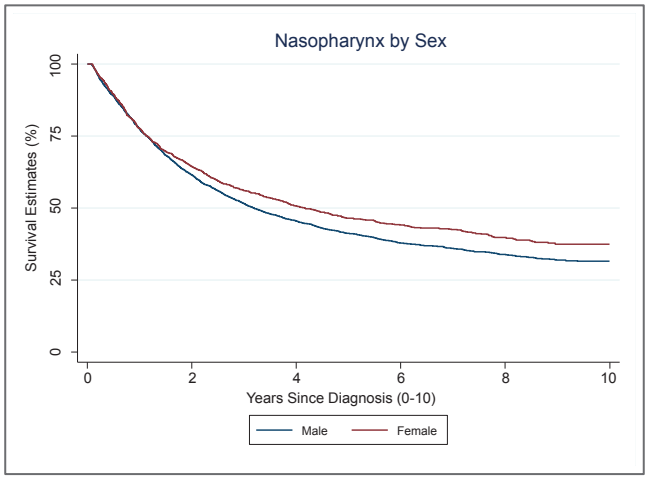


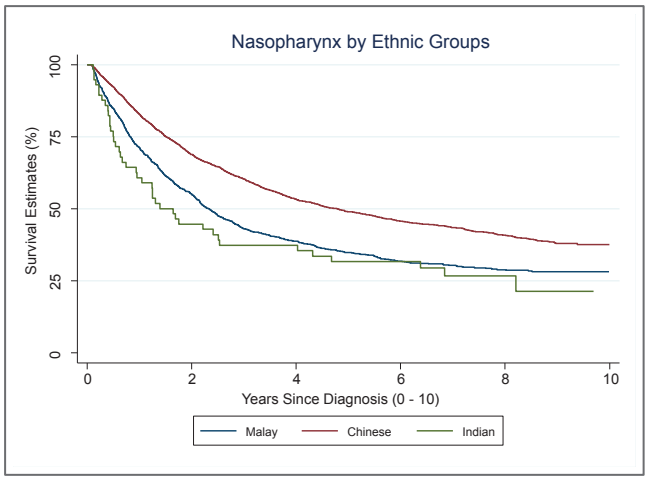
KM GRAPH

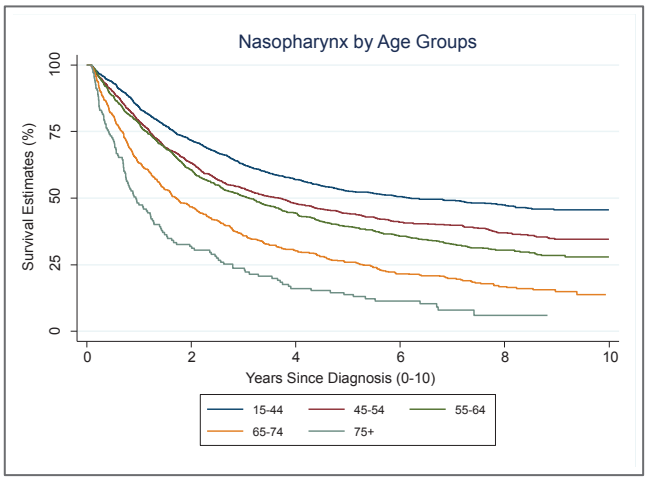
KM GRAPH

KM graph up to 10 years after diagnosis: Period of diagnosis 2007-2011 and followed up to 2016, Malaysia

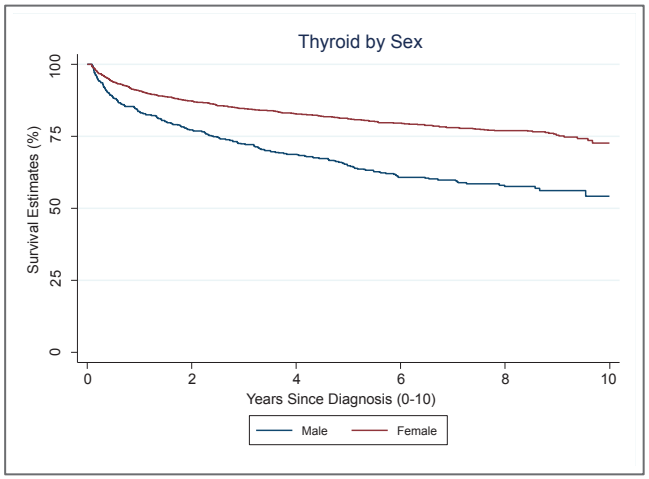
Nasopharynx (ICD-10: C11)

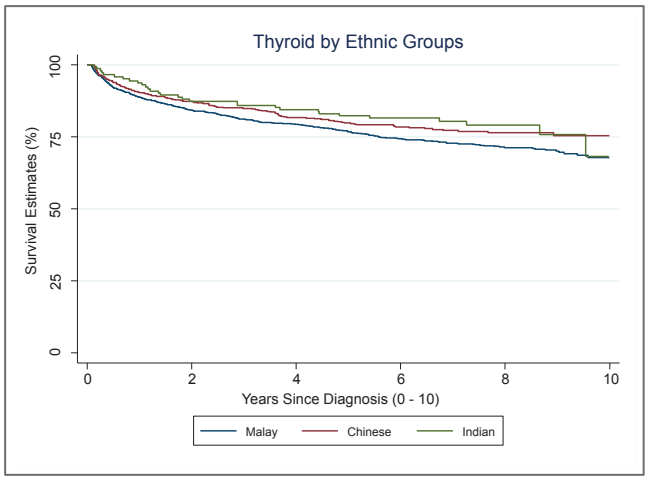


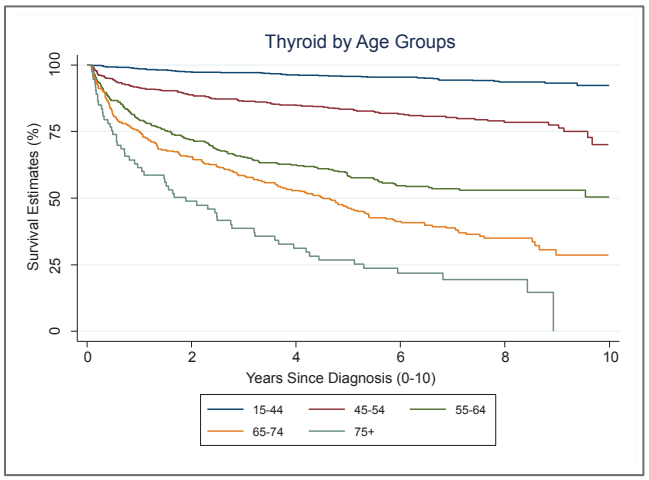




Thyroid (ICD-10: C73)

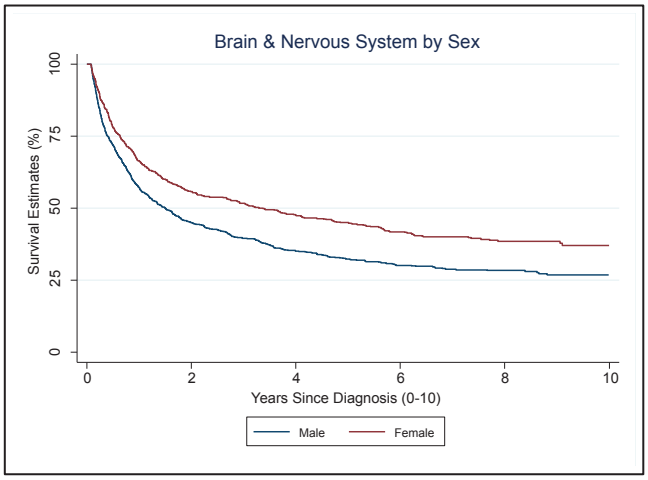


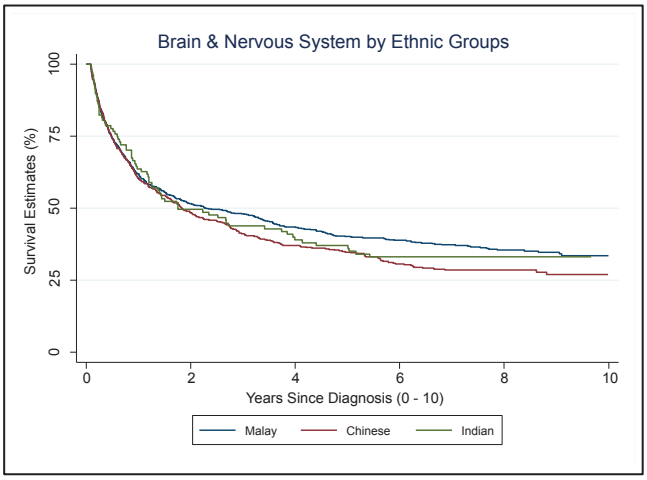


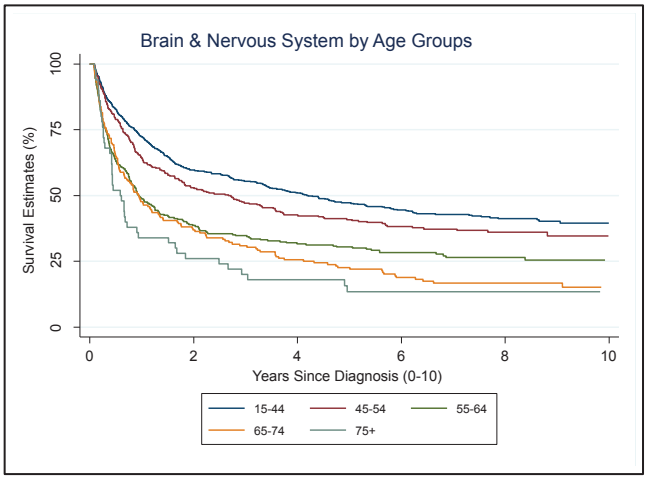


KM graph up to 10 years after diagnosis: Period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Brain & Nervous System (ICD-10: C71-72)







Kaplan-Meier survival curve ended

KM GRAPH

3.4 Commentary on 7 Selected Cancers

In this section, the trend of seven selected cancer survival after 1-year, 3-year and 5-year of diagnosis were reviewed according to sex, age groups (adults: 15-74 years, childhood 0-14 years), three major ethnic groups and stage at diagnosis with additional analysis on MST (refer table 7) and HR. International comparison were made with CONCORD-3, period of diagnosis 2005-2009 (C. Allemani et al, 2018), and other studies where applicable as indicated in the respective subtopic.

3.4.1 Female Breast (ICD-10: C50)

Results were analysed for 17009 cases. The overall 5-year RS for breast cancer was 66.8% (95% CI: 66.0, 67.6). The relative survival was highest at stage I and stage II of diagnosis, being above 80% up to 10 years for stage I (refer Appendix 2) and up to 5 years for stage II. Survivals deteriorated at a faster rate for stage III and stage IV.

HR was significantly high at stage IV, which was 7.52 (95% CI: 6.83, 8.28) compared to stage I. HR was 2.71(95%CI: 2.46, 3.00) at stage III and 1.41(95%CI: 1.28, 1.56) at stage II.

By ethnicity, Chinese had the highest RS followed by Indians and Malays. Malays had HR of 1.68 (95% CI: 1.60, 1.77) and Indians had 1.26 (95% CI: 1.16, 1.37) compared to Chinese.

