BELGIAN CANCER REGISTRY

10 years
Belgian Cancer Registry

Cancer Incidence in Belgium

years

Cancer Incidence in Belgium 2012

Special Issue

Haematological malignancies

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Special Issue

Haematological malignancies

Colophon

Stichting Kankerregister – Fondation Registre du Cancer
– Stiftung Krebsregister

Editorial team
Belgian Cancer Registry: Kris Henau, Marijke Vanspauwen, Mia Slabbaert, Katia Emmerechts, Liesbet Van Eycken

External experts: Prof. Beguin Yves, Prof. Bron Dominique, Prof. Kerre Tessa, Dr. Kornreich Anne, Prof. Schots Rik, Dr. Selleslag Dominik, Prof. Zachée Pierre.

Responsible editor:
Dr. Liesbet Van Eycken, Koningsstraat 215, 1210 Brussels

Design:
www.buzzbee.be

D/2015/11.846/1

Recommended reference
Haematological malignancies in Belgium, Belgian Cancer Registry, Brussels 2015

Additional information can be requested at:
Tel. 0032-2-250 10 10
Fax. 0032-2-250 10 11
E-mail: info@kankerregister.org – info@registreducancer.org

This publication was realised with the specific financial support of :

RIZIV INAMI

service public fédéral SANTE PUBLIQUE, SECURITE DE LA CHAINE ALIMENTAIRE ET ENVIRONNEMENT

federale overheidsdienst VOLKSGEZONDHEID, VEILIGHEID VAN DE VOEDSELKETEN EN LEEFMILIEU

Met steun van de Vlaamse Regering

COMMISSION COMMUNAUTAIRE FRANÇAISE

Wallonie

be.brussels

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Stichting tegen Kanker
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Een actie voor Kom op tegen Kanker

Foreword

Although haematological malignancies represent the 4th most common category and account for 10% of all malignant tumours, they have been underexposed in the previous publications of the Belgian Cancer Registry. This is mainly due to major progress in understanding the biology of these malignancies leading to increased complexity in classification, diagnosis and registration procedures.

A close collaboration between the Belgian Cancer Registry and expert physicians from the Belgian Haematological Society (BHS) first resulted in the setup of the Belgian Transplant Registry (2011) and subsequently in this special issue on the epidemiology of haematological malignancies.

This publication is devoted to haematological malignancies as they strongly differ from the epidemiology of solid tumours. They indeed represent a very diverse and complex group of diseases with more than 100 different, often very rare subtypes. For this publication, they are stratified according to the WHO 2008/Haemacare classification into the three main groups i.e. lymphoid, myeloid and histiocytic/dendritic cell neoplasms. While solid tumours are most frequently diagnosed in adults and elderly, haematological malignancies occur at all ages including the younger ones (infants, children and adolescents). Each year about 6.500 persons living in Belgium face the diagnosis of leukaemia or lymphoma. Over time, prognosis of haematological malignancies has substantially improved due to major therapeutic advances: the 5-year relative survival rate has increased from 57% in 2000-2003 to 66% in 2008-2012. The improvement has been most spectacular for chronic myeloid leukaemia where the 5-year relative survival rate increased from 48% to 80% over the same period.

The data have been collected at the national level through both the pathology and the clinical registration pathways starting at the incidence year 2004 for Belgium and 1999 for the Flemish Region. Incidence, prevalence and 5-year survival data are presented for Belgium with as much detail and specificity as possible and with comments on possible registration imperfections. Moreover, analysis of the data provided more insight into the difficulties and complexity of registration.
As a result, key recommendations for better quality registration involving data managers and treating physicians are integrated for the first time in our epidemiological report.
A publication is always an outstanding moment to express our gratitude to physicians, pathologists and data managers in the hospitals for their intensive commitment and sustained efforts in registration.
We hope that this work will be an added value to your daily work and for future projects to strengthen scientific population based cancer research.

Dr. Liesbet Van Eycken
Director BCR

Prof. Dr. Rik Schots
President BHS

10 years
Belgian Cancer Registry

BHS
Belgian Hematological Society

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Summary / Key notes

- This special issue on "Haematological malignancies" is the first in depth description on the epidemiology of haematological malignancies in Belgium.
- Haematological malignancies account for 10% of all malignant tumours.
  - Third most frequent malignancy in males.
  - Fourth most frequent malignancy in females.

- One in twenty-five males and one in thirty-five females will develop a haematological malignancy before the age of 75 years.
- Haematological malignancies are the fourth most frequent cause of death from cancer.
- New classification guidelines published in 2008 stratifies haematological malignancies in:
  1. Lymphoid malignancies: more than two/thirds of all haematological malignancies.
  2. Myeloid malignancies: almost one/third of all haematological malignancies.
  3. Histiocytic/dendritic cell neoplasms: rare disease but accounts for more than 11% of haematological malignancies in children.

- As a result of improvements in detection and registration, an increase over time is observed in the incidence of myeloid malignancies.
  - One example are the new findings in molecular biology (JAK-2 and similar activating mutations) that probably have contributed to the increase in incidence rates of myeloproliferative neoplasms.

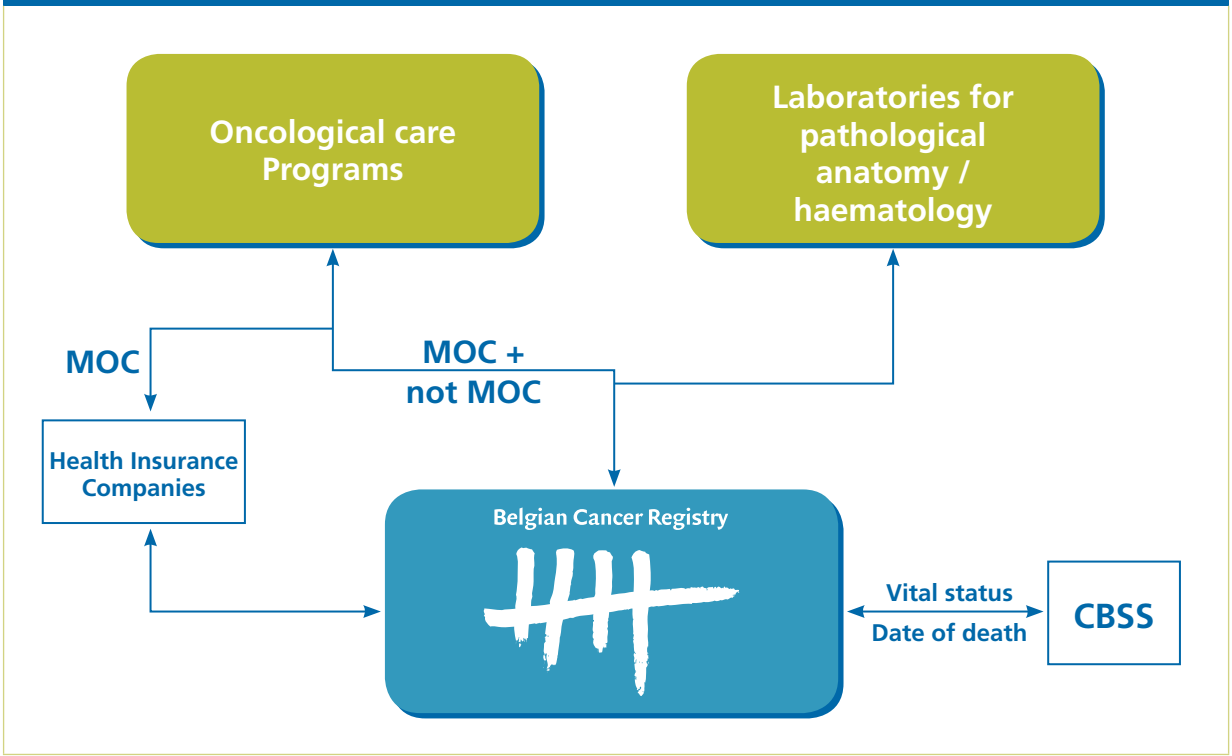
- 64% of males and 66% of females with a haematological malignancy are still alive 5 years after their diagnosis.
  - The survival rates differ by specific disease subtype and by age.
  - Over time, prognosis for haematological malignancies has improved; the 5-year relative survival rates have increased from 57% in the period 2000-2003 to 66% in 2008-2012.
  - The largest increase in survival rates is observed for Chronic Myeloid Leukaemia (CML). Due to improvements in therapeutic modalities, 5-year relative survival rates increased from 48% (2000-2003) to 80% (2008-2012).

1 Introduction

1.1 THE BELGIAN CANCER REGISTRY

The Belgian Cancer Registry is a national population based cancer registry, collecting data on a national level since the incidence year 2004 (1). Cancer registration in Belgium has a firm legal basis. In 2003 the Royal Decree on the oncological care programs (2) describing the reimbursement of the multidisciplinary oncological consult (MOC) was enacted. Later on, in 2006, the specific law on the Cancer Registry (3) was created, making cancer registration compulsory for the oncological care programs and for the laboratories for pathological anatomy. Furthermore, the law authorizes the use of the national Social Security Identification Number (SSIN) as the unique identifier of the patient. The SSIN enables linkage with other medical and/or administrative data. Additionally, through linkage with the Crossroads Bank for Social Security (CBSS), the SSIN enables the Registry to perform active follow-up on vital status and date of death of the patients.

FIGURE 1 BELGIAN CANCER REGISTRY: DATAFLOW



MOC: Multidisciplinary Oncological Consult
CBSS: Crossroads Bank for Social Security

A complete description of the role, the objectives and data flow of the Cancer Registry was reported in several publications (1; 4; 5; 6; 7). The general data flow **(Figure 1)** relies on all information (notifications) coming from the oncological care programs (clinical network) and from the laboratories for pathological anatomy (pathological network). The authorities involved and several other organisations contribute financially to ensure the continuity of cancer registration in Belgium.

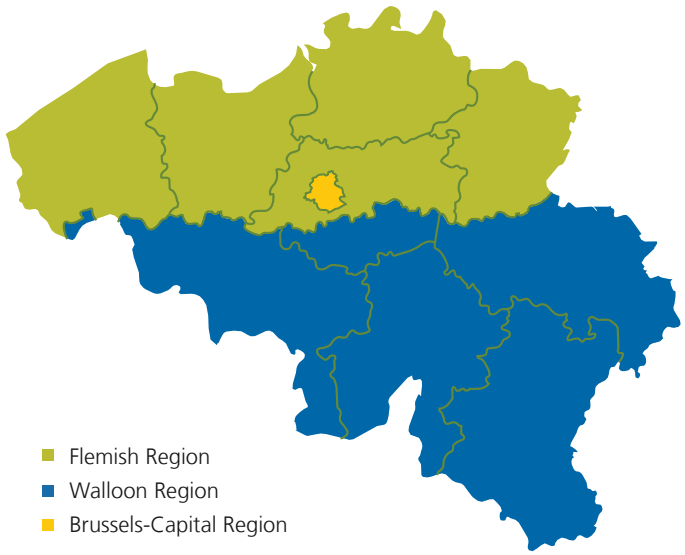
1.2 POPULATION AND REGION

Belgium **(Figure 2)** comprises an area of 30,528 square kilometres. On January 1st 2012, Belgium had a population of 11,035,948 including 5,413,801 males and 5,622,147 females. The population is divided in the Flemish Region (6,350,765), the Walloon Region (3,546,329) and the Brussels Capital Region (1,138,854).

The population density is 355 inhabitants per square kilometre for Belgium, 462 for the Flemish Region and 208 and 6,751 for the Walloon Region and the Brussels Capital Region, respectively.

Seventeen percent of the population is 65 years of age or older and 5.2% is 80 years of age or older. According to the Directorate-general Statistics Belgium (8), life expectancy at birth is 82.8 years in females and 77.6 years in males.

FIGURE 2 - BELGIUM



Source: Belgian Cancer Registry

2 Methodology

2.1 CLASSIFICATION AND REPORTING OF HAEMATOLOGICAL MALIGNANCIES

In the last decades, several classification systems have been used for haematological malignancies (Rappaport (9), Kiel, Lukes (10), NCI Working group (11), French-American-British FAB (12), REAL (13)). Continuous improvements in immunophenotypic and molecular biological techniques have brought new insights in this field which in turn created the need for new and updated classification schemes for haematological malignancies. In 2001, the WHO published the first true worldwide consensus classification of haematological malignancies (14). The most recent developments were compiled in an updated WHO-version, published in 2008 (15).

Haemacare

In an effort to facilitate the use of the most up-to date information, an expert panel formulated standard rules for the registration of haematological malignancies for use by population-based cancer registries. A multidisciplinary team of twelve experts (senior physicians, epidemiologists and onco-haematologists) worked in collaboration with a group of experts from different Cancer Registries to create a coding manual for haematological malignancies (Haemacare manual (16)).

The Haemacare manual follows the 'WHO-2008'-recommendations and stratifies haematological malignancies according to cell lineage into:

1. Lymphoid malignancies
2. Myeloid malignancies
3. Histiocytic/dendritic cell neoplasms

Within each of these groups, malignancies are further sub-divided according to the cell of origin, morphology, immunohistochemistry, genetic characteristics or clinical behaviour. Each subcategory is likely to have a distinct physiopathology and prognosis. For this reason, the Haemacare panel also developed a consensus grouping of all morphology codes (ICD-O-3: International classification of diseases for oncology, 3rd revision (17)) into groups of similar physiopathology and prognosis, useful to report on incidence and survival. A detailed overview of these groupings, used throughout this publication, can be found in Appendix 1.

2.2 QUALITY OF INCIDENCE DATA

2.2.1 COMPLETENESS OF THE CANCER REGISTRY

Completeness is the extent to which all incident cancers in the Belgian population are included in the Cancer Registry. Incidence rates will be close to their true value if maximum completeness in the case-finding procedures can be achieved.

The Cancer Registry validates its completeness on a regular basis. We estimate the database of the BCR to be more than 95% complete (1), incompleteness being more likely due to elderly patients with a very poor prognosis at diagnosis and outpatients with a clinical diagnosis only.

Independent data set method

The independent data set method is a technique to check the completeness of cancer registration by validating the presence at the cancer registry of cancer cases recorded in an independent, project specific database (18).

Overall completeness is routinely evaluated using the independent data set method. Record linkage with datasets for rectal, breast, head and neck and prostate cancer resulted in an overlap between 98.6% and 100% (1). A more recent evaluation, using data from a multicentre prospective registration project on endometrial carcinoma (EFFECT-EFFectiveness of Endometrial Cancer Treatment), revealed that 561 out of 562 cases (99.8%) diagnosed in 2012, were present in the cancer registry database.