Table 13. Female Breast: Relative survival by year and selected variables, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Variables		NO.	Relative survival by year (%)		
			1-year	3-year	5-year
Overall	Female	17009	89.7	74.3	66.8
Age groups (years)	15-44	4435	89.4	72.3	63.6
	45-54	5936	90.0	74.6	66.7
	55-64	4152	89.5	73.8	65.8
	65-74	1829	88.5	73.7	68.1
Major ethnic groups	Malay	7568	86.1	67.0	57.9
	Chinese	7014	93.4	82.5	76.5
	Indian	1578	93.5	77.1	70.5
Stage at diagnosis	Stage I	2428	97.8	91.2	87.5
	Stage II	4291	96.7	86.8	80.7
	Stage III	2654	91.5	70.2	59.7
	Stage IV	2071	66.8	35.6	23.3

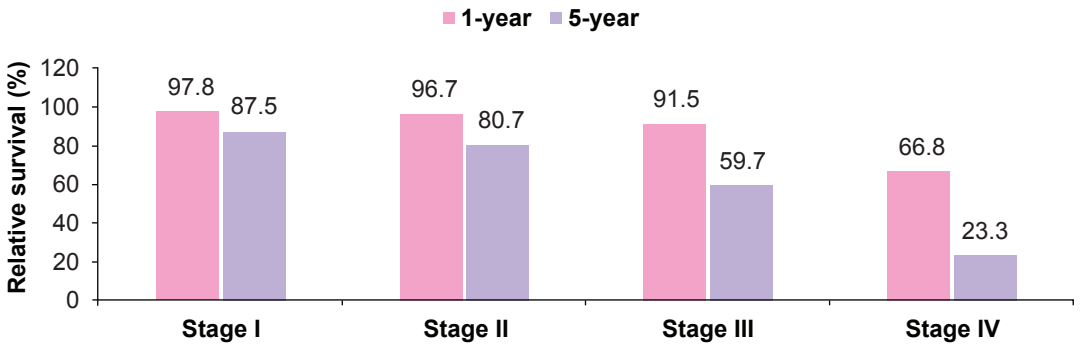


Figure 11. Female Breast: Relative survival by year and staging, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

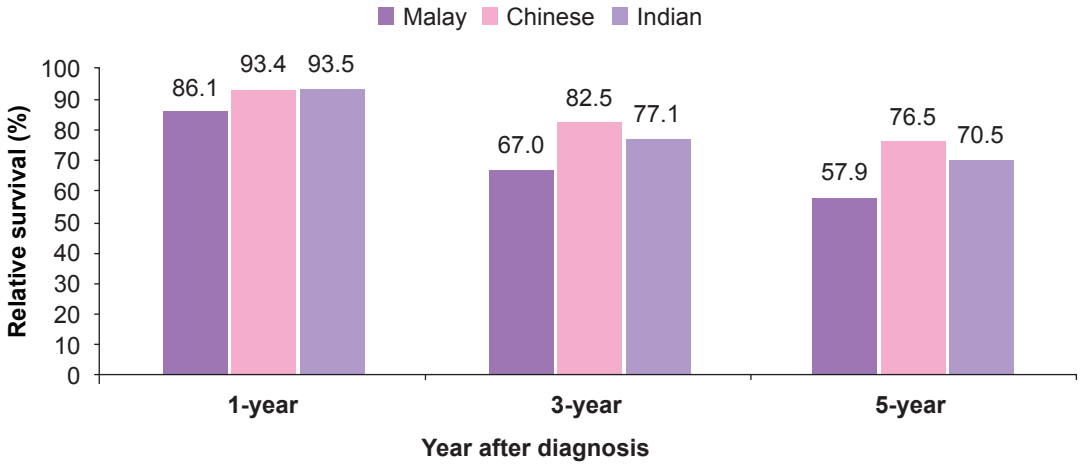
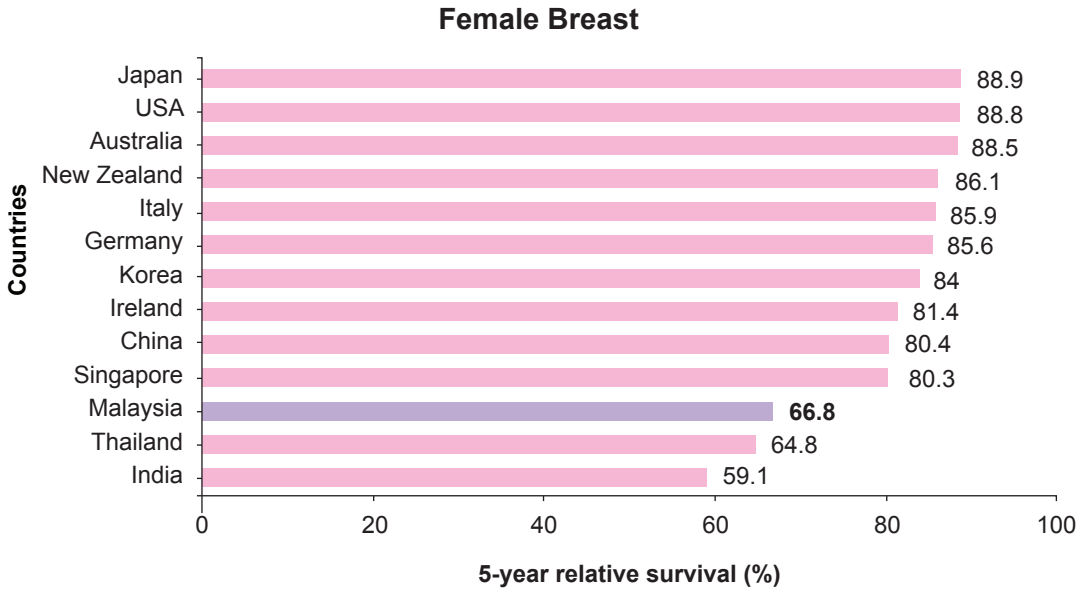


Figure 12. Female Breast: Relative survival by year and ethnicity, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

International comparisons with selected countries (C. Allemani, et al, 2018), in Asia the 5-year RS was higher than India and Thailand but lower than Singapore, China, Korea and Japan. The survival was lower compared to Australia, New Zealand, USA and most of the European countries.



*Source of the International data: CONCORD-3 study, 2005-2009 (C. Allemani e al, 2018) Malaysia: MyScan, 2018

Figure 13. Female Breast: International comparison of 5-year relative survival

3.4.2 Colorectal (ICD-10: C18-21)

Results were analysed for 12093 cases of colorectal cancer, which consisted of 6273 patients with colon and 5820 patients with rectal cancers. The 5-year RS in colorectal was 51.1% with MST of 35.9 months. Indians and Chinese had higher survival than Malays. Simple cox regression shown Malays had HR of 1.19 (95% CI: 1.13, 1.25) compared to Chinese. Survival deteriorated at advanced stage with HR of 1.45 (95% CI: 1.29, 1.64) at stage III and 3.86 (95% CI: 3.44, 4.32) at stage IV compared to stage 1.

Table 14. Colorectal: Relative survival by year and selected variables, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Variables		NO.	Relative survival by year (%)		
			1-year	3-year	5-year
Overall		12093	76.8	56.9	51.1
Sex	Male	6678	76.4	55.6	49.0
	Female	5415	77.3	58.5	53.8
Age groups (years)	15-44	1323	77.0	55.5	47.4
	45-54	2200	78.9	55.7	47.4
	55-64	3454	76.3	54.6	47.3
	65-74	3254	75.0	55.0	49.4
Major ethnic groups	Malay	4398	72.0	51.9	44.9
	Chinese	6204	80.1	60.4	55.5
	Indian	673	81.8	64.7	58.3
Stage at diagnosis	Stage I	793	87.8	77.9	75.8
	Stage II	1728	89.9	76.9	72.5
	Stage III	2225	86.0	63.7	55.6
	Stage IV	2216	55.1	24.0	17.3

Table 15. Colon & Rectum: 5-year relative survival by selected variables, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

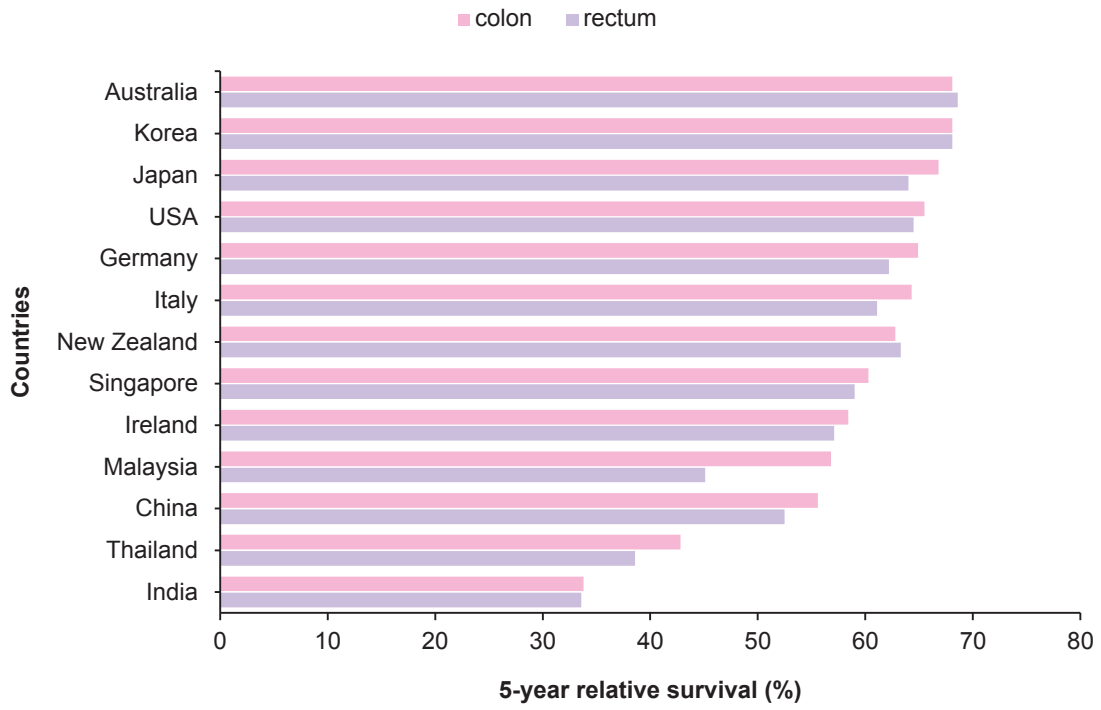
Variables		Colon		Rectum	
		NO.	RS (%)	NO.	RS (%)
Overall		6273	56.8	5820	45.1
Sex	Male	3297	55.4	3381	42.8
	Female	2976	58.3	2439	48.2
Age groups (years)	15-44	731	55.2	592	37.6
	45-54	1131	51.8	1069	42.8
	55-64	1772	52.6	1682	41.7
	65-74	1618	54.7	1636	44.3
Major ethnic groups	Malay	2013	51.4	2385	39.2
	Chinese	3487	60.1	2717	49.8
	Indian	339	60.4	334	56.2
Stage at diagnosis	Stage I	402	79.3	391	72.2
	Stage II	965	77.4	763	66.3
	Stage III	1171	62.5	1054	47.9
	Stage IV	1103	18.8	1113	15.8

International comparisons with selected countries (C. Allemani et al, 2018), in Asia the 5-year RS for colon cancer was higher than China, Thailand, India and lower than Singapore. While for rectal cancer, 5-year RS was higher than Thailand and India but lower than China and Singapore. The survival was lower compared to New Zealand, Korea, Japan, USA, Australia and most of European countries for both colon and rectal cancers.

Table 16. Colon & Rectum: International comparison of 5-year relative survival

Variables	Colon		Rectum	
	5-year RS	95% CI	5-year RS	95% CI
India	33.8	(21.1,46.4)	33.6	(20.8,46.3)
Thailand	42.8	(41.1,44.6)	38.6	(36.0,41.1)
Malaysia (MyScan)	56.8	(55.2,58.3)	45.1	(43.5,46.6)
China	55.6	(54.6,56.5)	52.5	(51.5,53.6)
Ireland	58.4	(57.1,59.7)	57.1	(55.0,59.1)
Singapore	60.3	(58.7,61.8)	59.0	(56.3,61.8)
Italy	64.3	(63.9,64.7)	61.1	(60.4,61.8)
Germany	64.9	(64.4,65.3)	62.2	(61.6,62.8)
New Zealand	62.8	(61.6,64.0)	63.3	(61.4,65.3)
Japan	66.8	(66.3,67.3)	64.0	(63.3,64.6)
USA	65.5	(65.3,65.7)	64.5	(64.1,64.8)
Korea	68.1	(67.6,68.6)	68.1	(67.5,68.7)
Australia	68.1	(67.6,68.6)	68.6	(67.8,69.5)

*Source of the International data: CONCORD-3 study, 2005-2009 (C. Allemani e al, 2018)



*Source of the International data: CONCORD-3 study, 2005-2009 (C. Allemani e al, 2018) Malaysia: MyScan, 2018

Figure 14. Colon & Rectum: International comparison of 5-year relative survival

3.4.3 Lung, Trachea & Bronchus (ICD-10: C33-34)

Results were analysed for 8021 cases. 5-year RS for lung, trachea and bronchus was 11.0% with MST of 6.8 months. RS was low for all variables and deteriorated at late stage. HR at stage IV was 2.36 (95% CI: 2.01, 2.75), 1.97 (95% CI: 1.67, 2.31) at stage III and 1.41 (95% CI: 1.17, 1.70) at stage II compared to stage I. HR in Malays was 1.15 (95% CI: 1.09, 1.21) compared to Chinese.

Table 17. Lung, Trachea & Bronchus: Relative survival by year and selected variables, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Variables		NO.	Relative survival by year (%)		
			1-year	3-year	5-year
Overall		8021	35.5	14.3	11.0
Sex	Male	5543	32.6	12.9	10.4
	Female	2478	41.7	17.4	12.5
Age groups (years)	15-44	657	43.1	19.4	16.5
	45-54	1473	39.8	17.5	12.5
	55-64	2308	37.0	13.1	9.6
	65-74	2452	32.0	12.7	9.7
Major ethnic groups	Malay	3116	30.1	13.4	10.9
	Chinese	3888	39.9	14.1	10.0
	Indian	304	47.2	22.5	19.3
Stage at diagnosis	Stage I	223	63.3	43.3	37.1
	Stage II	350	53.1	25.8	17.4
	Stage III	1135	39.4	11.5	7.5
	Stage IV	3007	29.6	9.0	6.3

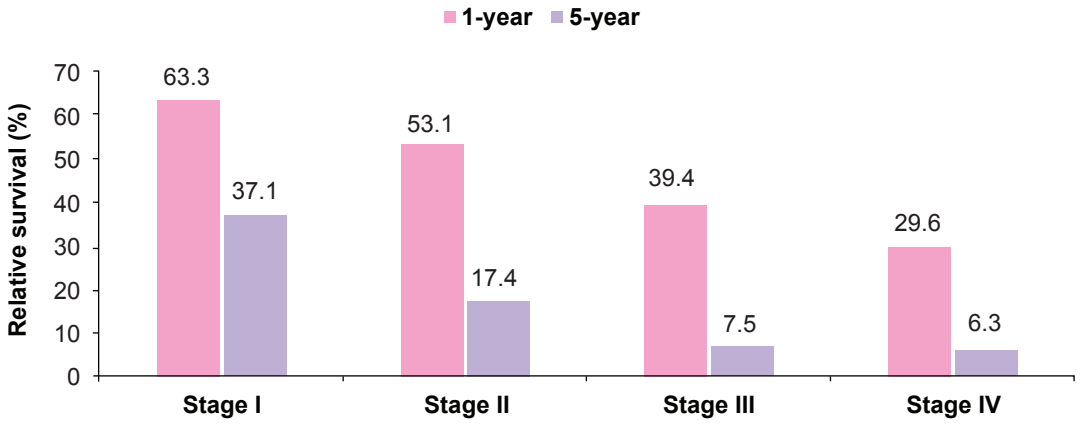


Figure 15. Lung, Trachea & Bronchus: Relative survival by year and staging, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

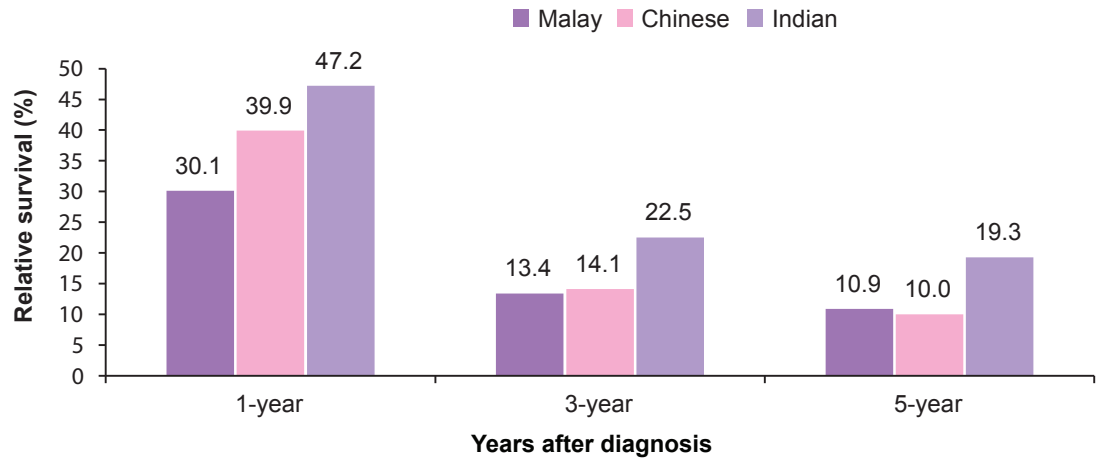
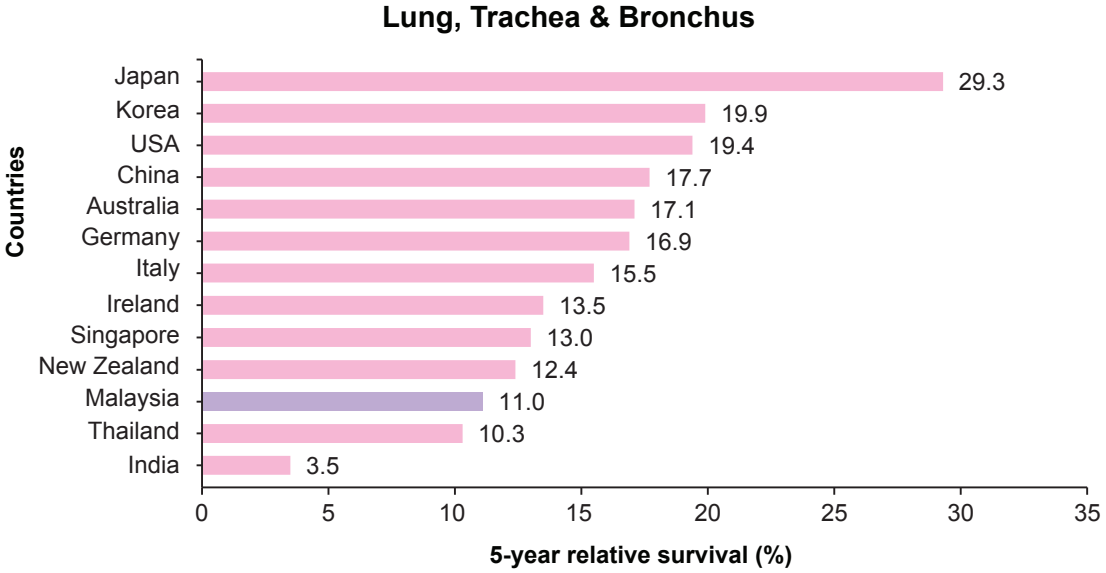


Figure 16. Lung, Trachea & Bronchus: Relative survival by year and ethnicity, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

International comparisons with selected countries (C. Allemani et al, 2018), in Asia the 5-year RS for lung cancer was higher than Thailand and India but lower than Singapore. The survival was lower compared to China, Korea, Japan, Australia, USA and most of the European countries.



*Source of the International data: CONCORD-3 study, 2005-2009 (C. Allemani e al, 2018) Malaysia: MyScan, 2018

Figure 17. Lung, Trachea & Bronchus: International comparison of 5-year relative survival

3.4.4 Nasopharynx (ICD-10: C11)

Results were analysed for 4697 cases. 5-year RS was 46.0% with MST of 40.6 months. HR in Malays was 1.49 (95% CI: 1.36, 1.61) and in Indians was 1.77 (95% CI: 1.30, 2.41) compared to Chinese. Survivals deteriorated significantly after stage III onwards. HR at stage III was 1.45 (95% CI: 1.21, 1.75) and was 2.73 (95% CI: 2.29, 3.27) at stage IV compared to stage I.

International comparisons with other study (Zeng, H et. al., 2018); showed the 5-year RS was higher than China (43.8%, incidence 2009-2011). However the 5-year RS by sex was noted to be lower than Singapore (males: 58.5%, females 60.4%) for incidence 2008-2012. (Cancer Survival in Singapore, 2015).

Table 18. Nasopharynx: Relative survival by year and selected variables, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Variables		NO.	Relative survival by year (%)		
			1-year	3-year	5-year
Overall		4697	78.9	55.2	46.0
Sex	Male	3486	79.0	54.2	44.8
	Female	1211	78.7	58.0	49.2
Age groups (years)	15-44	1459	84.5	63.3	53.6
	45-54	1433	79.6	55.0	46.1
	55-64	1101	79.4	53.3	43.1
	65-74	568	66.1	41.2	33.3
Major ethnic groups	Malay	1223	72.6	45.4	37.9
	Chinese	2555	84.0	62.6	52.2
	Indian	58	63.3	41.2	37.0
Stage at diagnosis	Stage I	316	94.0	73.8	63.7
	Stage II	669	85.5	68.3	59.1
	Stage III	750	84.3	59.8	50.2
	Stage IV	828	66.2	37.0	26.9

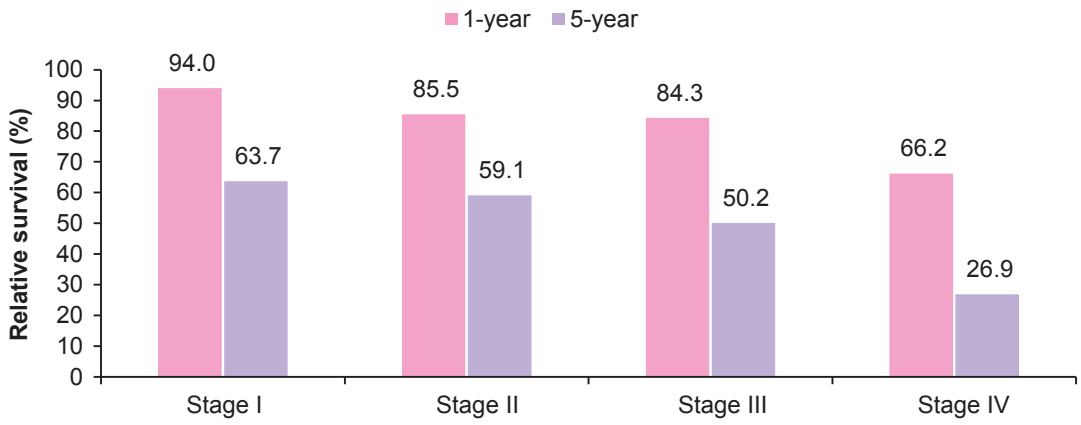


Figure 18. Nasopharynx: Relative survival by year and staging, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