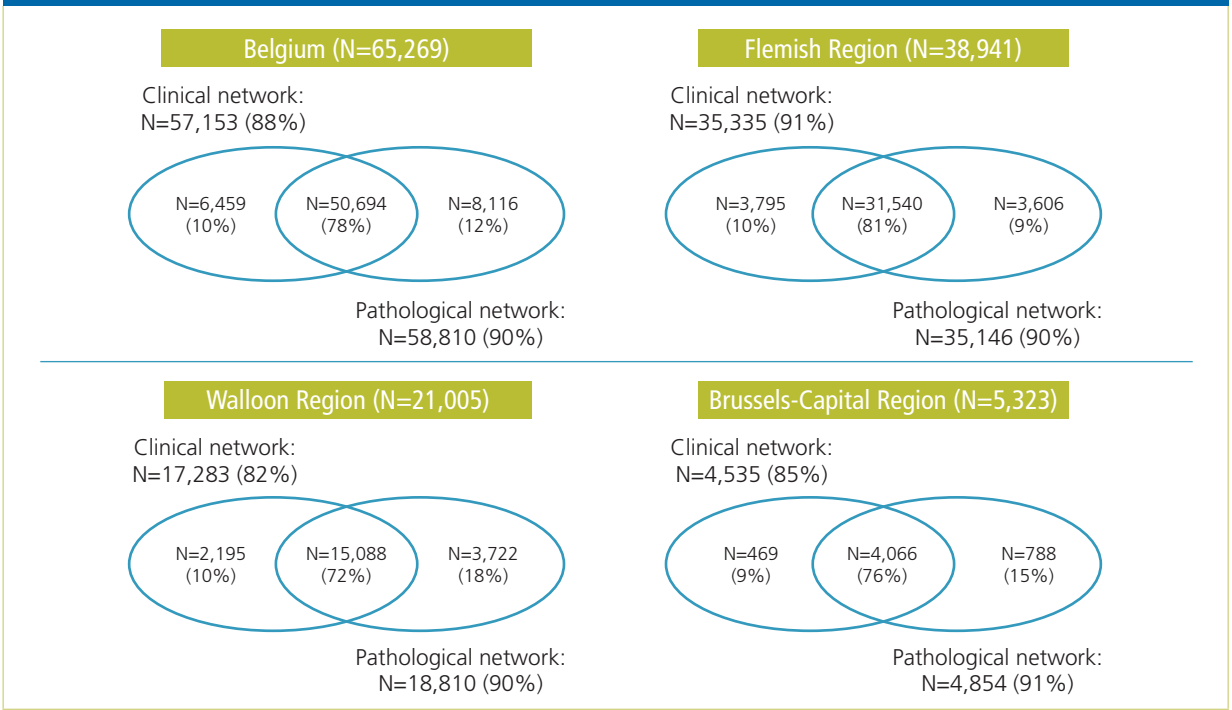
Death certificates have only recently been made available to the registry. A pilot study linking the mesothelioma death statistics (2009-2010) showed that 416 out of 440 deaths (94.5%) mentioned in the death certificates were also known by the BCR (1). Further investigations are ongoing to trace back the remaining 5% and validate the diagnosis of mesothelioma.

At the moment, no independent datasets on haematological malignancies have been used to evaluate completeness for haematological malignancies using this method.

Number of notifications/data sources

The number of independent registrations by different data sources per tumour is a raw indicator of completeness. The higher the average, the more complete the registration process. Linkage of data from different sources and source types leads to information that is more complete, precise and reliable.

FIGURE 3 INVASIVE TUMOURS, EXCL. NON MELANOMA SKIN CANCER: COMBINATION OF NOTIFICATIONS BY SOURCE TYPE AND REGION, 2012



In 2012, the Belgian Cancer Registry has recorded 65,269 invasive tumours (excl. non melanoma skin cancer), originating from 129,505 notifications (on average 2.0 notifications per tumour, range [1-7]). There is little variation between the three regions (Flemish Region: average = 2.0 [1-7], Walloon Region: average = 1.9 [1-7], Brussels-Capital Region: average = 2.1 [1-6]). When considering the two main groups of source types **(Figure 3)**, laboratories for pathological anatomy (pathological network) versus the oncological care programs (clinical network), 78% of all malignancies were notified by both groups (Belgium 2012). The overlap in the Flemish Region (81%) was somewhat higher than in the Walloon and Brussels-Capital Region (72% and 76% respectively).

For haematological malignancies, the average number of notifications per tumour is lower (1.7, range [1-7]) than for invasive solid tumours. Especially for myeloid malignancies, a lower number of notifications is observed. Lymphoid malignancies are more often notified by the clinical and the pathological network. There are however large differences between the subtypes. SLL/CLL is only notified in 1 out of 4 cases by both networks, while more than 80% of all Hodgkin lymphoma, diffuse large B-cell lymphoma, follicular lymphoma and Burkitt lymphoma are recorded by a pathologist and the oncological care program **(Table 1)**. This does not imply that laboratories are not involved in the diagnostic setting for SLL/CLL and myeloid malignancies. Very often the laboratories for pathological anatomy are not equipped for these tumour types and, in several cases, anatomopathological findings need to be confronted with the clinical presentation, results of genetic research … to make a final correct diagnosis. The uncertainty of the pathological diagnosis prohibits some pathologists to make a registration after the examination of the sample and the specimens are transferred to haematology/clinical biology laboratories. A specific collaboration with these laboratories has not yet been fully implemented.

TABLE 1 - HAEMATOLOGICAL MALIGNANCIES: OVERVIEW OF NOTIFICATIONS BY SOURCE TYPE AND HISTOLOGY, BELGIUM 2012

Belgium 2012	Total	Number of notifications		Notification by hospital and laboratory		Notification only by hospital		Notification only by laboratory	
	N	Averages	Range	N	%	N	%	N	%
Haematological malignancies	6,524	1.7	[1-7]	3,438	53%	2,316	35%	770	12%
Lymphoid malignancies	4,357	1.8	[1-7]	2,606	60%	1,268	29%	483	11%
Hodgkin lymphoma	325	2.1	[1-5]	268	82%	24	7%	33	10%
Mature B-cell neoplasms	3,417	1.8	[1-6]	2,036	60%	1,039	30%	342	10%
Small lymphocytic lymphoma/chronic lymphocytic leukaemia (SLL/CLL)	808	1.4	[1-6]	224	28%	503	62%	81	10%
Immunoproliferative diseases	135	1.5	[1-4]	64	47%	55	41%	16	12%
Mantle cell/centrocytic lymphoma	122	2.0	[1-4]	93	76%	20	16%	9	7%
Follicular B-cell lymphoma	402	2.1	[1-5]	323	80%	38	9%	41	10%
Diffuse B-cell lymphoma	829	2.1	[1-6]	698	84%	44	5%	87	10%
Burkitt lymphoma/leukaemia	37	2.6	[1-5]	30	81%	5	14%	2	5%
Marginal zone lymphoma	282	1.9	[1-5]	176	62%	65	23%	41	15%
Mature B-cell leukaemia	45	1.5	[1-2]	22	49%	21	47%	2	4%
Plasma cell neoplasms	757	1.7	[1-5]	406	54%	288	38%	63	8%
Mature T-cell and NK-cell neoplasms	282	2.0	[1-7]	168	60%	44	16%	70	25%
Lymphoblastic lymphoma/ acute (precursor cell) lymphatic leukaemia (ALL)	181	2.2	[1-5]	94	52%	80	44%	7	4%
Lymphoid neoplasms, NOS	152	1.3	[1-3]	40	26%	81	53%	31	20%
Myeloid malignancies	2,130	1.5	[1-5]	815	38%	1,039	49%	276	13%
Acute myeloid leukaemia (AML)	502	1.8	[1-5]	261	52%	221	44%	20	4%
Myeloproliferative neoplasms	761	1.5	[1-4]	273	36%	395	52%	93	12%
Chronic myeloid leukaemia (CML)	166	1.6	[1-4]	82	49%	69	42%	15	9%
Other myeloproliferative neoplasms	595	1.4	[1-4]	191	32%	326	55%	78	13%
Myelodysplastic syndrome	700	1.4	[1-4]	208	30%	346	49%	146	21%
Myelodysplastic/ myeloproliferative neoplasms	150	1.6	[1-5]	71	47%	63	42%	16	11%
Myeloid neoplasms, NOS	17	1.4	[1-3]	2	12%	14	82%	1	6%
Histiocytic and dendritic cell neoplasms	37	1.9	[1-4]	17	46%	9	24%	11	30%

Mortality/Incidence ratios

Mortality/Incidence ratios (M/I ratios) reflect the relationship between the number of deaths (from the mortality statistics) and the number of new cancer cases, both from a specific type of cancer and from the same period **(Table 2).** These cancer cases and deaths do not necessarily refer to the same cases, but rather to the same diagnosis. M/I ratios greater than 1 reflect either under reporting of incident cancer cases and/or inaccurate mortality statistics. Frequently death certificates are not filled in by the treating physician, which can explain inaccuracy in the mortality statistics. Liver cancer is an example where it might be possible that mortality statistics include cases of liver metastasis, where the cancer registry has information on the real primary site. In case of pancreatic cancer, an under registration of new cases can be assumed (likely to be elderly patients and/or patients with a very poor prognosis).

For haematological malignancies, it is not possible to calculate M/I ratios for the groupings used in this publications, since mortality statistics are coded using ICD10 (International Classification of Diseases, 10th revision (19)).

TABLE 2 MORTALITY / INCIDENCE RATIO BY REGION AND TUMOUR TYPE, 2004-2011

2004-2011		Belgium			Flemish Region			Walloon Region			Brussels-Capital Region		
ICD10	Label	Incidence	Mortality	M/I ratio	Incidence	Mortality	M/I ratio	Incidence	Mortality	M/I ratio	Incidence	Mortality	M/I ratio
C00-C14;C30-C32	Head and neck	20,010	6,095	30%	10,450	3,410	33%	7,685	2,074	27%	1,875	611	33%
C15	Oesophagus	7,315	5,394	74%	4,276	3,180	74%	2,470	1,769	72%	569	445	78%
C16	Stomach	11,183	6,385	57%	6,885	4,014	58%	3,350	1,872	56%	948	499	53%
C18-C20	Colon and rectum	64,379	23,533	37%	40,237	14,082	35%	18,997	7,409	39%	5,145	2,042	40%
C22	Liver	4,535	6,009	133%	2,351	3,122	133%	1,698	2,228	131%	486	659	136%
C25	Pancreas	10,159	11,859	117%	5,766	6,783	118%	3,491	4,002	115%	902	1,074	119%
C34	Lung	59,265	51,864	88%	34,396	30,078	87%	20,229	17,657	87%	4,640	4,129	89%
C43	Malignant melanoma	14,674	2,427	17%	8,450	1,559	18%	4,852	687	14%	1,372	181	13%
C45	Mesothelioma	2,013	1,668	83%	1,416	1,193	84%	514	417	81%	83	58	70%
C50	Breast	78,203	18,817	24%	45,136	11,118	25%	25,732	5,946	23%	7,335	1,753	24%
C53	Cervix uteri	4,985	1,427	29%	2,857	938	33%	1,598	345	22%	530	144	27%
C54-C55	Corpus uteri	11,495	2,872	25%	6,956	1,578	23%	3,653	1,021	28%	886	273	31%
C56	Ovary	7,069	5,428	77%	4,284	3,255	76%	2,189	1,733	79%	596	440	74%
C61	Prostate	73,031	11,566	16%	47,145	6,982	15%	21,166	3,643	17%	4,720	941	20%
C62	Testis	2,417	81	3%	1,304	42	3%	910	32	4%	203	7	3%
C64	Kidney	11,720	4,401	38%	7,471	2,736	37%	3,472	1,326	38%	777	339	44%
C67	Bladder	17,183	6,796	40%	10,469	3,958	38%	5,329	2,230	42%	1,385	608	44%
C70-C72	Central nervous system	6,428	4,928	77%	3,875	3,047	79%	2,024	1,502	74%	529	379	72%
C73	Thyroid	6,096	623	10%	2,620	389	15%	2,639	190	7%	837	44	5%
C81	Hodgkin	2,371	424	18%	1,322	261	20%	787	135	17%	262	28	11%
C82-C86	Non-Hodgkin	14,742	5,315	36%	8,603	3,046	35%	4,774	1,763	37%	1,365	506	37%
C90	Multiple myeloma	5,541	3,433	62%	3,387	2,089	62%	1,652	1,070	65%	502	274	55%
C91-C95	Leukaemia	11,667	7,254	62%	7,124	4,064	57%	3,512	2,583	74%	1,031	607	59%

2.2.2 VALIDITY

Validity or accuracy refers to the proportion of cases in a dataset with a given characteristic (e.g. cancer site, histology, age at diagnosis …) which truly have the attribute. The validity of the data depends strongly on the quality offered by the sources. All data that enters the Registry is submitted to an extended set of automated and manual validation procedures based on the IARC guidelines (20) to ensure validity and quality of the data. The data source is consulted to provide additional details for cases with an uncertain diagnosis, insufficient or erroneous data or conflicting information.

Microscopically verified tumours

Validity of the diagnosis is likely to be higher if it is based on histological or cytological examination. The percentage of microscopically verified tumours (MV%) is a positive indicator of validity, however a very high MV% would imply an over-reliance on the pathology laboratory as a source of information and failure to find cases diagnosed by other means.

The MV% for all malignancies (excl. non melanoma skin cancer) is 97.2% in Belgium. Compared to other registries, the results for Belgium are rather high (21). MV% is lower for cancer of the pancreas and liver. For haematological malignancies the MV% is 99.7% in Belgium **(Table 3)**.

TABLE 3 MICROSCOPIC VERIFICATION (MV%) BY REGION AND TUMOUR TYPE, 2012

ICD10	Tumour type	Belgium	Flemish Region	Walloon Region	Brussels-Capital Region
C00-C43,C45-C97,MDS and MPN	Invasive tumours (excl. non melanoma skin cancer)	97.2%	96.6%	98.1%	98.0%
C00-C14,C30-C32	Head and neck	99.3%	99.0%	99.5%	100.0%
C15	Oesophagus	99.4%	99.1%	99.7%	100.0%
C16	Stomach	99.1%	98.9%	99.6%	99.2%
C18-C20	Colon and rectum	98.9%	98.8%	99.1%	99.2%
C22	Liver	71.2%	70.9%	74.6%	60.4%
C25	Pancreas	86.8%	83.0%	92.6%	92.1%
C34	Lung	92.3%	89.8%	95.4%	96.8%
C43	Malignant melanoma	99.9%	99.9%	100.0%	99.5%
C45	Mesothelioma	100.0%	100.0%	100.0%	100.0%
C50	Breast	99.8%	99.7%	99.9%	99.9%
C53	Cervix uteri	99.3%	99.2%	99.2%	100.0%
C54	Corpus uteri	99.2%	99.3%	98.7%	100.0%
C56	Ovary	97.1%	96.3%	98.1%	98.4%
C61	Prostate	99.0%	98.9%	99.2%	99.1%
C62	Testis	100.0%	100.0%	100.0%	100.0%
C64	Kidney	91.4%	89.2%	95.0%	96.1%
C67	Bladder	99.0%	98.9%	99.2%	98.1%
C70-C72	Central nervous system	93.0%	91.2%	96.0%	95.6%
C73	Thyroid	100.0%	100.0%	100.0%	100.0%
ICD-O-3: M9590/3-M9992/3	Haematological malignancies	99.7%	99.7%	99.8%	99.3%

MDS: Myelodysplastic syndrome MPN: myeloproliferative neoplasms

Stability of incidence data over time

As a result of delays in notification or by recovering additional information not available at time of registration, the number of cases registered for a given year will change over time. Due to the continuous and thorough data cleaning, this data is incorporated at a later date resulting in small changes over time in the number of new diagnoses for the same incidence year. Very often, the number of cases in the first year after publication will increase due to the inclusion of 'late arrivals', while later on, the number of cases decreases a little due to the thorough and consistent data cleaning that results in for example the exclusion of cases that after additional investigations were confirmed as non-malignant.