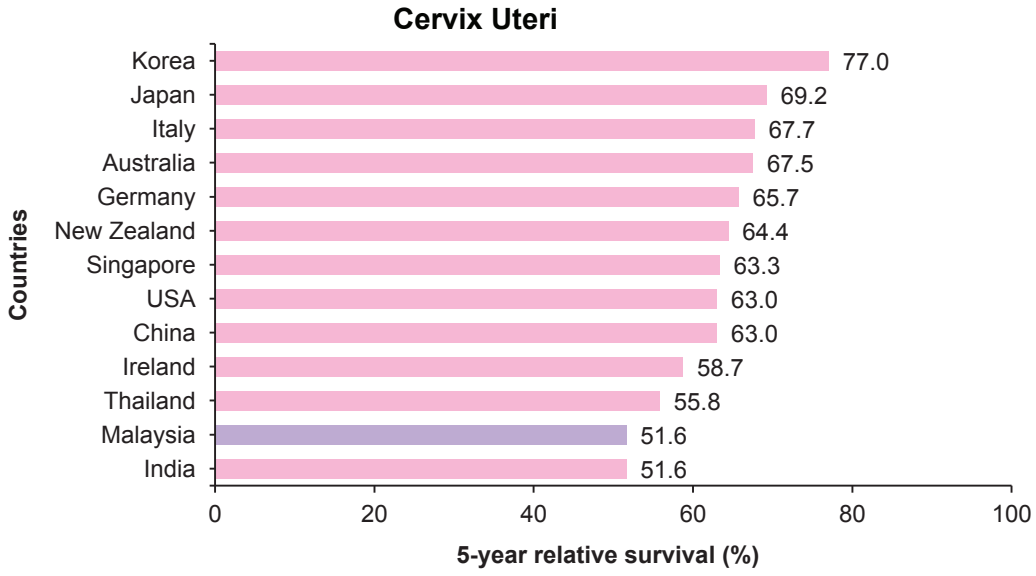
3.4.5 Cervix Uteri (ICD-10: C53)

Results were analysed for 4015 cases. 5-year RS was 51.6% with MST of 46.1 months. HR in Malay was 1.33 (95% CI: 1.21, 1.46) and in Indians was 1.41 (95% CI: 1.20, 1.65) compared to Chinese. HR at stage II was 2.19 (95% CI: 1.88, 2.57), 3.61 (95% CI: 3.06, 4.25) at stage III, and 5.45 (95% CI: 4.60, 6.46) at stage IV compared to stage I.

Table 19. Cervix Uteri: Relative survival by year and selected variables, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Variables		NO.	Relative survival by year (%)		
			1-year	3-year	5-year
Overall	Female	4015	79.3	57.2	51.6
Age groups (years)	15-44	971	83.7	63.4	59.2
	45-54	1244	77.8	55.4	49.5
	55-64	969	79.2	54.1	47.5
	65-74	602	75.8	54.3	46.6
Major ethnic groups	Malay	1361	74.2	50.7	44.8
	Chinese	1630	84.9	63.6	57.7
	Indian	297	73.0	52.3	47.0
Stage at diagnosis	Stage I	665	94.3	80.5	75.3
	Stage II	954	85.4	60.1	52.3
	Stage III	565	69.1	38.4	32.1
	Stage IV	447	53.0	26.5	23.0

International comparisons with selected countries (C. Allemani et al, 2018), in Asia the 5-year RS for cervix uteri cancer was similar to India. The survival was lower than Thailand, China, Singapore, Japan, Korea and most of the European countries.



*Source of the International data: CONCORD-3 study, 2005-2009 (C. Allemani e al, 2018) Malaysia: MyScan, 2018

Figure 19. Cervix Uteri: International comparison of 5-year relative survival

3.4.6 Lymphoma (ICD-10: C81-85, C96)

Results were analysed for 4709 cases (adults: 4465, childhood: 244). Overall 5-year RS in lymphoma was 49.3% with MST of 36.6 months. 5-year RS in childhood lymphoma was 63.3%, which was higher than in adults (48.5%). HR in adults were statistically significant at stage III and stage IV with HR of 1.44 (95% CI: 1.18, 1.75) and 2.17 (95% CI: 1.83, 2.89) respectively compared to stage I.

Table 20. Lymphoma (adults): Relative survival by year and selected variables, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Variables		NO.	Relative survival by year (%)		
			1-year	3-year	5-year
All adults		4465	65.9	52.4	48.5
Sex	Male	2609	64.2	50.6	46.4
	Female	1856	68.4	55.1	51.5
Age groups (years)	15-44	1468	78.5	66.2	61.3
	45-54	885	65.5	51.1	46.2
	55-64	1019	61.5	44.2	40.9
	65-74	767	55.2	42.5	38.5
Major ethnic groups	Malay	2262	63.9	51.4	47.2
	Chinese	1361	68.8	55.1	52.4
	Indian	266	73.6	60.2	56.8
Stage at diagnosis	Stage I	390	79.6	68.5	65.8
	Stage II	508	80.3	70.7	66.6
	Stage III	429	69.2	54.6	49.4
	Stage IV	662	56.3	40.0	35.5

Table 21. Lymphoma (children): Relative survival by year and selected variables, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Variables		NO.	Relative survival by year (%)		
			1-year	3-year	5-year
All children		244	80.0	70.2	63.3
Sex	Male	158	80.0	68.7	62.0
	Female	86	80.0	72.8	65.6
Age groups (years)	0-4	46	75.6	68.7	66.3
	5-9	81	82.1	71.3	67.0
	10-14	117	80.3	69.8	60.0
Major ethnic groups	Malay	141	76.6	63.6	60.5
	Chinese	34	83.6	80.0	63.9
	Indian	17	93.6	93.8	76.9
Stage at diagnosis	Stage I	11	91.0	72.8	63.8
	Stage II	21	85.4	80.3	68.9
	Stage III	24	78.8	60.9	61.0
	Stage IV	35	61.2	54.8	51.6

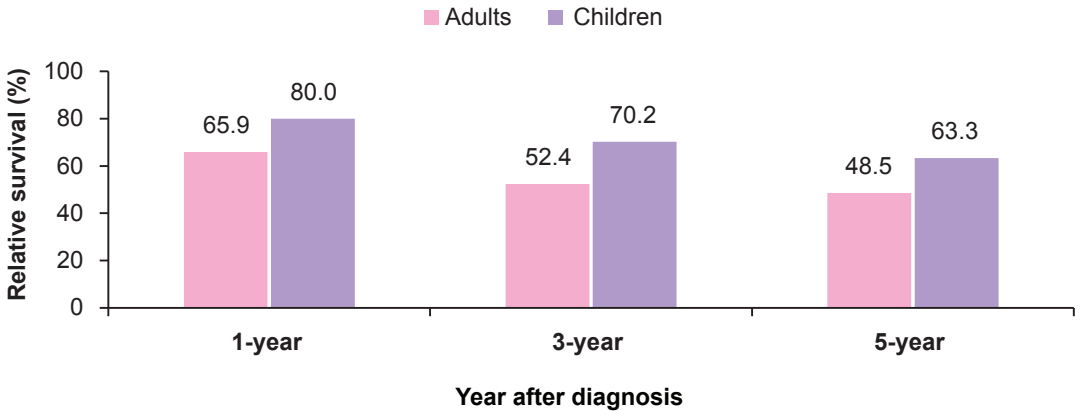
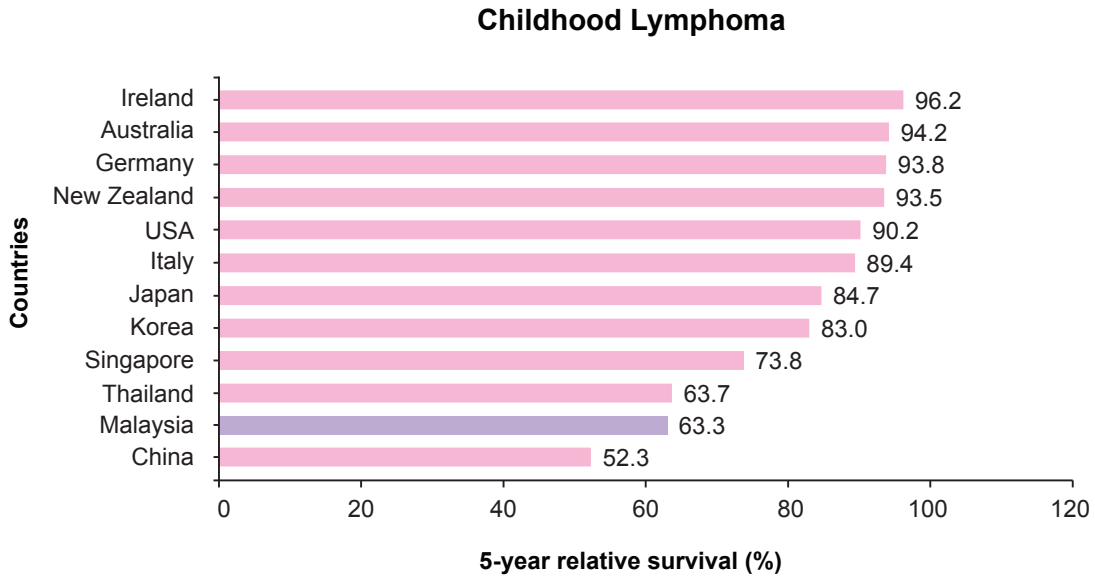


Figure 20. Lymphoma: Comparison of relative survival by year in adults and children, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

International comparisons in childhood lymphoma with selected countries (C. Allemani et al, 2018); in Asia the 5-year RS in childhood lymphoma was higher than China but lower than Thailand, Singapore, Korea and Japan. The survival was lower compared to Australia, New Zealand, USA and most of European countries.



*Source of the International data: CONCORD-3 study, 2005-2009 (C. Allemani e al, 2018) Malaysia: MyScan, 2018

Figure 21. Childhood Lymphoma: International comparison of 5-year relative survival

3.4.7 Leukaemia (ICD-10: C91-95)

Results were analysed for 3873 cases (adults: 2694, childhood: 1179). Overall 5-year RS was 44.0% with MST of 28.0 months. The 5-year RS was higher in childhood (62.3%) compared to adults (36.5%).

In childhood, HR was statistically significant for age 10-14 years old with 1.91 (95% CI: 1.51, 2.40) compared to age 0-4 years old. HR among Malays was 1.82 (95% CI: 1.37, 2.43) compared to Chinese.

Table 22. Leukaemia (adults): Relative survival by year and selected variables, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Variables		NO.	Relative survival by year (%)		
			1-year	3-year	5-year
All adults		2694	59.7	41.4	36.5
Sex	Male	1484	60.6	40.2	34.8
	Female	1210	58.7	42.8	38.5
Age groups (years)	15-44	1235	69.0	48.3	44.0
	45-54	510	58.9	40.5	36.2
	55-64	495	51.2	35.7	29.2
	65-74	317	40.7	22.9	16.6
Major ethnic groups	Malay	1411	57.0	41.3	36.6
	Chinese	795	62.7	41.4	36.8
	Indian	205	64.7	48.2	43.4

Table 23. Leukaemia (children): Relative survival by year and selected variables, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

Variables		NO.	Relative survival by year (%)		
			1-year	3-year	5-year
All children		1179	79.0	66.9	62.3
Sex	Male	668	77.8	65.4	60.3
	Female	511	80.5	68.8	65.0
Age groups (years)	0-4	586	81.9	72.8	69.3
	5-9	330	81.2	66.4	62.1
	10-14	263	69.9	54.4	47.5
Major ethnic groups	Malay	716	74.0	60.9	56.9
	Chinese	220	85.6	75.6	72.3
	Indian	73	90.0	80.6	75.6

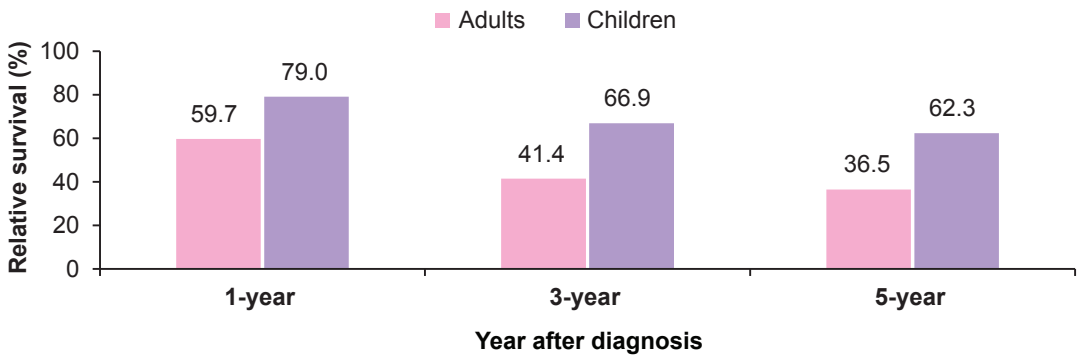


Figure 22. Leukaemia: Comparison of relative survival by year in adults and children, period of diagnosis 2007-2011 and followed up to 2016, Malaysia

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APPENDIX 1. ACTUARIAL LIFE TABLE BY CANCER TYPES

Definition:

start	:	Start of life table interval (year)
end	:	End of life table interval (year)
n	:	Number alive at start
d	:	Number of deaths during the interval
w	:	Withdrawals (censorings) during the interval
cp	:	Cumulative observed survival - Observed Survival (OS)
cr_e2	:	Cumulative relative survival (Ederer II) – Relative Survival (RS)
lo_cr_e2	:	Lower 95% CI for cr_e2 (Ederer II)
hi_cr_e2	:	Upper 95% CI for cr_e2 (Ederer II)

1-year interval for 10 years – period of diagnosis 2007-2011 and followed up to 2016

1. Female Breast (ICD-10: C50)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	17009	1932	399	0.8851	0.8974	0.8924	0.9022
1	2	14678	1679	52	0.7836	0.8060	0.7995	0.8124
2	3	12947	1186	47	0.7117	0.7431	0.7358	0.7502
3	4	11714	906	41	0.6566	0.6969	0.6891	0.7045
4	5	10767	623	14	0.6186	0.6681	0.6601	0.6761
5	6	10130	491	2084	0.5851	0.6441	0.6357	0.6524
6	7	7555	262	1929	0.5619	0.6312	0.6225	0.6399
7	8	5364	197	1707	0.5373	0.6170	0.6076	0.6264
8	9	3460	75	1737	0.5218	0.6131	0.6029	0.6232
9	10	1648	21	1627	0.5087	0.6119	0.5997	0.6239

2. Colorectal (ICD-10: C18-21)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	12093	3149	278	0.7366	0.7676	0.7593	0.7758
1	2	8666	1757	44	0.5869	0.6376	0.6280	0.6472
2	3	6865	1003	50	0.5008	0.5687	0.5584	0.5789
3	4	5812	658	33	0.4439	0.5284	0.5177	0.5390
4	5	5121	410	7	0.4084	0.5114	0.5002	0.5225
5	6	4704	300	931	0.3795	0.5022	0.4905	0.5139
6	7	3473	187	899	0.3560	0.4994	0.4869	0.5119
7	8	2387	99	818	0.3382	0.5045	0.4909	0.5182
8	9	1470	56	753	0.3209	0.5109	0.4954	0.5264
9	10	661	11	650	0.3104	0.5305	0.5114	0.5498

Colon (ICD-10: C18)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	6273	1576	138	0.7460	0.7778	0.7663	0.7889
1	2	4559	816	21	0.6121	0.6652	0.6518	0.6783
2	3	3722	436	25	0.5402	0.6135	0.5992	0.6275
3	4	3261	304	21	0.4897	0.5831	0.5681	0.5979
4	5	2936	219	4	0.4531	0.5675	0.5518	0.5831
5	6	2713	158	516	0.4240	0.5613	0.5447	0.5778
6	7	2039	95	545	0.4012	0.5628	0.5450	0.5805
7	8	1399	56	469	0.3819	0.5695	0.5501	0.5889
8	9	874	23	468	0.3681	0.5856	0.5638	0.6074
9	10	383	4	379	0.3605	0.6134	0.5874	0.6395

Rectum (ICD-10: C19-21)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	5820	1573	140	0.7264	0.7567	0.7445	0.7685
1	2	4107	941	23	0.5595	0.6079	0.5938	0.6218
2	3	3143	567	25	0.4582	0.5202	0.5054	0.5349
3	4	2551	354	12	0.3945	0.4692	0.4540	0.4844
4	5	2185	191	3	0.3599	0.4507	0.4350	0.4664
5	6	1991	142	415	0.3313	0.4382	0.4218	0.4546
6	7	1434	92	354	0.3070	0.4307	0.4133	0.4482
7	8	988	43	349	0.2908	0.4341	0.4152	0.4531
8	9	596	33	285	0.2697	0.4300	0.4084	0.4520
9	10	278	7	271	0.2564	0.4412	0.4137	0.4692

3. Lung, Trachea & Bronchus (ICD-10: C33-34)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	8021	5246	136	0.3404	0.3546	0.3437	0.3654
1	2	2639	1216	36	0.1825	0.1970	0.1879	0.2064
2	3	1387	414	22	0.1276	0.1430	0.1348	0.1515
3	4	951	186	21	0.1023	0.1196	0.1118	0.1277
4	5	744	87	3	0.0903	0.1104	0.1027	0.1185
5	6	654	71	95	0.0798	0.1022	0.0945	0.1103
6	7	488	33	116	0.0736	0.0989	0.0910	0.1071
7	8	339	23	100	0.0678	0.0957	0.0875	0.1044
8	9	216	7	97	0.0650	0.0964	0.0876	0.1057
9	10	112	4	108	0.0605	0.0946	0.0840	0.1062

4. Nasopharynx (ICD-10: C11)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	4697	1035	113	0.7770	0.7889	0.7765	0.8008
1	2	3549	697	11	0.6241	0.6428	0.6282	0.6570
2	3	2841	433	30	0.5285	0.5522	0.5370	0.5672
3	4	2378	265	11	0.4695	0.4977	0.4823	0.5130
4	5	2102	190	7	0.4270	0.4595	0.4440	0.4749
5	6	1905	127	330	0.3958	0.4328	0.4171	0.4484
6	7	1448	60	321	0.3774	0.4198	0.4038	0.4358
7	8	1067	56	313	0.3541	0.4008	0.3841	0.4175
8	9	698	31	342	0.3333	0.3841	0.3662	0.4021
9	10	325	2	323	0.3292	0.3864	0.3673	0.4057

5. Cervix Uteri (ICD-10: C53)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	4015	876	105	0.7789	0.7932	0.7797	0.8060
1	2	3034	568	34	0.6323	0.6555	0.6396	0.6709
2	3	2432	346	21	0.5419	0.5724	0.5557	0.5888
3	4	2065	179	19	0.4947	0.5329	0.5159	0.5498
4	5	1867	96	3	0.4693	0.5157	0.4983	0.5329
5	6	1768	82	333	0.4453	0.4995	0.4818	0.5172
6	7	1353	43	319	0.4292	0.4927	0.4744	0.5109
7	8	991	32	300	0.4129	0.4857	0.4665	0.5048
8	9	659	18	367	0.3973	0.4800	0.4592	0.5008
9	10	274	7	267	0.3775	0.4706	0.4435	0.4976

6. Liver (ICD-10: C22)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	2766	1833	63	0.3297	0.3405	0.3224	0.3587
1	2	870	341	12	0.1996	0.2121	0.1963	0.2285
2	3	517	127	14	0.1499	0.1638	0.1492	0.1790
3	4	376	53	4	0.1286	0.1446	0.1306	0.1594
4	5	319	45	1	0.1105	0.1283	0.1147	0.1427
5	6	273	34	40	0.0956	0.1152	0.1019	0.1294
6	7	199	22	43	0.0838	0.1048	0.0915	0.1191
7	8	134	12	42	0.0749	0.0977	0.0841	0.1126
8	9	80	3	43	0.0710	0.0965	0.0820	0.1125
9	10	34	0	34	0.0710	0.1015	0.0863	0.1185

7. Ovary (ICD-10: C56)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	3084	635	70	0.7917	0.8023	0.7872	0.8165
1	2	2379	362	12	0.6710	0.6881	0.6706	0.7049
2	3	2005	225	10	0.5955	0.6181	0.5996	0.6360
3	4	1770	152	6	0.5443	0.5723	0.5534	0.5909
4	5	1612	97	1	0.5115	0.5451	0.5259	0.5640
5	6	1514	67	306	0.4863	0.5260	0.5064	0.5454
6	7	1141	46	273	0.4640	0.5101	0.4899	0.5301
7	8	822	27	276	0.4457	0.4983	0.4772	0.5192
8	9	519	16	226	0.4282	0.4879	0.4650	0.5105
9	10	277	4	273	0.4160	0.4830	0.4566	0.5092

8. Stomach (ICD-10: C16)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	2818	1480	66	0.4686	0.4941	0.4744	0.5135
1	2	1272	415	9	0.3152	0.3483	0.3291	0.3675
2	3	848	164	18	0.2536	0.2941	0.2753	0.3132
3	4	666	82	9	0.2221	0.2698	0.2510	0.2890
4	5	575	53	0	0.2017	0.2566	0.2376	0.2761
5	6	522	28	97	0.1897	0.2544	0.2347	0.2746
6	7	397	28	99	0.1744	0.2481	0.2276	0.2695
7	8	270	8	87	0.1683	0.2552	0.2331	0.2781
8	9	175	7	83	0.1595	0.2612	0.2365	0.2870
9	10	85	2	83	0.1521	0.2726	0.2417	0.3052

9. Prostate (ICD-10: C61)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	2913	485	49	0.8321	0.8929	0.8777	0.9070
1	2	2379	379	16	0.6991	0.8082	0.7884	0.8272
2	3	1984	235	10	0.6161	0.7707	0.7480	0.7926
3	4	1739	204	8	0.5436	0.7397	0.7145	0.7643
4	5	1527	149	3	0.4905	0.7300	0.7024	0.7572
5	6	1375	128	289	0.4395	0.7209	0.6904	0.7510
6	7	958	79	266	0.3974	0.7228	0.6883	0.7571
7	8	613	40	200	0.3664	0.7435	0.7036	0.7835
8	9	373	17	204	0.3434	0.7809	0.7326	0.8294
9	10	152	3	149	0.3302	0.8496	0.7850	0.9147

10. Thyroid (ICD-10: C73)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	2058	222	42	0.8910	0.9042	0.8896	0.9171
1	2	1794	85	12	0.8487	0.8725	0.8557	0.8878
2	3	1697	62	9	0.8176	0.8512	0.8329	0.8680
3	4	1626	46	5	0.7944	0.8372	0.8179	0.8551
4	5	1575	46	3	0.7712	0.8226	0.8023	0.8415
5	6	1526	37	298	0.7505	0.8105	0.7892	0.8304
6	7	1191	19	300	0.7368	0.8060	0.7838	0.8269
7	8	872	14	267	0.7228	0.8019	0.7784	0.8241
8	9	591	8	290	0.7098	0.7986	0.7730	0.8227
9	10	293	6	287	0.6813	0.7755	0.7392	0.8093