The number of new diagnoses for all invasive tumours **(Table 4)** remains fairly stable and rarely exceeds 1% change between 2 consecutive publication years. For haematological malignancies **(Table 5)**, the largest change was observed between the publication years 2005 and 2006 (more than 5%). High mortality/incidence ratios in the Walloon Region for leukaemia (4) revealed a possible under-registration. To identify cases missed by the data managers in the hospital, the Cancer Registry set up a temporary collaboration with the haematology departments in the Walloon Region and retrospectively collected additional diagnoses for 2004 and 2005, which have been included in the registry database. This explains the % difference observed for haematological malignancies between publication years 2005 and 2006. In more recent years, the difference rarely exceeds 1% change between publication years.

TABLE 4 ALL INVASIVE TUMOURS (ICD10: C00-C97, MDS AND MPN): STABILITY OF INCIDENCE DATA (N) OVER TIME, 2004-2012

Belgium		Incidence year								
		2004	2005	2006	2007	2008	2009	2010	2011	2012
Publication year	2004	60,047								
	2005	59,976	59,478							
	2006	60,740	60,618	60,046						
	2008	61,480	61,482	61,246	63,170	63,738				
	2009	61,507	61,482	61,266	63,189	64,096	64,526			
	2010	61,496	61,416	61,252	63,236	64,087	64,720	66,331		
	2011	61,424	61,363	61,202	63,183	64,041	64,770	66,667	69,062	
	2012	61,293	61,265	61,090	63,090	63,966	64,768	66,664	69,719	70,992

TABLE 5 HAEMATOLOGICAL MALIGNANCIES (ICD-O-3: M9590/3-9992/3): STABILITY OF INCIDENCE DATA (N) OVER TIME, 2004-2012

Belgium		Incidence year								
		2004	2005	2006	2007	2008	2009	2010	2011	2012
Publication year	2004	4,902								
	2005	4,906	4,638							
	2006	5,139	4,971	4,857						
	2008	5,182	5,042	5,006	5,308	5,426				
	2009	5,219	5,077	5,030	5,337	5,521	5,574			
	2010	5,233	5,091	5,052	5,359	5,559	5,625	5,924		
	2011	5,188	5,047	4,987	5,305	5,493	5,628	5,970	6,143	
	2012	5,175	5,040	4,979	5,297	5,503	5,643	5,991	6,238	6,524

2.3 CALCULATION OF INCIDENCE, TRENDS, PREVALENCE AND SURVIVAL

Incidence

Incidence is the number of new cases occurring in a given time period in a specific population. It provides a direct estimate of the probability or risk of illness, and can be expressed in different ways.

- The **crude incidence rate** is calculated by dividing the number of new cases observed during a given time period by the corresponding number of people in the population at risk. The crude rate is expressed as the number of new cases per 100,000 person years.
- The **age-specific incidence rate** is the number of newly diagnosed cases in a particular 5-year age group over a specified time period and expressed per 100,000 person years.
- The **age-standardised incidence rate** is a weighted average of the individual age-specific rates using an external standard population. It is the incidence that would be observed if the population had the age structure of the standard population (European or World Standard Population). Since age has a powerful influence on the risk of cancer, this standardisation is necessary when comparing several populations that differ with respect to their age structure. In this publication, the World Standard Population is used for standardisation and consequently World Standardised incidence Rates (WSR) are reported. These are expressed as the number of new cases per 100,000 person years.
- **Male/Female (M/F) ratios** are calculated by dividing the corresponding age-standardised incidence rates (WSR).

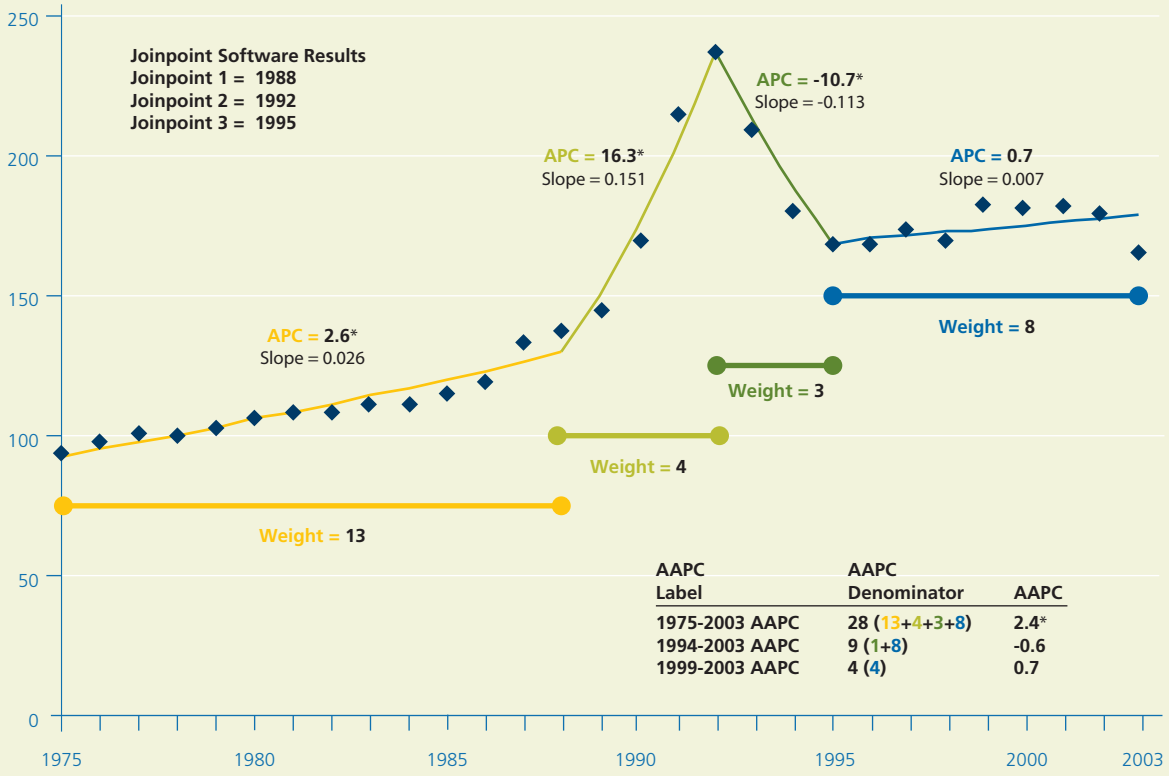
Trends

The NCI Joinpoint Regression Analysis program, version 4.1.1.1 (22; 23) was used to examine trends in incidence by sex, age group and/or histological subtype. The Joinpoint program selects the best-fitting piecewise continuous log-linear model, where the segments are connected at "joinpoints", and statistical tests are performed to determine the minimum number of joinpoints necessary to fit the data. All Joinpoint program settings remained in the default mode.

For Belgium, 9 years of incidence data were available, allowing for a maximum of 1 joinpoint. For each detected linear segment, annual percentage changes (APC) in age-adjusted incidence (WSR) were calculated, and 95% confidence intervals (CIs) were reported. Incidence trends over the entire study period (2004-2012) were presented using **average annual percentage changes (AAPC)** (24), which is an average of the APC's for each segment, weighted by the segment length **(Figure 4).**

The occurrence of a joinpoint does not necessarily reflect a true change in the underlying risk. Very often this will be the result of better or improved coding practices.

FIGURE 4 EXAMPLE (SEER) ON THE CALCULATION OF AAPC (REPRODUCED FROM THE 'JOINPOINTS USER'S GUIDE 4.2' HTTP://SURVEILLANCE.CANCER.GOV/JOINPOINT/JOINPOINT_HELP_4.2.0.0.PDF)



Weight is the number of years the APC segment contributes to the AAPC denominator when calculating the AAPC for 1975-2003.
* The APC/AAPC is significantly different from 0.

Relative Survival

The relative survival ratio gives the estimate of survival of the patients when the effect of other causes of death than cancer of the patients has been eliminated based on the mortality in a comparable group of the general population. In this publication we used mainly 5-year relative survival ratios (Ederer II method) by age group, sex and tumour type. Unless otherwise stated, survival rates or prognosis always refer to 5-year relative survival ratios. The methodology was described in detail in our publication 'Cancer Survival in Belgium' (6).

The empirical life tables (by sex-, age, region- and calendar-year) (8), used in the calculation for relative survival, vary considerably by year of age for young (<30 year) and old ages (>90 year). To reduce the variability due to random effect and to ensure that death probabilities evolve consistently from one age to another, the life tables were smoothed using the LOESS-method (25; 26; 27; 28). The variability of the probability of dying at older ages from one year to the next remains substantial after smoothing. Therefore patients older than 99 years of age at time of diagnosis were excluded for the 5-year relative survival calculations. Furthermore, survival analyses for any interval were not published when less than 10 patients entered the interval alive, because of instability of the resulting estimates (29).

Prevalence

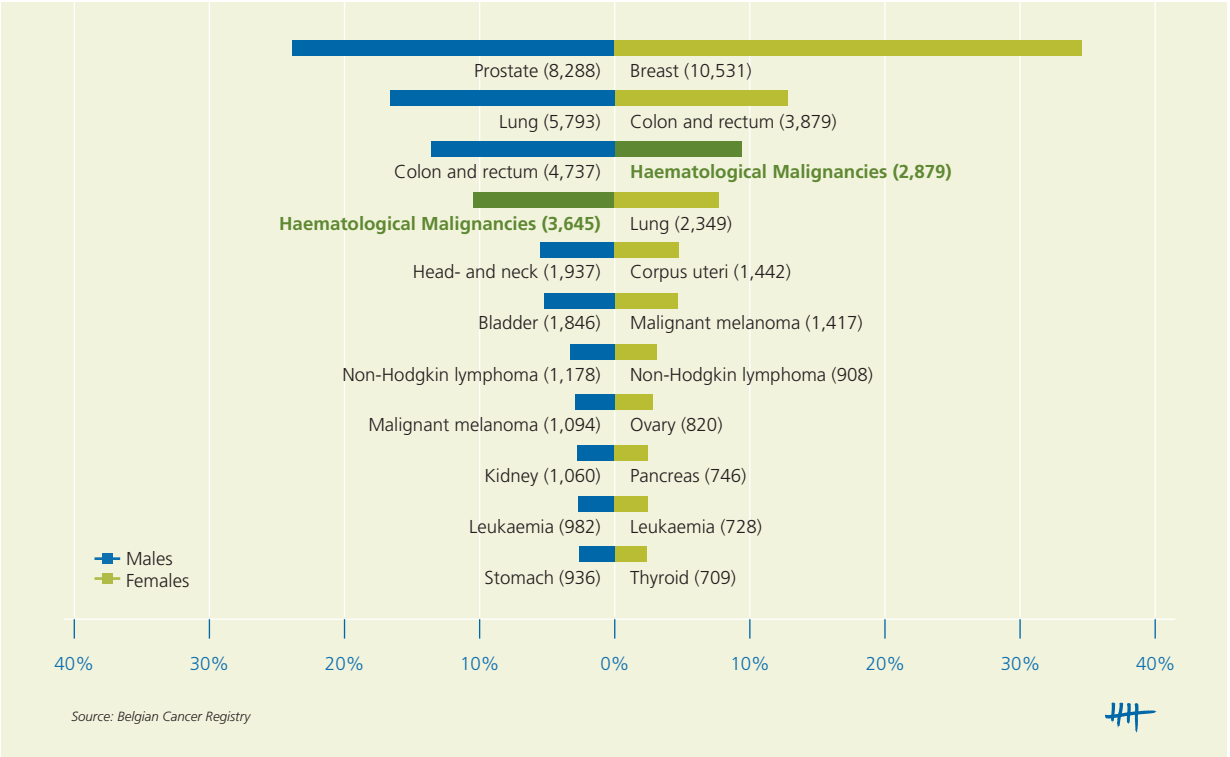
Five-year prevalence data (30) were estimated with an index date of 31st December 2012, representing people living in Belgium who were diagnosed with at least one invasive haematological malignancy in the period from 1st January 2008 to 31st December 2012 and who were still alive at the end of 2012 (index date). Persons with more than one haematological malignancy were included as prevalent cases in each cancer type, but were counted only once in analysis regrouping multiple tumour sites.

3 Haematological malignancies

Incidence

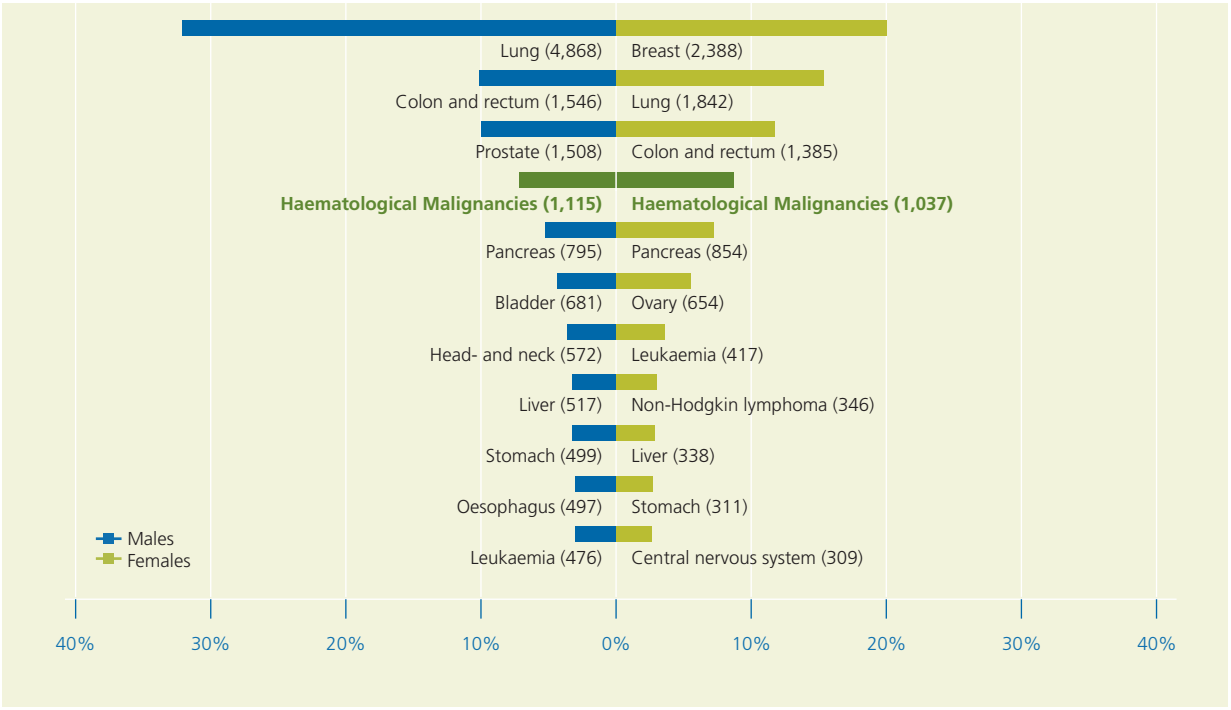
- Belgium 2012: 6,524 new diagnoses of haematological malignancies
  - 3,645 males (56%)
  - 2,879 females (44%)
- Haematological malignancies account for 10% of all malignant tumours in both sexes.
  - All haematological malignancies combined are the 4th most frequent tumour type in males and the 3rd most frequent in females **(Figure 5).**
  - Haematological malignancies are the 4th most frequent cause of death from cancer in both sexes **(Figure 6).**
- One in twenty-five males and one in thirty-five females will develop a haematological malignancy before the age of 75 years.
  - Haematological malignancies already occur at an early age, while the risk for developing a haematological malignancy starts to increase around the age of 35 years **(Figure 7).**
  - The male/female ratio under the age of 35 years is 1.2.
  - After the age of 35 years, the risk in males increases more rapidly than in females.
  - At 75 years of age, cancer incidence in males is almost twice as high as in females.
  - The male/female ratio in patients older than 75 years is 1.7
- Average age at diagnosis: 64 years in males, 65 years in females.

FIGURE 5 TEN MOST FREQUENTLY OCCURRING INVASIVE TUMOURS (EXCL. NON MELANOMA SKIN CANCER) BY SEX, BELGIUM 2012 (EXTENDED WITH DATA FOR ALL HAEMATOLOGICAL MALIGNANCIES COMBINED)



Source: Belgian Cancer Registry

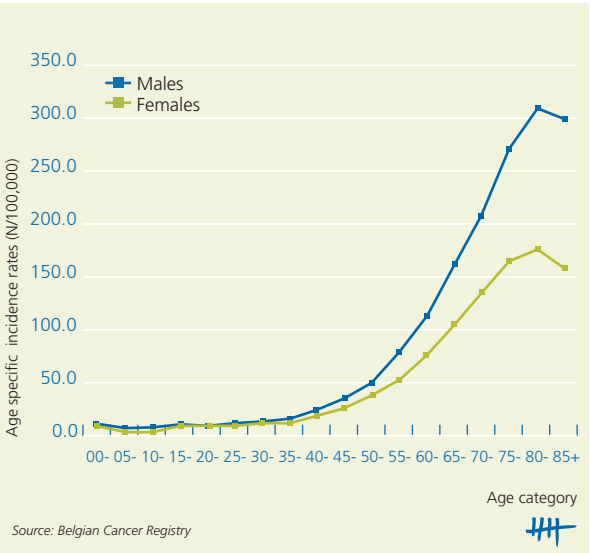
FIGURE 6 TEN MOST FREQUENT CAUSES OF DEATH FROM CANCER (EXCL. NON MELANOMA SKIN CANCER) BY SEX, BELGIUM 2012 (EXTENDED WITH DATA FOR ALL HAEMATOLOGICAL MALIGNANCIES COMBINED)



Haemacare/WHO classification (see chapter 2.1) stratifies haematological malignancies according to cell lineage into **(Figure 8):**

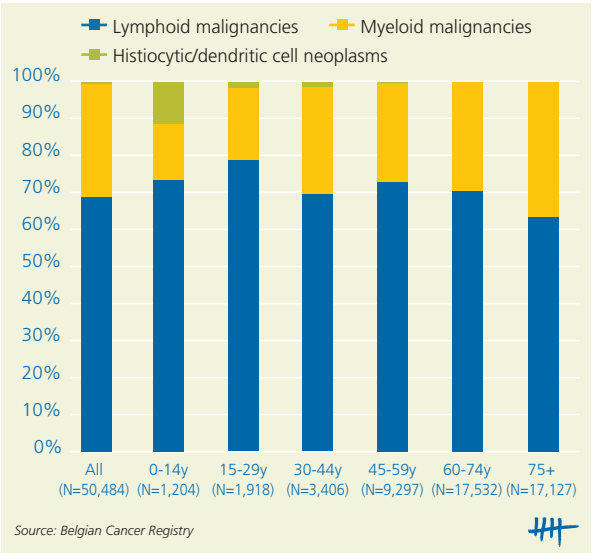
- **Lymphoid malignancies:** More than two thirds (69%) of haematological malignancies diagnosed in 2004-2012.
- **Myeloid malignancies:** Almost one third (30%) of haematological malignancies diagnosed in 2004-2012.
- **Histiocytic/dendritic cell neoplasms:** Very rare: 0.6% of haematological malignancies diagnosed, but accounts for more than 11% in children (0-14 year).

FIGURE 7 HAEMATOLOGICAL MALIGNANCIES: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 8 HAEMATOLOGICAL MALIGNANCIES: INCIDENCE BY CELL LINEAGE AND AGE GROUP, BELGIUM 2004-2012



Source: Belgian Cancer Registry

Trends

- Significant trends are observed in the incidence rates (2004-2012) for haematological malignancies in males and females **(Figure 9 and Table 6),** which can mainly be attributed to myeloid malignancies **(Figure 10).**
- Increases in incidence over time are mainly observed in older age groups **(Figure 11 and Table 6).**

FIGURE 9 HAEMATOLOGICAL MALIGNANCIES: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012

FIGURE 10 HAEMATOLOGICAL MALIGNANCIES: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND CELL LINEAGE, BELGIUM 2004-2012

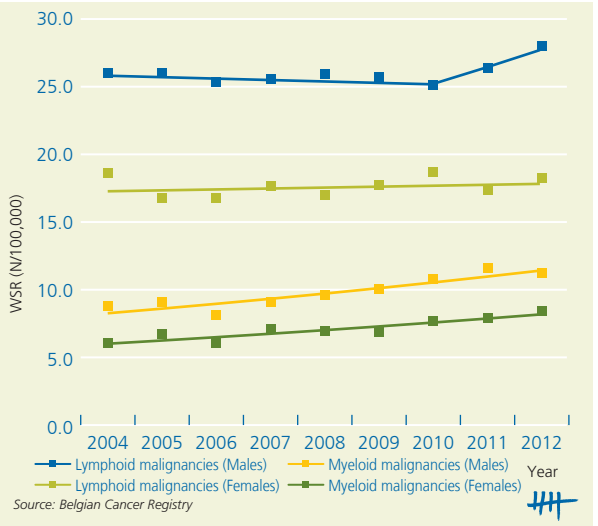


FIGURE 11 HAEMATOLOGICAL MALIGNANCIES: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

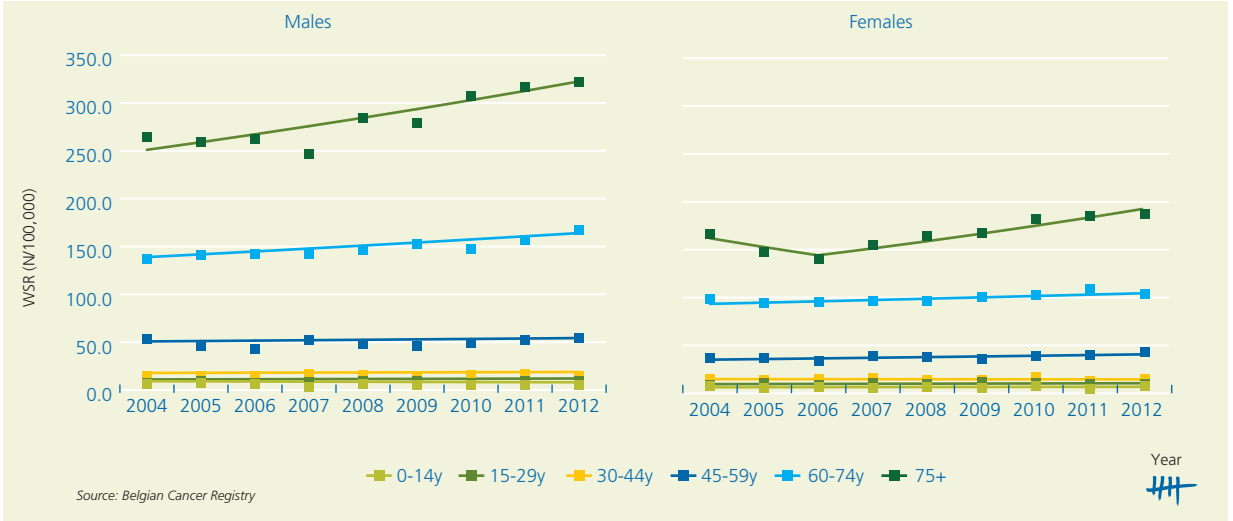


TABLE 6 HAEMATOLOGICAL MALIGNANCIES: AAPC(%) BY SEX, CELL LINEAGE AND AGE GROUP, BELGIUM 2004-2012

	Males			Females		
Subtype	AAPC(%)	95%CI	period	AAPC(%)	95%CI	period
Haematological malignancies	1.2	[-0.3:2.7]		1.4	[0.3:2.6]	
	-1.9	[-9.2:5.9]	2004-2006			
	2.3	[1.0:3.7]	2006-2012			
Lymphoid malignancies	0.9	[0.0:1.8]		0.4	[-0.9:1.7]	
	-0.4	[-1.2:0.4]	2004-2010			
	4.9	[0.6:9.4]	2010-2012			
Myeloid malignancies	4.1	[2.5:5.8]		3.9	[2.3:5.5]	
Age	AAPC(%)	95%CI	period	AAPC(%)	95%CI	period
0-14 years	-1.6	[-5.5:2.4]		1.0	[-4.5:6.9]	
15-29 years	1.1	[-0.7:2.9]		1.2	[-2.4:4.9]	
30-44 years	0.7	[-0.8:2.2]		-0.2	[-2.9:2.5]	
45-59 years	0.8	[-1.3:3.1]		1.9	[0.1:3.6]	
60-74 years	2.1	[1.3:2.9]		1.4	[0.5:2.3]	
75+	3.2	[1.7:4.7]		2.2	[0.2:4.2]	
				-5.7	[-15:4.1]	2004-2006
				4.9	[3.4:6.5]	2006-2012

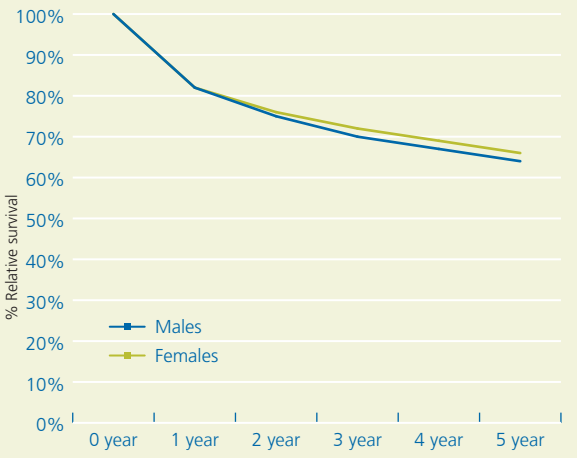
AAPC: average annual percentage change (2004-2012)

Period: When a joinpoint occured, APC's are calculated for the period before and after the joinpoint. This column represents the corresponding interval. AAPC's are always calculated over the entire study-period (2004-2012).

Relative Survival

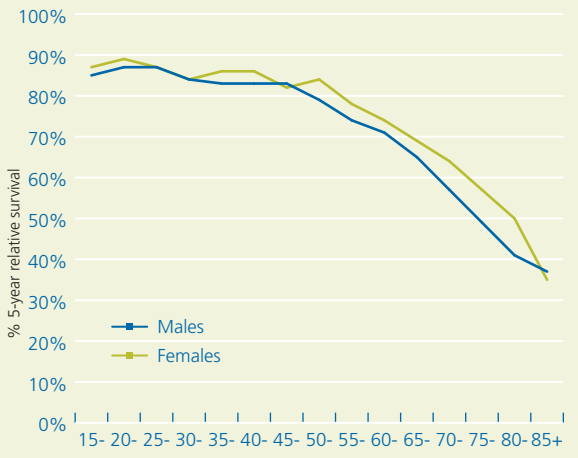
- Five-year relative survival is similar in males and females **(Figure 12):**
  - Males: 64%
  - Females: 66%
- Survival rates decrease with age **(Figure 13):**
  - Under the age of 50 years, 5-year relative survival rates are higher than 80%.
  - From the age of 50 years, survival rates decrease rapidly with age and are lower than 50% in the oldest age groups.
- Prognosis depends on cell lineage **(Figure 14):**
  - Higher 5-year survival rates are observed with lymphoid malignancies (70% in both males and females), compared to myeloid malignancies (49% in males and 57% in females).
  - Within a cell lineage, survival rates differ greatly between the different main subtypes.
- Over time, prognosis for haematological malignancies has improved; the 5-year relative survival rates have increased from 57% in the period 2000-2003 (Flemish Region) to 63% in 2004-2007 (Belgium) and up to 66% in 2008-2012 (Belgium) **(Figure 15).**
  - The largest increase in survival rates is observed for CML. Due to improvements in therapeutic modalities, 5-year relative survival rates increased from 48% (2000-2003) to 80% (2008-2012).