11. Corpus Uteri (ICD-10: C54)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	2038	285	67	0.8578	0.8722	0.8559	0.8870
1	2	1686	176	11	0.7680	0.7932	0.7734	0.8118
2	3	1499	114	12	0.7093	0.7442	0.7226	0.7646
3	4	1373	76	4	0.6700	0.7143	0.6916	0.7359
4	5	1293	37	0	0.6508	0.7055	0.6821	0.7278
5	6	1256	40	259	0.6277	0.6927	0.6684	0.7159
6	7	957	28	251	0.6066	0.6824	0.6570	0.7069
7	8	678	12	226	0.5937	0.6819	0.6552	0.7077
8	9	440	6	198	0.5833	0.6832	0.6546	0.7107
9	10	236	4	232	0.5638	0.6745	0.6382	0.7094

12. Brain & Nervous System (ICD-10: C71-72)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	1352	514	31	0.6154	0.6247	0.5977	0.6506
1	2	807	151	2	0.5001	0.5141	0.4861	0.5414
2	3	654	63	8	0.4516	0.4702	0.4421	0.4979
3	4	583	55	2	0.4090	0.4312	0.4031	0.4591
4	5	526	35	2	0.3817	0.4081	0.3800	0.4361
5	6	489	31	82	0.3553	0.3852	0.3570	0.4135
6	7	376	15	73	0.3396	0.3743	0.3457	0.4031
7	8	288	7	78	0.3300	0.3701	0.3407	0.3997
8	9	203	4	93	0.3216	0.3669	0.3364	0.3977
9	10	106	2	104	0.3097	0.3617	0.3263	0.3976

13. Pancreas (ICD-10: C25)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	1438	965	36	0.3204	0.3324	0.3074	0.3577
1	2	437	165	4	0.1989	0.2124	0.1905	0.2352
2	3	268	59	1	0.1550	0.1709	0.1505	0.1926
3	4	208	30	5	0.1324	0.1509	0.1311	0.1720
4	5	173	17	0	0.1194	0.1403	0.1208	0.1613
5	6	156	12	24	0.1094	0.1331	0.1137	0.1543
6	7	120	9	35	0.0998	0.1252	0.1057	0.1467
7	8	76	3	23	0.0952	0.1240	0.1037	0.1465
8	9	50	3	22	0.0879	0.1195	0.0976	0.1441
9	10	25	0	25	0.0879	0.1229	0.1003	0.1482

14. Lymphoma (adults) (ICD-10: C81-85; C96)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	4465	1556	179	0.6444	0.6592	0.6445	0.6735
1	2	2730	403	45	0.5485	0.5714	0.5558	0.5867
2	3	2282	225	22	0.4941	0.5244	0.5084	0.5402
3	4	2035	127	13	0.4632	0.5011	0.4849	0.5173
4	5	1895	97	7	0.4394	0.4853	0.4687	0.5017
5	6	1791	84	360	0.4165	0.4699	0.4530	0.4867
6	7	1347	44	351	0.4009	0.4626	0.4452	0.4800
7	8	952	31	335	0.3850	0.4549	0.4366	0.4732
8	9	586	16	315	0.3707	0.4487	0.4288	0.4686
9	10	255	2	253	0.3649	0.4552	0.4328	0.4777

Lymphoma (children) (ICD-10: C81-85; C96)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	244	46	30	0.7991	0.7995	0.7415	0.8459
1	2	168	12	5	0.7412	0.7418	0.6789	0.7944
2	3	151	8	9	0.7007	0.7017	0.6359	0.7579
3	4	134	12	5	0.6368	0.6380	0.5687	0.6992
4	5	117	1	3	0.6313	0.6328	0.5633	0.6944
5	6	113	1	27	0.6249	0.6268	0.5568	0.6890
6	7	85	1	23	0.6164	0.6187	0.5475	0.6821
7	8	61	2	26	0.5907	0.5933	0.5159	0.6626
8	9	33	0	17	0.5907	0.5937	0.5163	0.6630
9	10	16	0	16	0.5907	0.5942	0.5167	0.6636

15. Leukaemia (adults) (ICD-10: C91-95)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	2694	1097	78	0.5868	0.5971	0.5778	0.6159
1	2	1519	364	27	0.4449	0.4593	0.4395	0.4788
2	3	1128	125	13	0.3953	0.4138	0.3941	0.4335
3	4	990	90	8	0.3593	0.3818	0.3621	0.4015
4	5	892	51	3	0.3387	0.3650	0.3453	0.3847
5	6	838	40	150	0.3209	0.3506	0.3309	0.3705
6	7	648	19	148	0.3103	0.3436	0.3236	0.3638
7	8	481	11	164	0.3018	0.3394	0.3188	0.3601
8	9	306	5	169	0.2949	0.3372	0.3157	0.3588
9	10	132	2	130	0.2861	0.3322	0.3070	0.3579

Leukaemia (children) (ICD-10: C91-95)

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	1179	235	127	0.7893	0.7898	0.7646	0.8126
1	2	817	80	44	0.7099	0.7105	0.6823	0.7366
2	3	693	39	66	0.6680	0.6687	0.6392	0.6964
3	4	588	22	23	0.6425	0.6434	0.6132	0.6720
4	5	543	17	6	0.6222	0.6234	0.5926	0.6527
5	6	520	6	98	0.6143	0.6158	0.5847	0.6453
6	7	416	2	120	0.6109	0.6126	0.5813	0.6423
7	8	294	1	104	0.6083	0.6103	0.5787	0.6404
8	9	189	2	102	0.5995	0.6018	0.5682	0.6337
9	10	85	0	85	0.5995	0.6021	0.5685	0.6340

APPENDIX 2. ACTUARIAL LIFE TABLE BY STAGING FOR SELECTED CANCERS

start : Start of life table interval (year)
end : End of life table interval (year)
n : Number alive at start
d : Number of deaths during the interval
w : Withdrawals (censorings) during the interval
cp : Cumulative observed survival- OS
cr_e2 : Cumulative relative survival (Ederer II)- RS
lo_cr_e2 : Lower 95% CI for CR (Ederer II)
hi_cr_e2 : Upper 95% CI for CR (Ederer II)

1-year interval for 10 years – period of diagnosis 2007-2011 and followed up to 2016

1. Female Breast (ICD-10: C50)

Stage I

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	2428	84	62	0.9650	0.9777	0.9694	0.9844
1	2	2282	112	4	0.9176	0.9426	0.9304	0.9532
2	3	2166	101	5	0.8747	0.9120	0.8974	0.9252
3	4	2060	77	3	0.8420	0.8920	0.8758	0.9070
4	5	1980	71	1	0.8118	0.8753	0.8576	0.8916
5	6	1908	46	378	0.7901	0.8682	0.8494	0.8857
6	7	1484	34	402	0.7691	0.8627	0.8424	0.8818
7	8	1048	18	332	0.7534	0.8629	0.8409	0.8836
8	9	698	9	348	0.7405	0.8678	0.8434	0.8906
9	10	341	4	337	0.7233	0.8689	0.8368	0.8987

Stage II

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	4291	189	105	0.9554	0.9673	0.9605	0.9732
1	2	3997	261	10	0.8929	0.9161	0.9061	0.9253
2	3	3726	245	4	0.8342	0.8677	0.8557	0.8791
3	4	3477	201	1	0.786	0.8301	0.8166	0.8429
4	5	3275	143	2	0.7516	0.8068	0.7925	0.8206
5	6	3130	133	660	0.7159	0.7822	0.7668	0.7970
6	7	2337	76	570	0.6894	0.7674	0.7510	0.7833
7	8	1691	58	543	0.6612	0.7517	0.7336	0.7691
8	9	1090	17	559	0.6474	0.7515	0.7319	0.7705
9	10	514	5	509	0.6349	0.7537	0.7300	0.7765

Stage III

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	2654	254	62	0.9032	0.9151	0.9030	0.9260
1	2	2338	348	7	0.7685	0.7894	0.7723	0.8056
2	3	1983	243	3	0.6743	0.7023	0.6831	0.7207
3	4	1737	186	2	0.6020	0.6370	0.6167	0.6566
4	5	1549	118	0	0.5562	0.5974	0.5766	0.6178
5	6	1431	79	289	0.5220	0.5702	0.5488	0.5912
6	7	1063	48	273	0.4950	0.5497	0.5275	0.5715
7	8	742	35	232	0.4673	0.5289	0.5053	0.5523
8	9	475	15	219	0.4481	0.5182	0.4925	0.5435
9	10	241	3	238	0.4371	0.5158	0.4864	0.5448

Stage IV

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	2071	703	32	0.6579	0.6684	0.6471	0.6888
1	2	1336	414	4	0.4537	0.4681	0.4457	0.4903
2	3	918	231	3	0.3394	0.3558	0.3342	0.3774
3	4	684	152	1	0.2639	0.2818	0.2615	0.3025
4	5	531	101	2	0.2136	0.2329	0.2137	0.2527
5	6	428	59	76	0.1813	0.2019	0.1834	0.2212
6	7	293	17	87	0.1689	0.1929	0.1741	0.2124
7	8	189	12	63	0.1561	0.1832	0.1637	0.2036
8	9	114	7	44	0.1442	0.1739	0.1530	0.1960
9	10	63	3	60	0.1311	0.1635	0.1378	0.1915

2. Colorectal (ICD-10: C18-21)

Stage I

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	793	120	30	0.8458	0.8784	0.8500	0.9028
1	2	643	71	2	0.7522	0.8133	0.7786	0.8447
2	3	570	48	0	0.6889	0.7790	0.7404	0.8146
3	4	522	41	2	0.6347	0.7521	0.7104	0.7912
4	5	479	21	1	0.6068	0.7581	0.7136	0.8001
5	6	457	23	100	0.5725	0.7581	0.7101	0.8039
6	7	334	16	94	0.5406	0.7646	0.7115	0.8154
7	8	224	10	80	0.5112	0.7720	0.7121	0.8297
8	9	134	2	79	0.5004	0.8095	0.7421	0.8744
9	10	53	1	52	0.4819	0.8584	0.7620	0.9509

Stage II

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	1728	236	37	0.8619	0.8991	0.8811	0.9153
1	2	1455	191	2	0.7487	0.8155	0.7922	0.8372
2	3	1262	124	6	0.6750	0.7691	0.7430	0.7939
3	4	1132	98	3	0.6165	0.7370	0.7088	0.7642
4	5	1031	68	0	0.5758	0.7254	0.6952	0.7546
5	6	963	56	174	0.5390	0.7180	0.6857	0.7495
6	7	733	42	181	0.5038	0.7094	0.6743	0.7438
7	8	510	20	175	0.4799	0.7161	0.6776	0.7540
8	9	315	11	164	0.4573	0.7224	0.6784	0.7658
9	10	140	2	138	0.4444	0.7408	0.6868	0.7938

Stage III

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	2225	373	47	0.8306	0.8597	0.8428	0.8752
1	2	1805	334	4	0.6767	0.7251	0.7036	0.7456
2	3	1467	225	3	0.5728	0.6374	0.6139	0.6602
3	4	1239	155	3	0.5011	0.5811	0.5565	0.6053
4	5	1081	93	3	0.4579	0.5559	0.5303	0.5811
5	6	985	69	237	0.4214	0.5377	0.5108	0.5643
6	7	679	31	169	0.3995	0.5355	0.5069	0.5639
7	8	479	20	175	0.3791	0.5367	0.5056	0.5678
8	9	284	8	145	0.3647	0.5472	0.5123	0.5821
9	10	131	2	129	0.3537	0.5632	0.5202	0.6064

Stage IV

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	2216	1031	42	0.5303	0.5508	0.5288	0.5722
1	2	1143	463	7	0.3148	0.3392	0.3182	0.3603
2	3	673	214	1	0.2146	0.2404	0.2212	0.2600
3	4	458	107	2	0.1644	0.1920	0.1741	0.2107
4	5	349	49	0	0.1413	0.1728	0.1552	0.1913
5	6	300	32	48	0.1249	0.1607	0.1431	0.1793
6	7	220	18	59	0.1131	0.1537	0.1356	0.1730
7	8	143	8	53	0.1054	0.1524	0.1331	0.1731
8	9	82	2	45	0.1018	0.1560	0.1351	0.1787
9	10	35	1	34	0.0962	0.1552	0.1288	0.1843