FIGURE 12 HAEMATOLOGICAL MALIGNANCIES: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



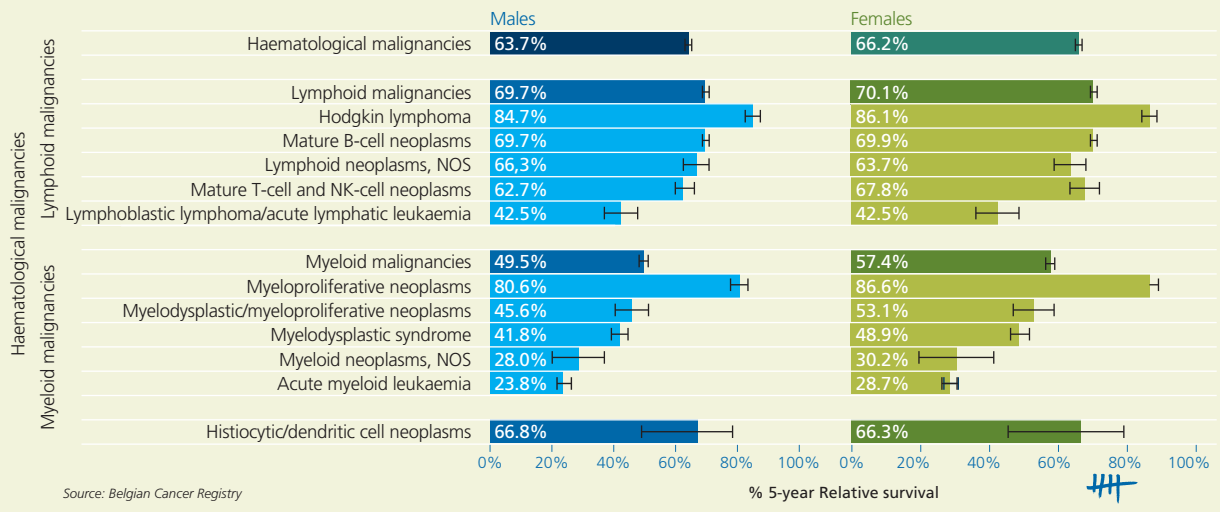
Source: Belgian Cancer Registry

FIGURE 13 HAEMATOLOGICAL MALIGNANCIES: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



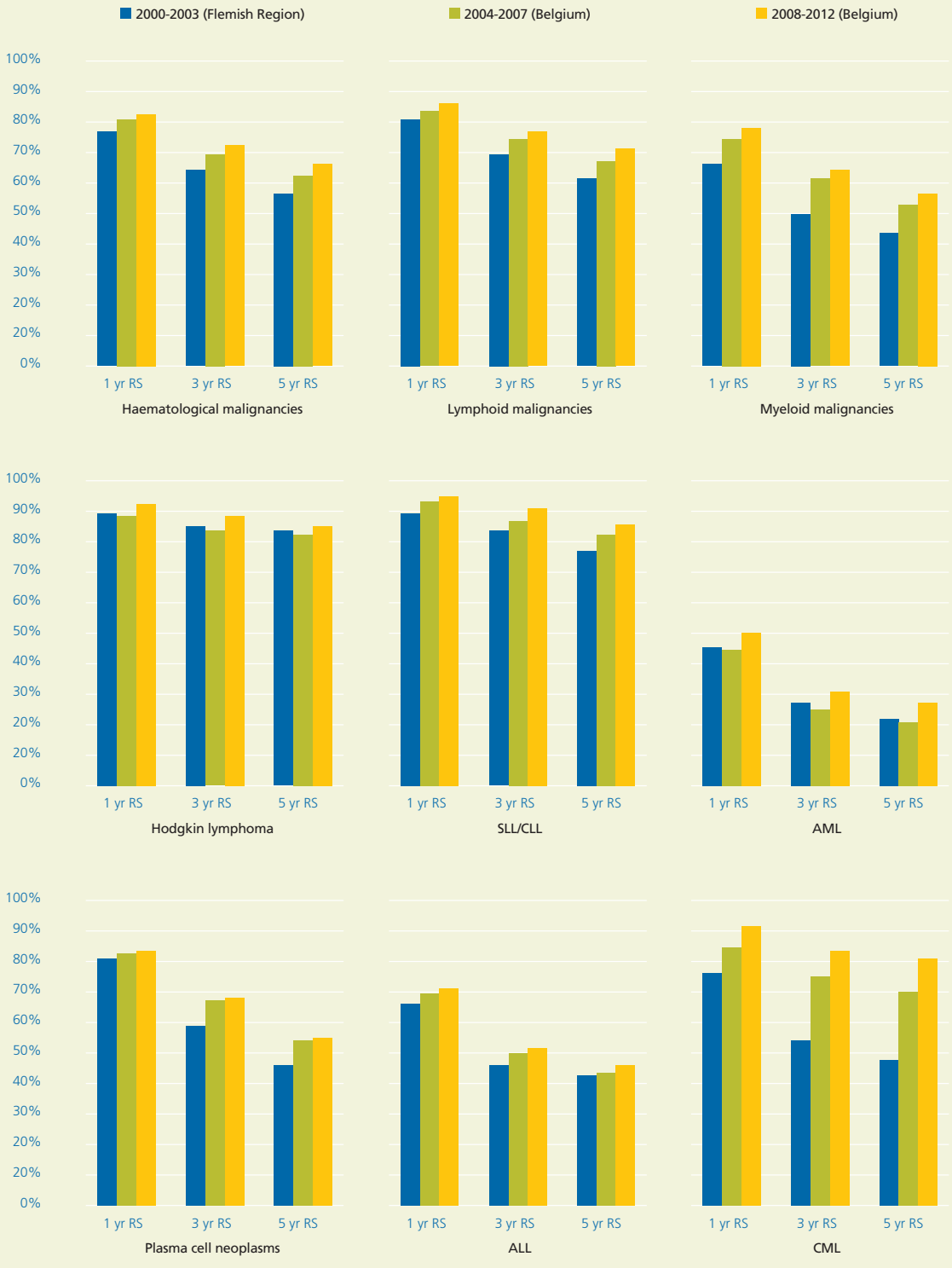
Source: Belgian Cancer Registry

FIGURE 14 HAEMATOLOGICAL MALIGNANCIES: 5-YEAR RELATIVE SURVIVAL BY SEX AND SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 15 HAEMATOLOGICAL MALIGNANCIES: 1-, 3- AND 5-YEAR AGE-STANDARDISED RELATIVE SURVIVAL (RS), FLEMISH REGION 2000-2003, BELGIUM 2004-2007 AND 2008-2012.



Source: Belgian Cancer Registry

3.1 LYMPHOID MALIGNANCIES

Incidence

- Belgium 2012: 4,357 lymphoid malignancies
  - 2,491 males (57%)
  - 1,866 females (43%)
- Mean age at diagnosis is 62 years in males, 65 years in females.
  - Age-specific incidence rates remain stable until 35 years. Afterwards a rapid increase occurs with age **(Figure 16).**
  - Male/female ratio over all ages is 1.5.
  - The male/female ratio under the age of 35 years is 1.3.
  - The male/female ratio in patients older than 40 years is 1.5 and reaches 1.7 in the patients over 75 years old.

FIGURE 16 LYMPHOID MALIGNANCIES: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

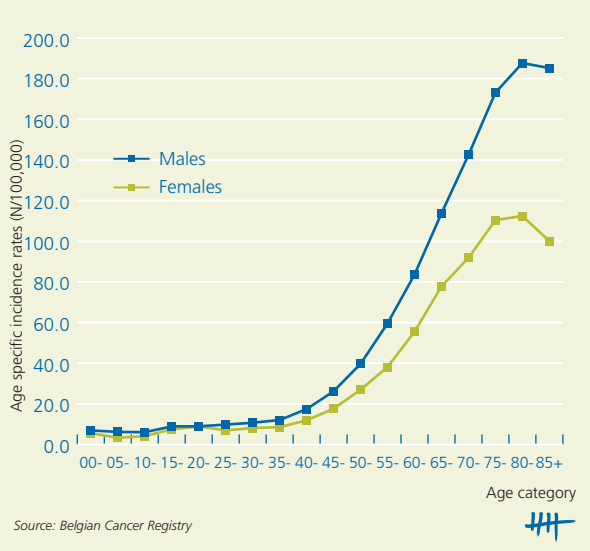
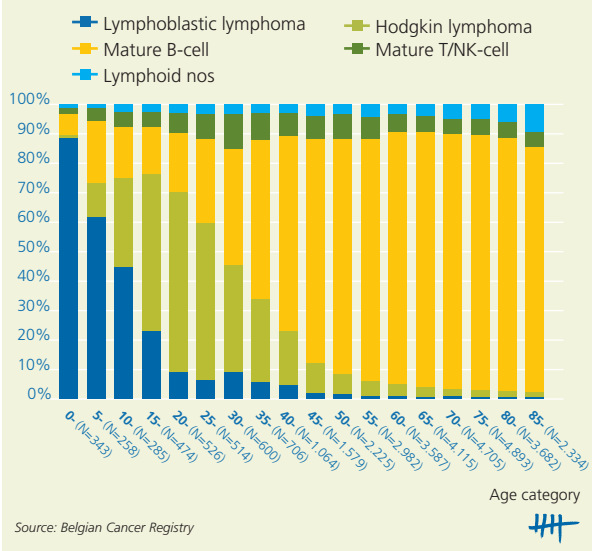


FIGURE 17 LYMPHOID MALIGNANCIES: INCIDENCE BY SUBTYPE AND AGE GROUP, BELGIUM 2004-2012



Haemacare/WHO classification (see chapter 2.1) identifies five major categories of lymphoid malignancies **(Figure 17).** With the exception of lymphoid malignancies, NOS a more detailed chapter is available for each subtype.

1. Hodgkin lymphoma:

- 8% of all lymphoid malignancies in 2004-2012
- In adolescents and young adults (15-40 years), about half of all lymphoid malignancies are Hodgkin lymphoma.

2. Mature B-cell neoplasms

- 78% of all lymphoid malignancies in 2004-2012
- They account for the majority of lymphoid malignancies in patients of 40 years of age and older.

3. Mature T-/NK cell neoplasms

- 6% of all lymphoid malignancies in 2004-2012
- Mature T/NK cell neoplasms account for about 4% to 7% of all lymphoid malignancies in every age group.

4. Lymphoblastic lymphoma/acute (precursor cell) lymphatic leukaemia

- 4% of all lymphoid malignancies in 2004-2012
- The most frequently diagnosed lymphoid subtype in children.

5. Lymphoid malignancies, NOS

- 4% of all lymphoid malignancies in 2004-2012

Figure 18 gives an overview of the incidence rates (ESR) in Belgium in comparison with European incidence data. The Belgian incidence rates for the selected lymphoid malignancies rank high in comparison with the other European regions, but this could partly be explained by the very low incidence rate for 'Lymphoid malignancy, NOS' and by the difference in incidence years rates for Belgium (2004-2012) and the European regions (2000-2002).

FIGURE 18 LYMPHOID MALIGNANCIES: AGE-STANDARDISED INCIDENCE RATES (ESR) IN BELGIUM (2004-2012) AND EUROPEAN REGIONS (2000-2002) (31)

European pool: 44 registries from 17 countries

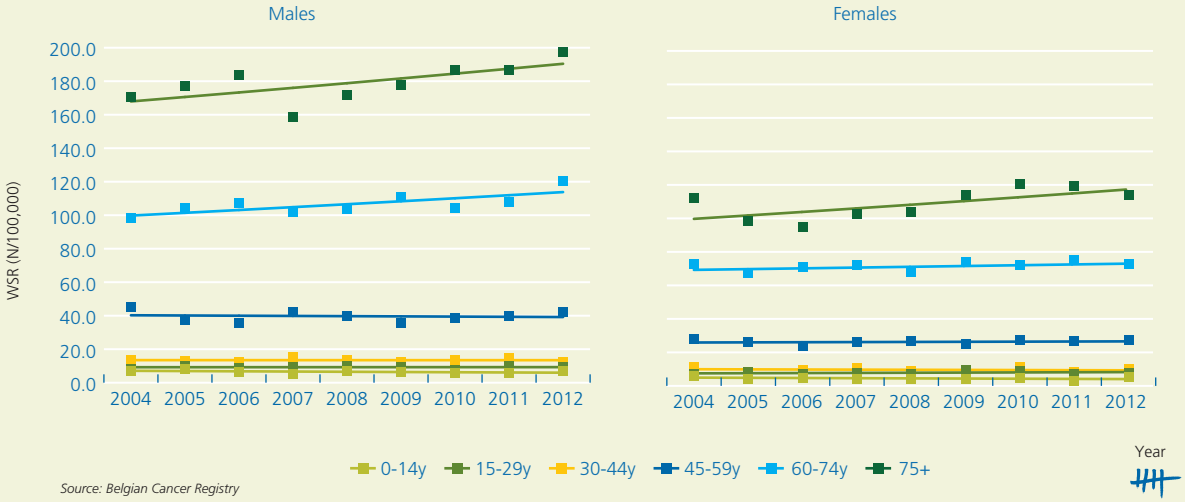
- **Central Europe:** Austria, France, Germany, Switzerland and The Netherlands
- **Eastern Europe:** Czech Republic, Poland and Slovakia
- **Northern Europe:** Iceland, Norway and Sweden
- **Southern Europe:** Italy, Malta, Slovenia and Spain
- **UK & Ireland:** United Kingdom and Ireland

Source: Belgian Cancer Registry

Trends

- The incidence rates for lymphoid malignancies remain fairly stable in both sexes **(Figure 10 and Table 7).**
- Increases in incidence over time are mainly observed in older age groups **(Figure 19 and Table 7)**.

FIGURE 19 LYMPHOID MALIGNANCIES: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012



Source: Belgian Cancer Registry

TABLE 7 LYMPHOID MALIGNANCIES: AAPC(%) BY SEX AND AGE GROUP, BELGIUM 2004-2012

Age	Males			Females		
	AAPC(%)	95%CI	period	AAPC(%)	95%CI	period
All Ages	0.9	[-0.0:1.8]		0.4	[-0.9:1.7]	
	-0.4	[-1.2:0.4]	2004-2010			
	4.9	[0.6:9.4]	2010-2012			
0-14 years	-2.1	[-6.1:2.0]		-2.4	[-7.0:2.4]	
15-29 years	0.1	[-2.9:3.1]		1.2	[-2.6:5.1]	
30-44 years	0.0	[-2.6:2.6]		-0.8	[-5.3:3.8]	
45-59 years	-0.3	[-2.9:2.3]		0.3	[-1.3:2.0]	
60-74 years	1.7	[0.3:3.0]		0.7	[-0.4:1.7]	
75+	1.6	[0.0:3.2]		2.0	[-0.1:4.2]	

AAPC: average annual percentage change (2004-2012)

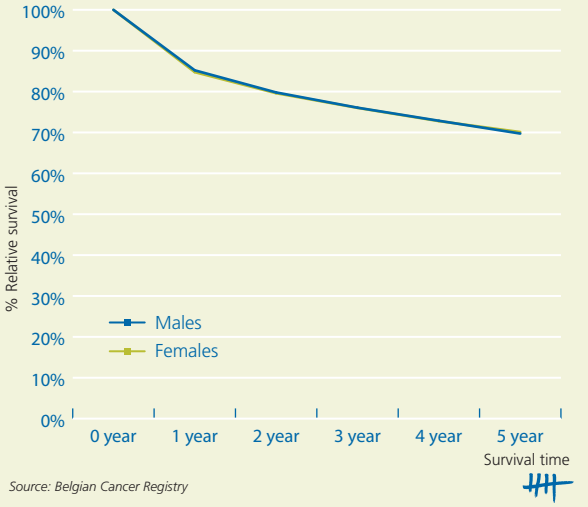
Period: When a joinpoint occured, APC's are calculated for the period before and after the joinpoint. This column represents the corresponding interval. AAPC's are always calculated over the entire study-period (2004-2012).

Relative Survival

- Prognosis (70% 5-year relative survival) is comparable between males and females **(Figure 20).**
- Age is an important factor for survival **(Figure 21).**
  - Under the age of 50 years, survival rates are above 80% in males and above 85% in females.
  - After the age of 50 years, survival rates decrease rapidly with age.
  - The worst survival rates are observed in the elderly: less than 55% after the age of 75 years.

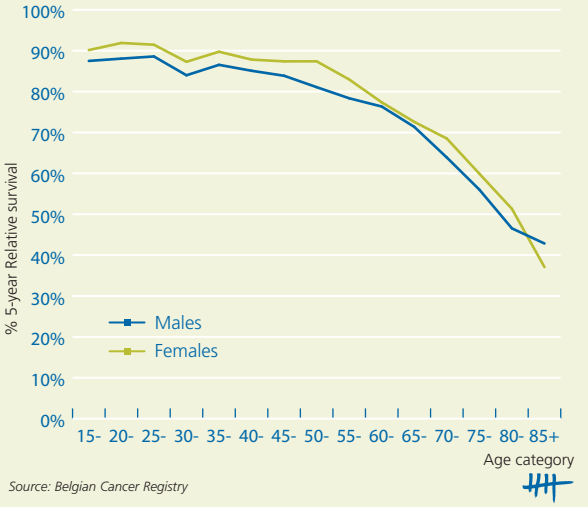
• Survival rates differ between the different lymphoid subtypes **(Figure 14).** When compared to other European countries, the survival rates for Belgium are high **(Figure 22).**

FIGURE 20 LYMPHOID MALIGNANCIES: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



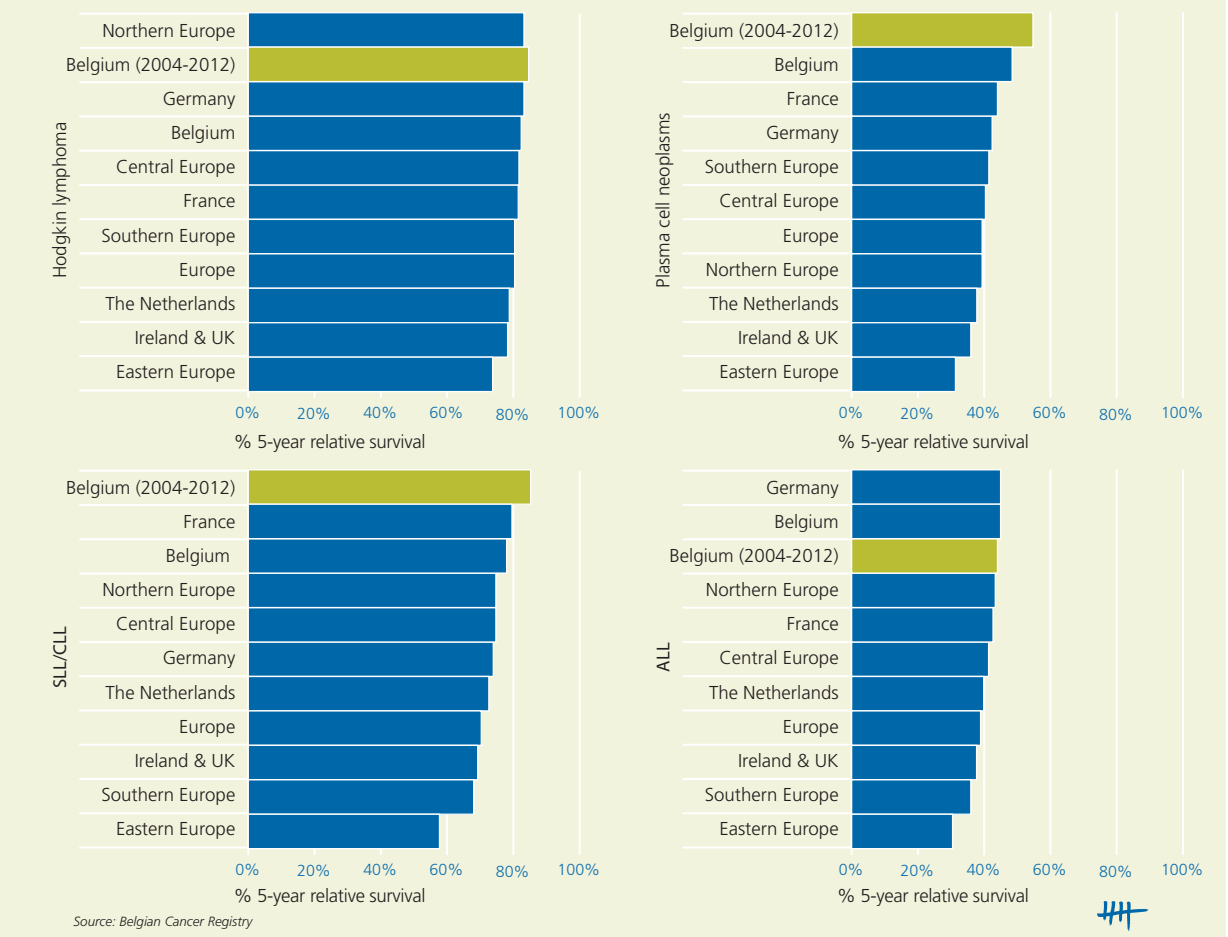
Source: Belgian Cancer Registry

FIGURE 21 LYMPHOID MALIGNANCIES: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 22 LYMPHOID MALIGNANCIES: AGE-STANDARDISED 5-YEAR RELATIVE SURVIVAL, BELGIUM (2004-2012) AND EUROCARE-5 RESULTS (2000-2007) (32). (RESULTS FOR BELGIUM FROM THE EUROCARE-5 STUDY REPRESENTED DATA FOR THE FLEMISH REGION 2000-2007)



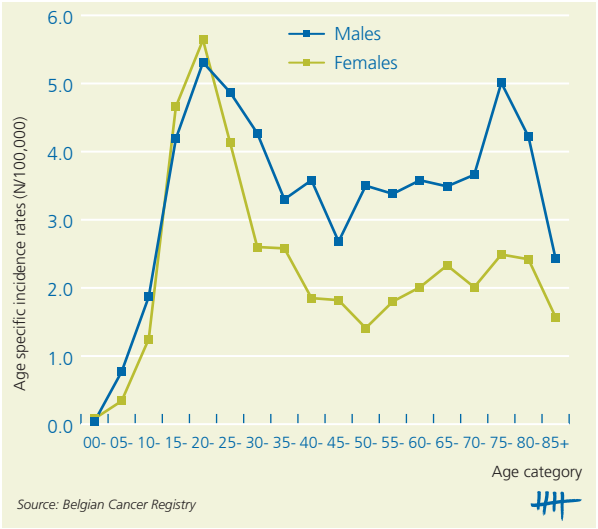
Source: Belgian Cancer Registry

3.1.1 HODGKIN LYMPHOMA

Incidence

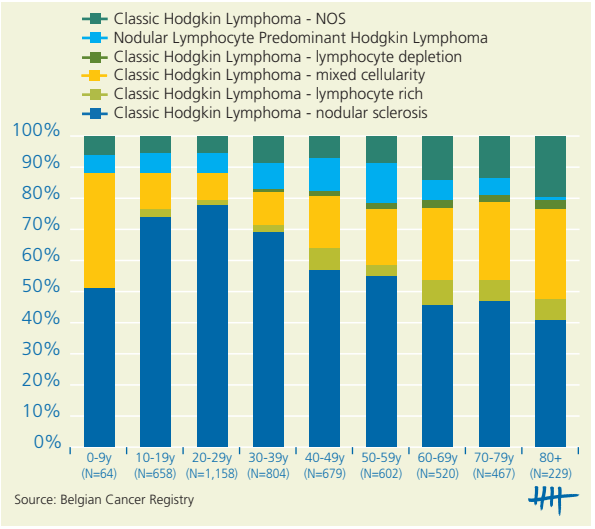
- Belgium 2012: 325 new diagnoses.
  - 185 males (57%)
  - 140 females (43%)
- Average age at diagnosis: 43 years in males and 41 years in females.
  - A peak in the incidence rates is observed in adolescents and young adults **(Figure 23).**
  - A secondary peak can be observed in the elderly.
  - Overall male/female ratio reveals a slight male predominance (M/F ratio = 1.3).
  - Higher rates in males are observed in children (M/F ratio = 1.6) and in patients older than 25 years of age (M/F ratio = 1.6).
  - For adolescents and young adults younger than 25 years of age, the rates rather reveal a slightly higher incidence in females (M/F ratio = 0.9).

FIGURE 23 HODGKIN LYMPHOMA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012



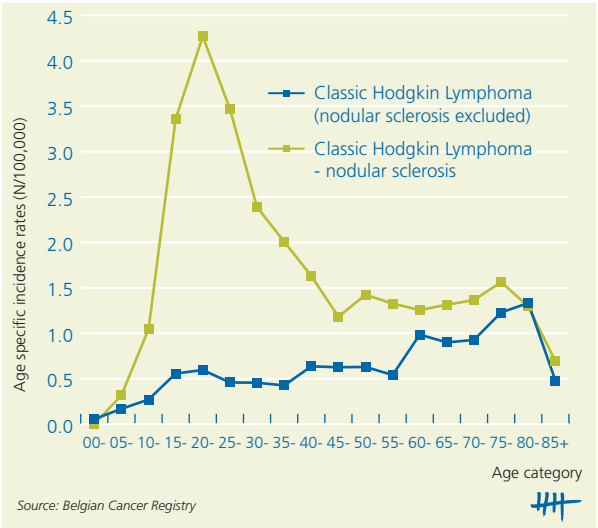
Source: Belgian Cancer Registry

FIGURE 24 HODGKIN LYMPHOMA: INCIDENCE BY SUBTYPE AND AGE GROUP, BELGIUM 2004-2012



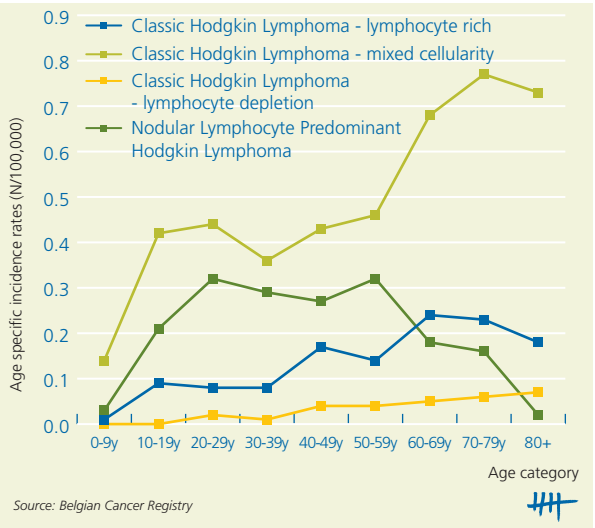
Source: Belgian Cancer Registry

FIGURE 25 CLASSICAL HODGKIN LYMPHOMA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 26 HODGKIN LYMPHOMA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

Haemacare/WHO classification (see chapter 2.1) differentiates Hodgkin lymphoma in two main groups with different clinical features and behaviour, composition of cellular background and morphology (33; 34; 35):

1. Nodular Lymphocyte Predominant Hodgkin Lymphoma (NLPHL)

- Twenty-three diagnoses in Belgium in 2012.
  - 17 males
  - 6 females
- Approximately 7% of Hodgkin lymphoma.
- Patients are predominantly male (male/female ratio = 3.5).
- Most frequently diagnosed in adults between 20 and 50 years of age **(Figure 24 and Figure 26).**
- The average age at diagnosis is 41 years in males and 44 years in females.

2. Classical Hodgkin Lymphoma (CHL)

- The majority of all Hodgkin lymphomas (93%).
- Belgium 2012: 302 new diagnoses.
  - 168 males
  - 134 females
- Four subtypes have been distinguished: nodular sclerosis, mixed cellularity, lymphocyte-rich and lymphocyte-depleted Hodgkin lymphoma.
- Hodgkin lymphoma, NOS is grouped within the classical Hodgkin lymphoma and represents a 5th group. These tumours represent 7% of all Hodgkin lymphomas.
- The male/female ratio is 1.2.
- Average age at diagnosis: 43 years in males and 41 years in females.
  - **Nodular sclerosis**
    - Most common classical Hodgkin lymphoma-subtype (67%).
    - Belgium 2012: 204 new diagnoses
      - 102 males
      - 102 females
    - In adolescents and young adults (15 to 29 years of age) they encompass 77% of all Hodgkin lymphoma diagnoses and are the main contributor for the incidence peak at young age observed for all Hodgkin lymphomas combined **(Figure 23, Figure 24 and Figure 25).**
    - With age, the relative frequency decreases to around 40% in the elderly.
    - The male/female ratio is 1.1.
  - **Mixed cellularity**
    - 2nd most frequently diagnosed classical Hodgkin lymphoma (19%).
    - Belgium 2012: 56 new diagnoses
      - 39 males
      - 17 females
    - Male predominance (male/female ratio = 1.9).
    - In children younger than 10 years of age, mixed cellularity classical Hodgkin lymphoma accounts for about one third of all Hodgkin lymphomas (36%).
    - From adolescence onwards, the age-specific incidence rates remain fairly stable until the age of 50-60 years, when the rates start to increase with age **(Figure 26)**.
    - Due to the large increase in nodular sclerosis incidence rates, the relative frequency of mixed cellularity cases drops to 9% in young adults (20-30 years) and then increases with age to 29% in the elderly **(Figure 24)**.