3. Colon (ICD-10: C18)

Stage I

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	402	45	17	0.8856	0.9193	0.8822	0.9480
1	2	340	40	0	0.7814	0.8433	0.7953	0.8842
2	3	300	20	0	0.7294	0.8206	0.7675	0.8672
3	4	280	24	2	0.6666	0.7844	0.7262	0.8369
4	5	254	10	1	0.6403	0.7928	0.7308	0.8494
5	6	243	14	54	0.5988	0.7847	0.7174	0.8470
6	7	175	6	58	0.5742	0.8038	0.7296	0.8728
7	8	111	6	35	0.5374	0.8056	0.7196	0.8865
8	9	70	1	41	0.5265	0.8403	0.7442	0.9307
9	10	28	0	28	0.5265	0.9115	0.8072	1.0095

Stage II

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	965	118	20	0.8764	0.9145	0.8909	0.9346
1	2	827	99	0	0.7715	0.8397	0.8091	0.8673
2	3	728	56	2	0.7121	0.8102	0.7761	0.8418
3	4	670	51	1	0.6578	0.7853	0.7481	0.8202
4	5	618	39	0	0.6163	0.7742	0.7342	0.8121
5	6	579	27	108	0.5846	0.7767	0.7337	0.8177
6	7	444	20	115	0.5544	0.7780	0.7312	0.8228
7	8	309	12	108	0.5283	0.7875	0.7355	0.8376
8	9	189	7	97	0.5020	0.7948	0.7342	0.8535
9	10	85	0	85	0.5020	0.8356	0.7718	0.8973

Stage III

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	1171	191	25	0.8351	0.8653	0.8418	0.8861
1	2	955	146	0	0.7075	0.7584	0.7293	0.7856
2	3	809	99	2	0.6208	0.6919	0.6598	0.7224
3	4	708	77	3	0.5531	0.6425	0.6085	0.6754
4	5	628	45	2	0.5134	0.6247	0.5890	0.6595
5	6	581	44	127	0.4698	0.6016	0.5638	0.6386
6	7	410	16	106	0.4487	0.6044	0.5642	0.6441
7	8	288	11	102	0.4279	0.6096	0.5655	0.6531
8	9	175	3	92	0.4179	0.6332	0.5844	0.6814
9	10	80	1	79	0.4076	0.6588	0.5987	0.7184

Stage IV

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	1103	526	23	0.5181	0.5382	0.5070	0.5685
1	2	554	219	2	0.3129	0.3376	0.3079	0.3676
2	3	333	93	0	0.2255	0.2538	0.2262	0.2824
3	4	240	50	1	0.1784	0.2103	0.1840	0.2381
4	5	189	28	0	0.1520	0.1881	0.1624	0.2156
5	6	161	13	25	0.1387	0.1821	0.1558	0.2104
6	7	123	7	36	0.1295	0.1811	0.1536	0.2110
7	8	80	4	31	0.1214	0.1829	0.1531	0.2154
8	9	45	0	27	0.1214	0.1951	0.1634	0.2299
9	10	18	0	18	0.1214	0.2037	0.1706	0.2400

4. Rectum (ICD-10: C19-21)

Stage I

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	391	75	13	0.8049	0.8364	0.7915	0.8741
1	2	303	31	2	0.7223	0.7826	0.7307	0.8282
2	3	270	28	0	0.6474	0.7362	0.6789	0.7883
3	4	242	17	0	0.6019	0.7190	0.6578	0.7755
4	5	225	11	0	0.5725	0.7224	0.6574	0.7832
5	6	214	9	46	0.5455	0.7309	0.6613	0.7965
6	7	159	10	36	0.5068	0.7252	0.6486	0.7981
7	8	113	4	45	0.4844	0.7379	0.6534	0.8188
8	9	64	1	38	0.4737	0.7781	0.6826	0.8699
9	10	25	1	24	0.4372	0.8046	0.6434	0.9596

Stage II

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	763	118	17	0.8436	0.8797	0.8505	0.9047
1	2	628	92	2	0.7198	0.7848	0.7481	0.8183
2	3	534	68	4	0.6278	0.7168	0.6759	0.7551
3	4	462	47	2	0.5638	0.6755	0.6318	0.7172
4	5	413	29	0	0.5242	0.6632	0.6169	0.7078
5	6	384	29	66	0.4809	0.6432	0.5941	0.6910
6	7	289	22	66	0.4396	0.6222	0.5694	0.6741
7	8	201	8	67	0.4186	0.6254	0.5683	0.6818
8	9	126	4	67	0.4005	0.6305	0.5669	0.6935
9	10	55	2	53	0.3724	0.6220	0.5336	0.7103

Stage III

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	1054	182	22	0.8255	0.8535	0.8282	0.8759
1	2	850	188	4	0.6425	0.6880	0.6558	0.7184
2	3	658	126	1	0.5194	0.5768	0.5424	0.6102
3	4	531	78	0	0.4431	0.5129	0.4775	0.5477
4	5	453	48	1	0.3961	0.4794	0.4431	0.5155
5	6	404	25	110	0.3677	0.4668	0.4291	0.5046
6	7	269	15	63	0.3445	0.4587	0.4188	0.4989
7	8	191	9	73	0.3244	0.4554	0.4121	0.4992
8	9	109	5	53	0.3048	0.4507	0.4015	0.5008
9	10	51	1	50	0.2930	0.4562	0.3957	0.5182

Stage IV

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	1113	505	19	0.5424	0.5632	0.5321	0.5932
1	2	589	244	5	0.3167	0.3408	0.3113	0.3706
2	3	340	121	1	0.2038	0.2272	0.2011	0.2545
3	4	218	57	1	0.1504	0.1741	0.1503	0.1996
4	5	160	21	0	0.1307	0.1578	0.1344	0.1830
5	6	139	19	23	0.1112	0.1399	0.1171	0.1648
6	7	97	11	23	0.0969	0.1273	0.1046	0.1527
7	8	63	4	22	0.0894	0.1233	0.0996	0.1500
8	9	37	2	18	0.0831	0.1204	0.0947	0.1498
9	10	17	1	16	0.0738	0.1136	0.0804	0.1543

5. Lung, Trachea & Bronchus (ICD-10: C33-34)

Stage I

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	223	87	4	0.6063	0.6332	0.5626	0.6968
1	2	132	37	0	0.4364	0.4751	0.4029	0.5452
2	3	95	12	0	0.3813	0.4334	0.3605	0.5060
3	4	83	11	1	0.3304	0.3947	0.3213	0.4695
4	5	71	8	0	0.2932	0.3705	0.2960	0.4480
5	6	63	10	10	0.2426	0.3231	0.2495	0.4020
6	7	43	4	14	0.2157	0.2993	0.2244	0.3814
7	8	25	4	10	0.1725	0.2515	0.1722	0.3434
8	9	11	0	7	0.1725	0.2668	0.1827	0.3643
9	10	4	0	4	0.1725	0.2719	0.1862	0.3713

Stage II

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	350	171	7	0.5065	0.5309	0.4745	0.5846
1	2	172	68	3	0.3045	0.3329	0.2803	0.3868
2	3	101	26	0	0.2261	0.2576	0.2086	0.3099
3	4	75	19	0	0.1688	0.2009	0.1558	0.2508
4	5	56	10	0	0.1387	0.1735	0.1304	0.2227
5	6	46	5	4	0.1229	0.1620	0.1191	0.2119
6	7	37	1	10	0.1191	0.1637	0.1195	0.2154
7	8	26	1	4	0.1141	0.1639	0.1181	0.2179
8	9	21	2	7	0.1011	0.1526	0.1047	0.2109
9	10	12	1	11	0.0855	0.1368	0.0806	0.2113

Stage III

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	1135	699	26	0.3770	0.3938	0.3642	0.4233
1	2	410	215	2	0.1788	0.1941	0.1702	0.2193
2	3	193	83	0	0.1019	0.1151	0.0958	0.1363
3	4	110	27	0	0.0769	0.0903	0.0728	0.1100
4	5	83	17	1	0.0611	0.0749	0.0587	0.0936
5	6	65	5	8	0.0561	0.0714	0.0553	0.0903
6	7	52	3	14	0.0523	0.0691	0.0528	0.0884
7	8	35	2	7	0.0490	0.0665	0.0500	0.0864
8	9	26	0	11	0.0490	0.0682	0.0513	0.0885
9	10	15	0	15	0.0490	0.0701	0.0527	0.0910

Stage IV

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	3007	2135	41	0.2851	0.2957	0.2790	0.3126
1	2	831	453	8	0.1289	0.1381	0.1254	0.1514
2	3	370	137	2	0.0811	0.0899	0.0793	0.1013
3	4	231	57	1	0.0610	0.0706	0.0609	0.0812
4	5	173	25	1	0.0522	0.0629	0.0536	0.0732
5	6	147	22	25	0.0436	0.0552	0.0463	0.0653
6	7	100	8	19	0.0398	0.0528	0.0437	0.0631
7	8	73	7	22	0.0353	0.0494	0.0400	0.0602
8	9	44	3	21	0.0321	0.0483	0.0381	0.0604
9	10	20	1	19	0.0291	0.0472	0.0344	0.0631

6. Nasopharynx (ICD-10: C11)

Stage I

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	316	23	8	0.9263	0.9400	0.9043	0.9644
1	2	285	32	0	0.8223	0.8473	0.7985	0.8868
2	3	253	36	1	0.7050	0.7384	0.6815	0.7882
3	4	216	28	0	0.6136	0.6520	0.5916	0.7071
4	5	188	7	0	0.5908	0.6373	0.5756	0.6940
5	6	181	11	37	0.5508	0.6041	0.5406	0.6634
6	7	133	3	24	0.5372	0.6003	0.5350	0.6616
7	8	106	7	35	0.4947	0.5630	0.4927	0.6298
8	9	64	2	32	0.4741	0.5496	0.4737	0.6222
9	10	30	0	30	0.4741	0.5620	0.4843	0.6362

Stage II

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	669	105	16	0.8411	0.8546	0.8240	0.8808
1	2	548	77	0	0.7230	0.7452	0.7082	0.7788
2	3	471	45	1	0.6538	0.6834	0.6439	0.7201
3	4	425	37	0	0.5969	0.6330	0.5920	0.6717
4	5	388	31	0	0.5492	0.5911	0.5491	0.6311
5	6	357	23	60	0.5106	0.5581	0.5151	0.5994
6	7	274	14	70	0.4807	0.5346	0.4902	0.5777
7	8	190	10	70	0.4497	0.5093	0.4621	0.5554
8	9	110	3	61	0.4327	0.4986	0.4476	0.5487
9	10	46	0	46	0.4327	0.5087	0.4566	0.5598

Stage III

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	750	125	23	0.8307	0.8427	0.8132	0.8682
1	2	602	121	1	0.6636	0.6820	0.6454	0.7159
2	3	480	65	1	0.5737	0.5975	0.5591	0.6339
3	4	414	48	1	0.5071	0.5358	0.4967	0.5735
4	5	365	28	0	0.4682	0.5017	0.4624	0.5401
5	6	337	20	55	0.4379	0.4766	0.4368	0.5157
6	7	262	14	68	0.4110	0.4545	0.4137	0.4948
7	8	180	10	60	0.3836	0.4308	0.3881	0.4733
8	9	110	5	57	0.3601	0.4114	0.3648	0.4581
9	10	48	1	47	0.3454	0.4011	0.3454	0.4573