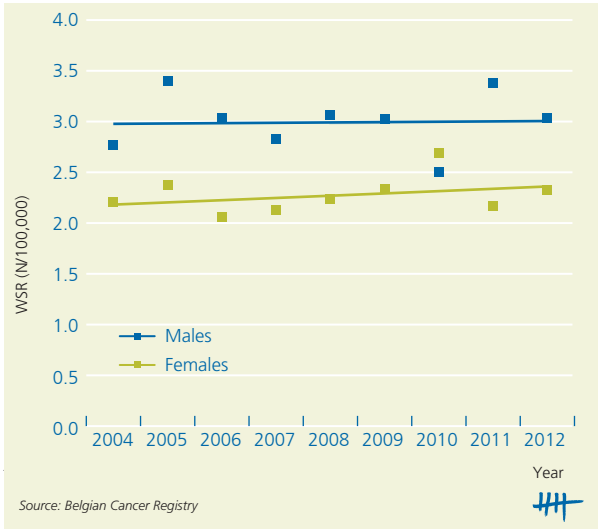
Key note for registration:
Actively look for more information in order to obtain a more specific disease characterisation:
- 9659 NLPHL
- 9651 HL lymphocyte rich
- 9663 HL nodular sclerosis (any grade)
- 9652 HL mixed cellularity
- 9653 HL lymphocyte depletion

- **Lymphocyte-rich**
  - Represents 5% of all classical Hodgkin lymphomas.
  - Belgium 2012: 15 new diagnoses
    - 10 males
    - 5 females
  - Male predominance (male/female ratio = 2.2).
  - A gradual increase in the incidence rates with age can be observed **(Figure 24 and Figure 26).**
- **Lymphocyte-depleted**
  - Only 5 new diagnoses are registered in Belgium in 2012.
    - 3 males
    - 2 females
  - The majority are males (male/female ratio = 1.8).
  - Incidence rates increase with age, but remain very low, even in the elderly (**Figure 24 and Figure 26).**

Trends

- The incidence rates for Hodgkin lymphoma did not change significantly over time **(Figure 27 and Table 8).**
- None of the Hodgkin lymphoma subtypes shows a significant change over time, with the exception of the decreasing pattern of Hodgkin NOS. This decrease reflects the improvement in availability of more specific information about histology over time **(Table 8 and Figure 28).**
- Decreasing tends are observed in children (0-14 years), while the trends in the other age groups (with the exception of males in the age group 40-59 years) are remaining stable or are increasing **(Table 8 and Figure 29).**

FIGURE 27 HODGKIN LYMPHOMA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



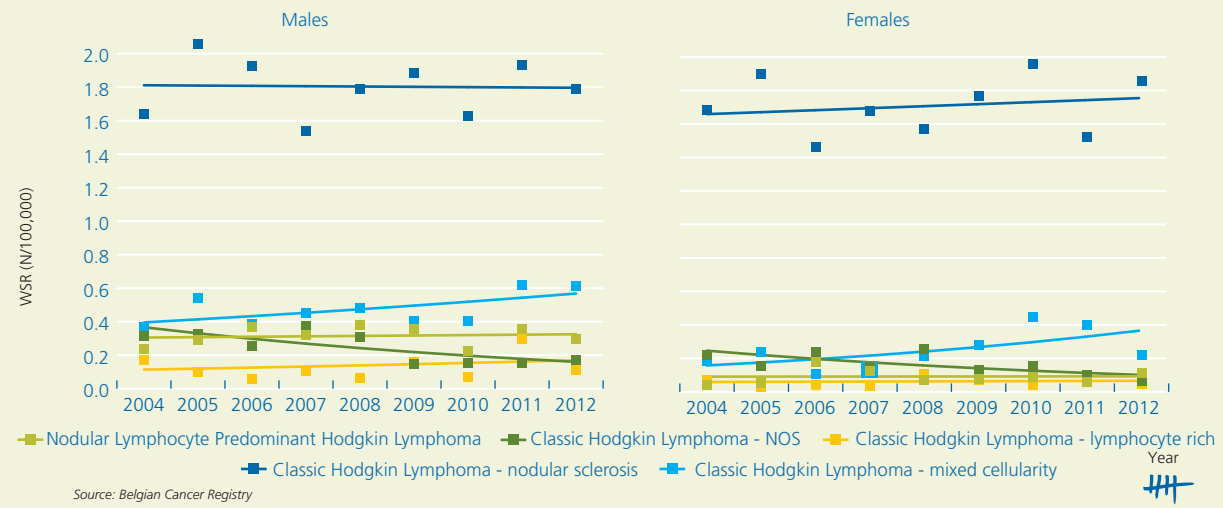
Source: Belgian Cancer Registry

TABLE 8 HODGKIN LYMPHOMA: AAPC(%) BY SEX, SUBTYPE AND AGE GROUP, BELGIUM 2004-2012

	Males		Females	
Subtype	AAPC(%)	95%CI	AAPC(%)	95%CI
Hodgkin lymphoma	0.1	[-2.9:3.2]	1.0	[-1.5:3.5]
NLPHL	0.8	[-5.3:7.3]	0.2	[-14.7:17.8]
Classic Hodgkin Lymphoma -NOS	-9.8	[-17.0:-2.1]	-10.5	[-19.4:-0.6]
Lymphocyte rich	5.1	[-10.4:23.3]	1.5	[-11.4:16.2]
Nodular sclerosis	-0.1	[-3.1:3.0]	0.7	[-2.5:4.0]
Mixed cellularity	4.6	[-0.5:10.1]	11.1	[-2.2:26.1]
Age	**AAPC(%)**	**95%CI**	**AAPC(%)**	**95%CI**
0-14 years	-6.4	[-17.3:5.8]	-9.0	[-14.5:-3.2]
15-29 years	0.4	[-4.4:5.5]	1.9	[-3.2:7.3]
30-44 years	2.6	[-0.0:5.3]	0.3	[-5.0:6.0]
45-59 years	-1.5	[-6.3:3.5]	0.8	[-0.8:12.7]
60+	0.6	[-5.9:7.6]	3.3	[-3.6:10.7]

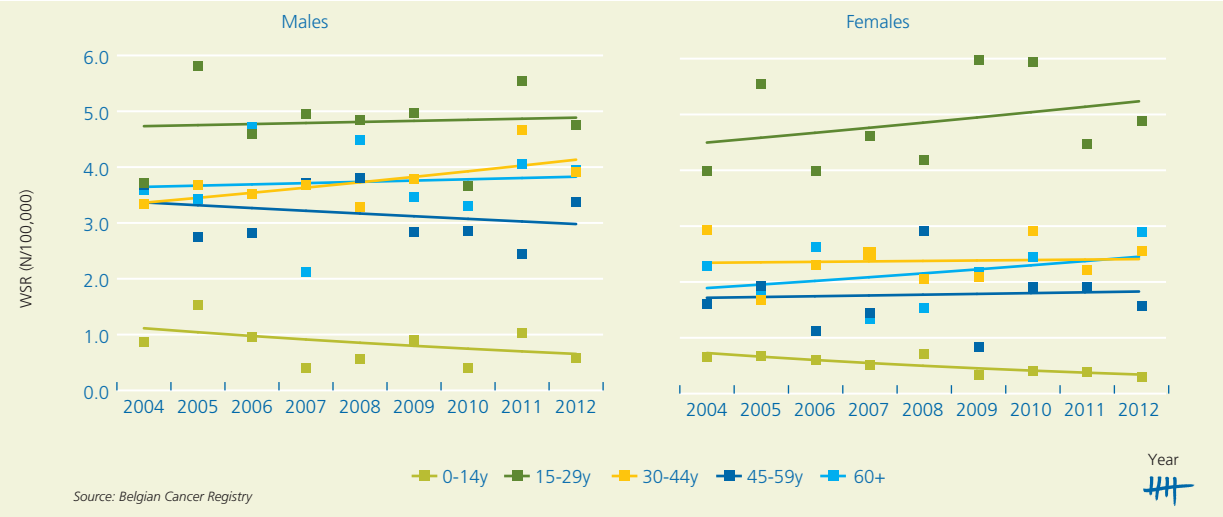
AAPC: average annual percentage change (2004-2012)

FIGURE 28 HODGKIN LYMPHOMA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 29 HODGKIN LYMPHOMA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

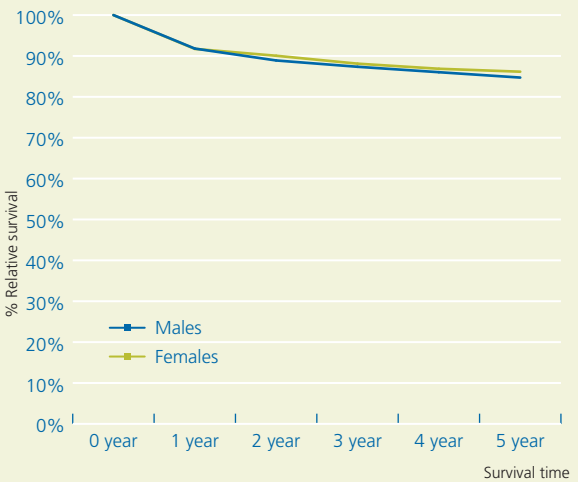


Source: Belgian Cancer Registry

Relative Survival

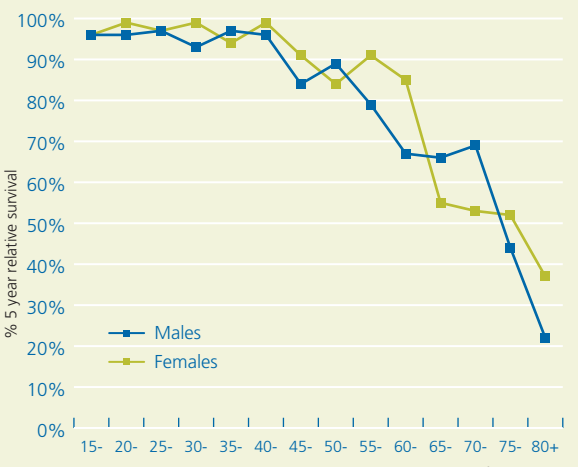
- Males and females with a diagnosis of Hodgkin lymphoma have very high 5-year relative survival rates **(Figure 30).**
- Age-specific 5-year relative survival rates are very high in younger patients (above 95%), but decrease rapidly with age from the age of 45 years **(Figure 31).**
- Prognosis depends on the morphological subtype **(Figure 32).**

FIGURE 30 HODGKIN LYMPHOMA: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



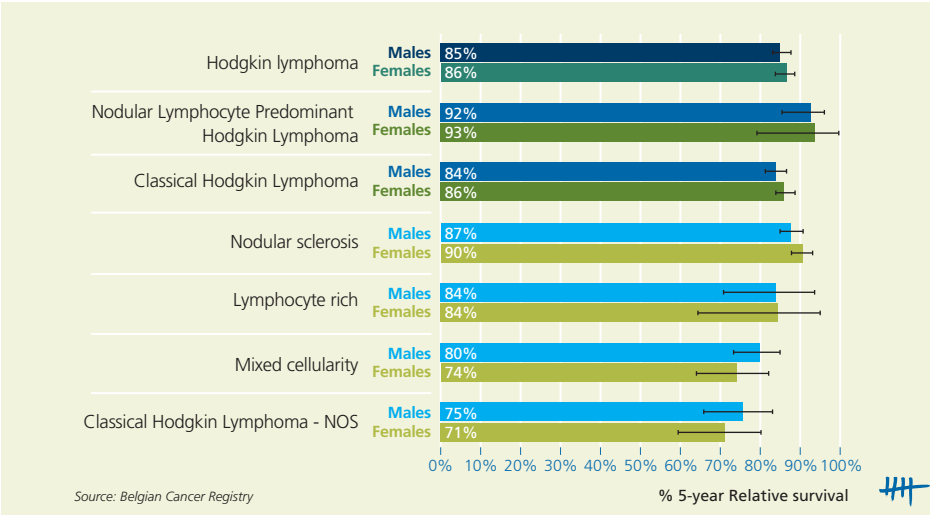
Source: Belgian Cancer Registry

FIGURE 31 HODGKIN LYMPHOMA: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 32 HODGKIN LYMPHOMA: 5-YEAR RELATIVE SURVIVAL BY SEX AND SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

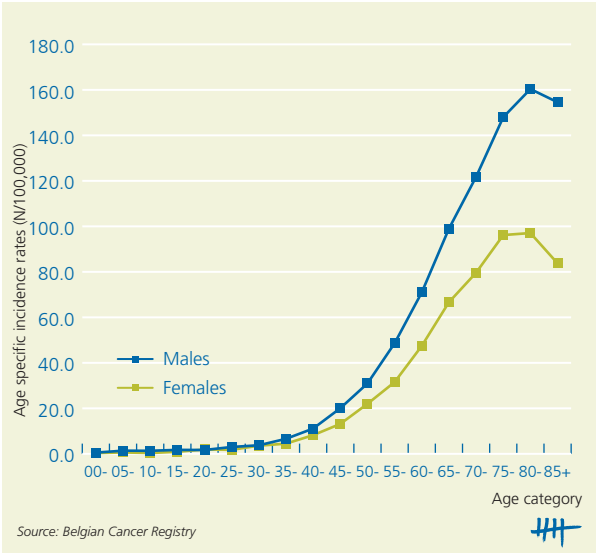
3.1.2 MATURE B-CELL NEOPLASMS

Incidence

- Belgium 2012: 3,417 new diagnoses.
  - 1,949 males (57%)
  - 1,468 females (43%)
- Average age at diagnosis: 66 years in males and 68 years in females.
  - Incidence rates are increasing with age after the age of 35 years **(Figure 33).**
  - All ages combined, the male/female ratio is 1.5.

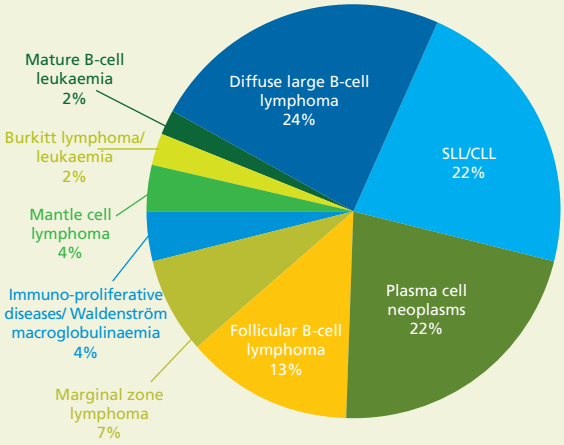
- The large group of mature B-cell neoplasms includes a variety of non-Hodgkin B-cell malignant lymphomas and chronic lymphoproliferative diseases of B-cell origin (Haemacare/WHO classification (see chapter 2.1)).
- Diffuse large B-cell lymphoma (24%), small lymphocytic lymphoma/chronic lymphocytic lymphoma (SLL/CLL) (22%), plasma cell neoplasms (22%) and follicular B-cell lymphoma (12%) are the most frequent subtypes **(Figure 34).**
- Marginal zone lymphoma (7%), immunoproliferative diseases (4%), mantle cell lymphoma (4%), Burkitt lymphoma/leukaemia (2%) and mature B-cell leukaemia (2%) are less frequently diagnosed and represent less than 10% each **(Figure 34).**

FIGURE 33 MATURE B-CELL NEOPLASMS: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 34 MATURE B-CELL NEOPLASMS: INCIDENCE BY SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

Trends

- Incidence rates increase in males and females **(Figure 35 and Table 9).**
- Trends by age group reveal significant increases in the oldest age groups **(Figure 36 and Table 9).**

FIGURE 35 MATURE B-CELL NEOPLASMS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012