Stage IV

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	828	285	13	0.6531	0.6623	0.6282	0.6942
1	2	530	151	1	0.4668	0.4796	0.4441	0.5144
2	3	378	90	2	0.3554	0.3697	0.3356	0.4040
3	4	286	48	0	0.2957	0.3117	0.2790	0.3451
4	5	238	35	1	0.2522	0.2689	0.2375	0.3013
5	6	202	27	42	0.2145	0.2316	0.2014	0.2631
6	7	133	5	31	0.2054	0.2245	0.1942	0.2564
7	8	97	8	32	0.1851	0.2048	0.1739	0.2378
8	9	57	5	29	0.1633	0.1833	0.1499	0.2198
9	10	23	0	23	0.1633	0.1860	0.1521	0.2230

7. Cervix Uteri (ICD-10: C53)

Stage I

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	665	43	22	0.9343	0.9430	0.9209	0.9597
1	2	600	54	2	0.8500	0.8664	0.8359	0.8923
2	3	544	44	0	0.7813	0.8049	0.7699	0.8358
3	4	500	27	2	0.7390	0.7693	0.7321	0.8028
4	5	471	15	0	0.7155	0.7529	0.7144	0.7879
5	6	456	13	86	0.6929	0.7382	0.6983	0.7747
6	7	357	11	84	0.6687	0.7217	0.6797	0.7604
7	8	262	4	93	0.6563	0.7170	0.6731	0.7575
8	9	165	3	97	0.6394	0.7075	0.6591	0.7521
9	10	65	2	63	0.6013	0.6740	0.5978	0.7427

Stage II

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	954	152	25	0.8386	0.8543	0.8287	0.8767
1	2	777	150	3	0.6764	0.7031	0.6708	0.7333
2	3	624	103	0	0.5647	0.6005	0.5659	0.6337
3	4	521	55	3	0.5049	0.5506	0.5150	0.5852
4	5	463	34	1	0.4678	0.5226	0.4863	0.5581
5	6	428	26	87	0.4362	0.4992	0.4621	0.5358
6	7	315	16	74	0.4111	0.4830	0.4446	0.5211
7	8	225	10	69	0.3895	0.4700	0.4295	0.5103
8	9	146	6	86	0.3668	0.4560	0.4111	0.5008
9	10	54	3	51	0.3282	0.4186	0.3525	0.4859

Stage III

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	565	181	12	0.6762	0.6913	0.6499	0.7292
1	2	372	111	3	0.4736	0.4960	0.4518	0.5389
2	3	258	63	1	0.3577	0.3838	0.3409	0.4268
3	4	194	24	1	0.3134	0.3447	0.3024	0.3877
4	5	169	16	0	0.2837	0.3210	0.2789	0.3643
5	6	153	9	26	0.2655	0.3090	0.2666	0.3530
6	7	118	3	28	0.2578	0.3104	0.2667	0.3559
7	8	87	2	21	0.2511	0.3126	0.2672	0.3599
8	9	64	1	35	0.2457	0.3179	0.2700	0.3680
9	10	28	0	28	0.2457	0.3398	0.2886	0.3934

Stage IV

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	447	212	14	0.5182	0.5299	0.4811	0.5765
1	2	221	81	0	0.3283	0.3438	0.2979	0.3903
2	3	140	35	0	0.2462	0.2648	0.2222	0.3095
3	4	105	16	1	0.2085	0.2307	0.1897	0.2745
4	5	88	3	1	0.2014	0.2302	0.1885	0.2750
5	6	84	13	13	0.1676	0.1988	0.1585	0.2431
6	7	58	3	15	0.1576	0.1958	0.1542	0.2418
7	8	40	5	14	0.1337	0.1758	0.1322	0.2257
8	9	21	0	11	0.1337	0.1875	0.1410	0.2407
9	10	10	0	10	0.1337	0.2057	0.1547	0.2641

8. Lymphoma (adults) (ICD-10: C81-85; C96)

Stage I

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	390	84	15	0.7804	0.7962	0.7503	0.8352
1	2	291	32	0	0.6946	0.7220	0.6710	0.7674
2	3	259	18	0	0.6463	0.6853	0.6318	0.7340
3	4	241	8	2	0.6248	0.6759	0.6208	0.7264
4	5	231	11	0	0.5950	0.6583	0.6014	0.7110
5	6	220	7	38	0.5743	0.6512	0.5924	0.7061
6	7	175	5	51	0.5551	0.6457	0.5842	0.7033
7	8	119	7	38	0.5162	0.6166	0.5491	0.6805
8	9	74	2	43	0.4966	0.6075	0.5332	0.6781
9	10	29	0	29	0.4966	0.6280	0.5512	0.7010

Stage II

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	508	106	9	0.7895	0.8028	0.7639	0.8364
1	2	393	36	1	0.7171	0.7390	0.6961	0.7774
2	3	356	20	1	0.6767	0.7070	0.6622	0.7478
3	4	335	18	2	0.6403	0.6782	0.6318	0.7209
4	5	315	10	0	0.6199	0.6660	0.6186	0.7100
5	6	305	17	57	0.5818	0.6348	0.5857	0.6809
6	7	231	8	64	0.5584	0.6191	0.5681	0.6673
7	8	159	4	49	0.5418	0.6107	0.5571	0.6615
8	9	106	3	54	0.5212	0.5998	0.5408	0.6559
9	10	49	1	48	0.5004	0.5936	0.5176	0.6656

Stage III

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	429	136	9	0.6796	0.6922	0.6446	0.7351
1	2	284	37	1	0.5909	0.6117	0.5615	0.6585
2	3	246	30	1	0.5187	0.5456	0.4943	0.5946
3	4	215	16	0	0.4801	0.5137	0.4617	0.5638
4	5	199	11	1	0.4535	0.4939	0.4413	0.5449
5	6	187	5	32	0.4402	0.4884	0.4350	0.5405
6	7	150	5	45	0.4230	0.4789	0.4240	0.5328
7	8	100	5	36	0.3972	0.4578	0.3998	0.5153
8	9	59	0	31	0.3972	0.4655	0.4065	0.5239
9	10	28	1	27	0.3698	0.4397	0.3572	0.5222

Stage IV

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	662	294	16	0.5505	0.5628	0.5230	0.6009
1	2	352	71	2	0.4391	0.4566	0.4166	0.4959
2	3	279	39	2	0.3775	0.3995	0.3599	0.4390
3	4	238	19	0	0.3474	0.3752	0.3356	0.4150
4	5	219	16	1	0.3219	0.3554	0.3158	0.3955
5	6	202	14	41	0.2971	0.3362	0.2964	0.3769
6	7	147	8	34	0.2788	0.3247	0.2839	0.3667
7	8	105	5	42	0.2622	0.3153	0.2724	0.3596
8	9	58	2	35	0.2493	0.3088	0.2620	0.3577
9	10	21	0	21	0.2493	0.3234	0.2744	0.3746

9. Lymphoma (children) (ICD-10: C81-85; C96)

Stage I

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	11	1	0	0.9091	0.9095	0.5083	0.9871
1	2	10	1	0	0.8182	0.8190	0.4479	0.9521
2	3	9	1	0	0.7273	0.7284	0.3714	0.9043
3	4	8	1	0	0.6364	0.6378	0.2975	0.8470
4	5	7	0	0	0.6364	0.6382	0.2977	0.8475
5	6	7	0	2	0.6364	0.6386	0.2979	0.8481
6	7	5	0	3	0.6364	0.6391	0.2982	0.8488
7	8	2	0	1	0.6364	0.6398	0.2985	0.8497
8	9	1	0	0	0.6364	0.6405	0.2988	0.8506
9	10	1	0	1	0.6364	0.6411	0.2991	0.8515

Stage II

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	21	3	1	0.8537	0.8540	0.6122	0.9507
1	2	17	1	1	0.8019	0.8026	0.5546	0.9216
2	3	15	0	1	0.8019	0.8030	0.5549	0.9220
3	4	14	2	0	0.6874	0.6887	0.4303	0.8484
4	5	12	0	1	0.6874	0.6891	0.4306	0.8490
5	6	11	0	2	0.6874	0.6896	0.4308	0.8495
6	7	9	1	2	0.6014	0.6037	0.3273	0.7970
7	8	6	0	3	0.6014	0.6041	0.3275	0.7975
8	9	3	0	3	0.6014	0.6043	0.3276	0.7978

Stage III

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	24	5	1	0.7872	0.7875	0.5624	0.9057
1	2	18	1	0	0.7435	0.7441	0.5162	0.8765
2	3	17	3	1	0.6083	0.6092	0.3818	0.7750
3	4	13	0	0	0.6083	0.6095	0.3820	0.7755
4	5	13	0	0	0.6083	0.6099	0.3823	0.7760
5	6	13	0	2	0.6083	0.6103	0.3826	0.7765
6	7	11	0	2	0.6083	0.6108	0.3829	0.7771
7	8	9	0	7	0.6083	0.6114	0.3832	0.7778
8	9	2	0	0	0.6083	0.6119	0.3835	0.7785
9	10	2	0	2	0.6083	0.6124	0.3839	0.7792

Stage IV

start	end	n	d	w	cp	cr_e2	lo_cr_e2	hi_cr_e2
0	1	35	13	3	0.6119	0.6121	0.4274	0.7533
1	2	19	0	0	0.6119	0.6123	0.4275	0.7536
2	3	19	2	0	0.5475	0.5481	0.3650	0.6986
3	4	17	1	0	0.5153	0.5160	0.3350	0.6703
4	5	16	0	0	0.5153	0.5162	0.3352	0.6705
5	6	16	1	5	0.4771	0.4782	0.2982	0.6379
6	7	10	0	4	0.4771	0.4784	0.2983	0.6383
7	8	6	1	3	0.3711	0.3724	0.1590	0.5886
8	9	2	0	1	0.3711	0.3727	0.1592	0.5891
9	10	1	0	1	0.3711	0.3731	0.1594	0.5898

APPENDIX 3. DESCRIPTION OF CANCER TYPES BY ICD-O3 AND ICD-10 CODES

Cancer types	Topography or Morphology ICD-O3 codes	Description	ICD-10 codes
Women's Cancers			
Female Breast	C50.0-C50.9	Breast	C50
Cervix Uteri	C53.0-C53.9	Cervix Uteri	C53
Ovary	C56.9	Ovary	C56
Corpus Uteri	C54.0-C54.9	Corpus Uteri	C54
Gastrointestinal Cancers			
Stomach	C16.0-C16.9	Stomach	C16
Colorectal (Colon & Rectum)	C18.0-C21.8	Colorectal	C18-21
	C18.0-C18.9	Colon	C18
	C19.0–C21.8	Rectum	C19-21
	:C19.9 :C20.9 :C21.0-C21.8	- Rectosigmoid Junction - Rectum - Anus & Anal canal (Adenocarcinoma only)	
Liver	C22.0-C22.1	Liver and intrahepatic duct	C22
Pancreas	C25.0-C25.9	Pancreas	C25
Other Cancers			
Lung, T & B	C33.9	Trachea	C33
	C34.0-C34.9	Bronchus & Lung	C34
Prostate	C61.9	Prostate	C61
Nasopharynx	C11.0-C11.9	Nasopharynx	C11
Thyroid	C73.0	Thyroid gland	C73
Brain & NS	C71.0-C71.9	Brain	C71
	C72.0-C72.9	Spinal cord, cranial nerves & other part of central nervous system	C72
Haematological Malignancies			
Lymphoma	M9590-M9597 M9650-M9667 M9670-M9729	Malignant lymphoma, NOS Hodgkin lymphoma Non-hodgkin lymphoma	C81-C85, C96
Leukaemia	M9800-M9809 M9811-M9837 M9840-M9931 M9940-M9948	Leukaemias, NOS Lymphoid leukaemias Myeloid leukaemias Other leukaemias	C91-C95

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