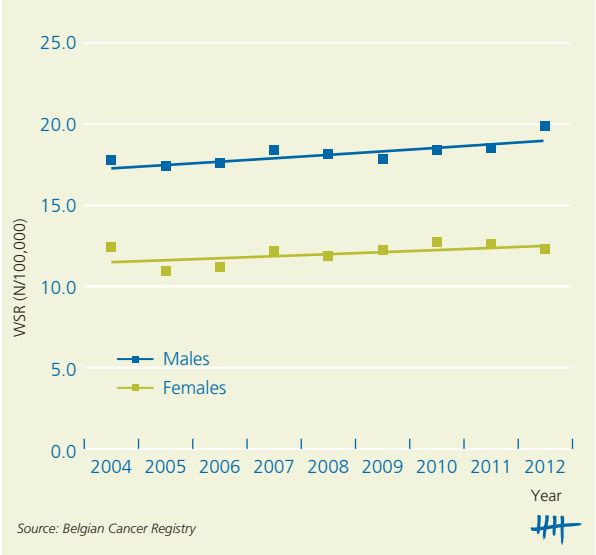
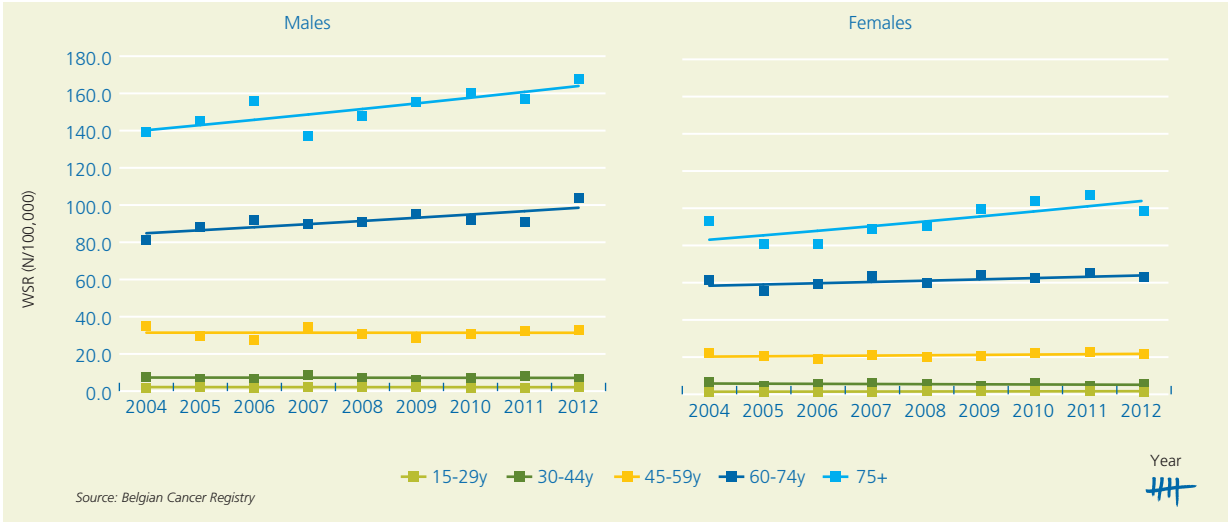


TABLE 9 MATURE B-CELL NEOPLASMS: AAPC(%) BY SEX AND AGE GROUP, BELGIUM 2004-2012

Age	Males		Females	
	AAPC(%)	95%CI	AAPC(%)	95%CI
All Ages	1.2	[0.4:2.0]	1.0	[-0.3:2.4]
15-29 years	-0.3	[-4.6:4.2]	2.4	[-4.7:9.9]
30-44 years	-0.3	[-4.2:3.7]	-1.5	[-5.8:3.0]
45-59 years	0.0	[-2.6:2.6]	0.9	[-0.8:2.6]
60-74 years	1.9	[0.6:3.2]	1.1	[-0.1:2.4]
75+	2.0	[0.7:3.3]	2.8	[0.7:5.0]

AAPC: average annual percentage change (2004-2012)

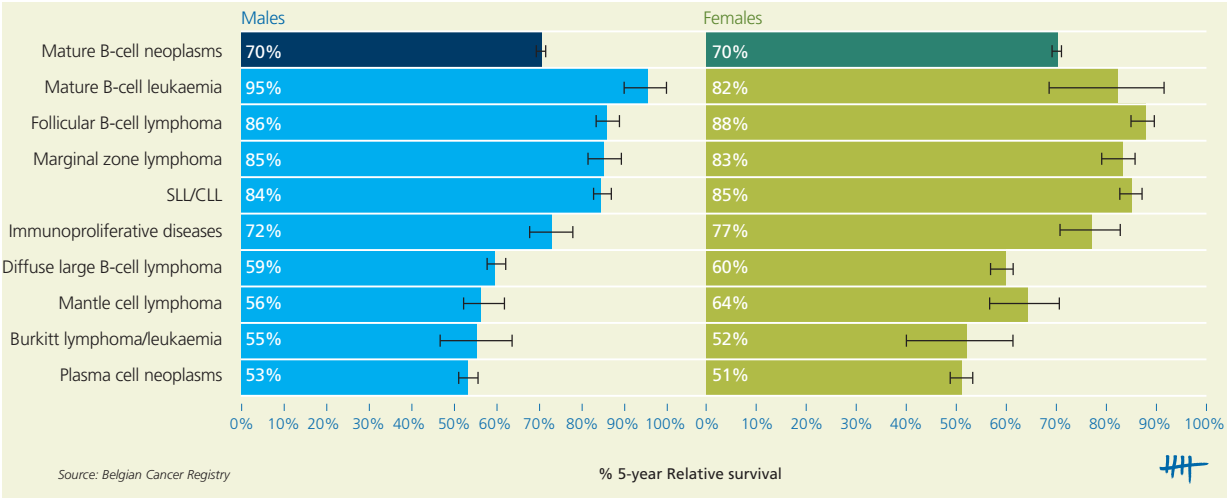
FIGURE 36 MATURE B-CELL NEOPLASMS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012



Relative Survival

- The 5-year relative survival rates are 70% in both males and females.
- Prognosis depends on the morphological subtype **(Figure 37).**

FIGURE 37 MATURE B-CELL NEOPLASMS: 5-YEAR RELATIVE SURVIVAL BY SEX AND SUBTYPE, BELGIUM 2004-2012



3.1.2.1 SMALL LYMPHOCYTIC LYMPHOMA/CHRONIC LYMPHOCYTIC LEUKAEMIA (SLL/CLL)

Incidence

- Belgium 2012: 808 new diagnoses
  - 506 males (63%)
  - 302 females (37%)
- The mean age at diagnosis is 68 years in males and 70 years in females.
  - SLL/CLL are very rare before the age of 40 years.
  - After the age of 40 years, age-specific incidence rates increase **(Figure 38).**
  - The increase occurs more rapidly in males than in females, resulting in a male/female ratio of 1.7.

FIGURE 38 SMALL LYMPHOCYTIC LYMPHOMA/CHRONIC LYMPHOCYTIC LEUKAEMIA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

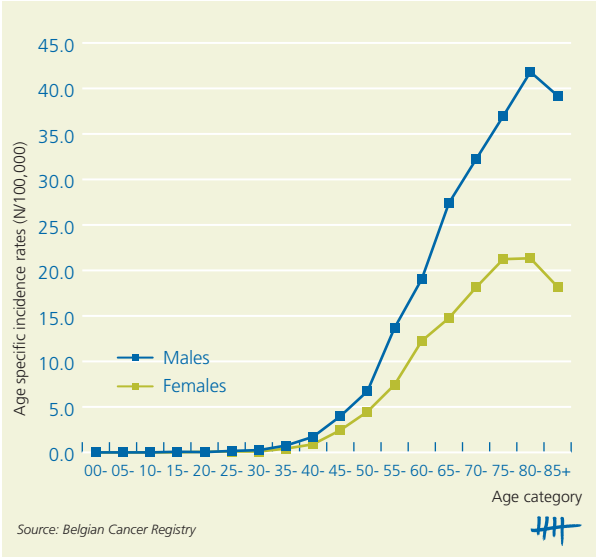
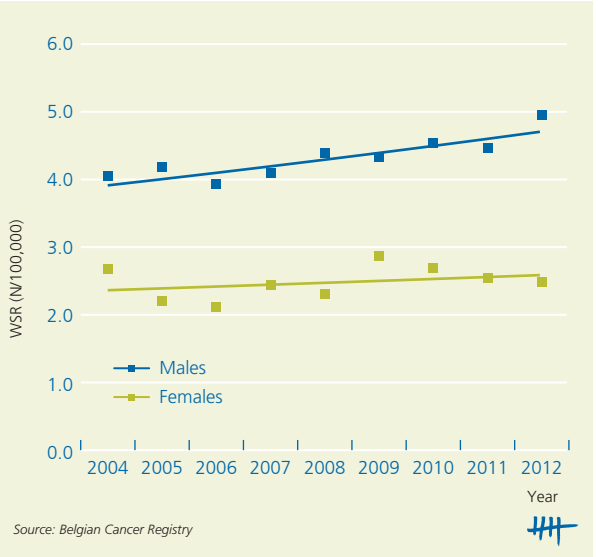


FIGURE 39 SMALL LYMPHOCYTIC LYMPHOMA/CHRONIC LYMPHOCYTIC LEUKAEMIA : AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



Trends

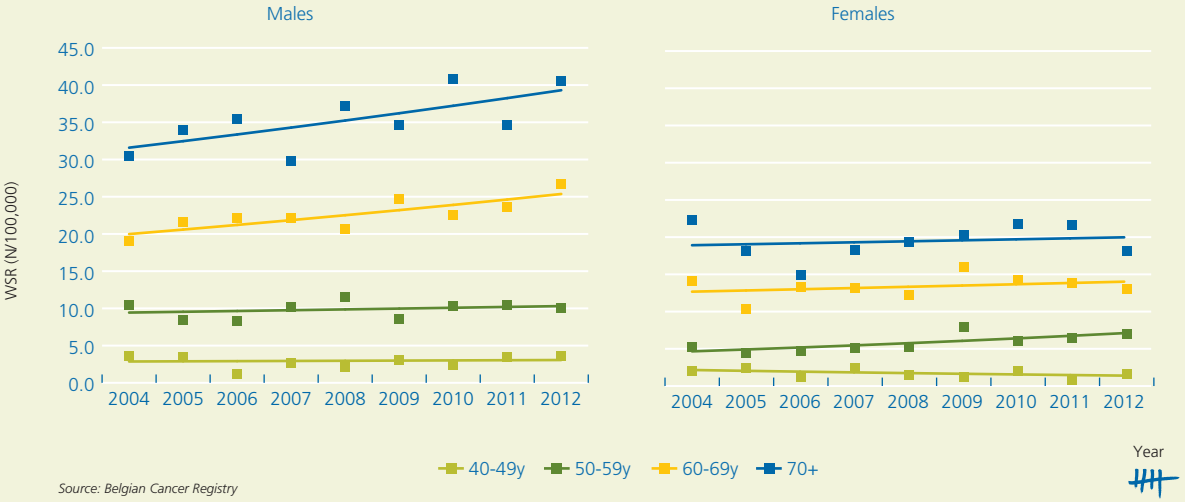
- Incidence rates increase significantly in males **(Figure 39 and Table 10).**
- Trends by age group are represented in **Table 10 and Figure 40.**

TABLE 10 SMALL LYMPHOCYTIC LYMPHOMA/CHRONIC LYMPHOCYTIC LEUKAEMIA: AAPC(%) BY SEX AND AGE GROUP, BELGIUM 2004-2012

	Males		Females	
Age	AAPC(%)	95%CI	AAPC(%)	95%CI
All Ages	2.3	[1.2:3.5]	1.1	[-1.8:4.2]
40-49 years	0.8	[-7.4:9.9]	-5.3	[-14.2:4.6]
50-59 years	1.1	[-2.5:4.8]	5.4	[0.8:10.2]
60-69 years	3.0	[1.1:4.9]	-0.8	[-2.4:5.1]
70+	2.8	[0.2:5.4]	0.7	[-3.1:4.6]

AAPC: average annual percentage change (2004-2012)

FIGURE 40 SMALL LYMPHOCYTIC LYMPHOMA/CHRONIC LYMPHOCYTIC LEUKAEMIA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

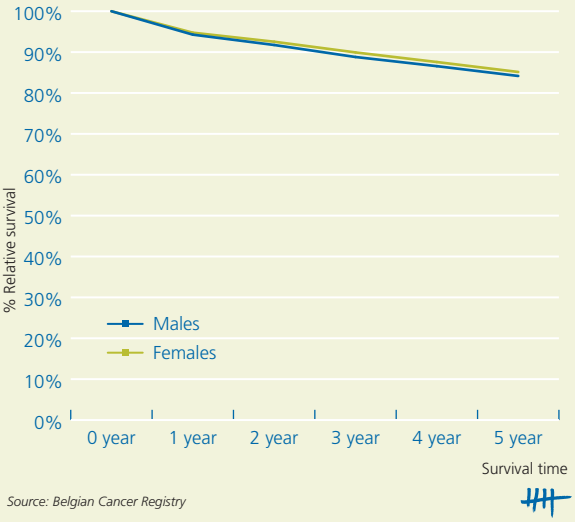


Source: Belgian Cancer Registry

Relative Survival

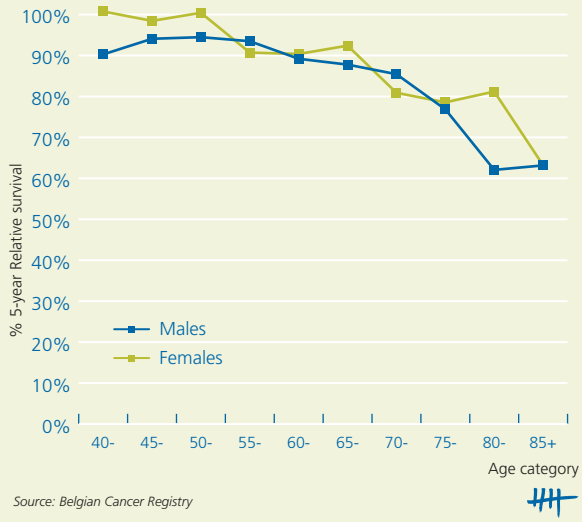
- Five-year relative survival is comparable between both sexes **(Figure 41).**
  - Males: 84%
  - Females: 85%
- Prognosis decreases slowly with increasing age at diagnosis **(Figure 42).**
  - The 5-year relative survival rates remain above 90% until the age of 65 years.
  - The lowest survival rates, observed in the elderly, remain above 60%.

FIGURE 41 SMALL LYMPHOCYTIC LYMPHOMA/CHRONIC LYMPHOCYTIC LEUKAEMIA: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 42 SMALL LYMPHOCYTIC LYMPHOMA/CHRONIC LYMPHOCYTIC LEUKAEMIA: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

3.1.2.2 IMMUNOPROLIFERATIVE DISEASES / WALDENSTRÖM MACROGLOBULINAEMIA

Incidence

- Belgium 2012: 135 new diagnoses.
  - 87 males (64%)
  - 48 females (36%)
- Average age at diagnosis: 69 years in males and 70 years in females.
  - Under the age of 45 years, immunoproliferative diseases are very rare **(Figure 43).**
  - From the age of 45 years, the incidence rates increase rapidly with age. This increase is much more pronounced in males than in females resulting in a male/female ratio of 2.0.
- The majority (99%) of immunoproliferative diseases are Waldenström macroglobulinaemia.
- The remaining cases are 'Heavy chain' diseases (very rare: only 5 diagnoses between 2004 and 2012).

FIGURE 43 IMMUNOPROLIFERATIVE DISEASES / WALDENSTRÖM MACROGLOBULINAEMIA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

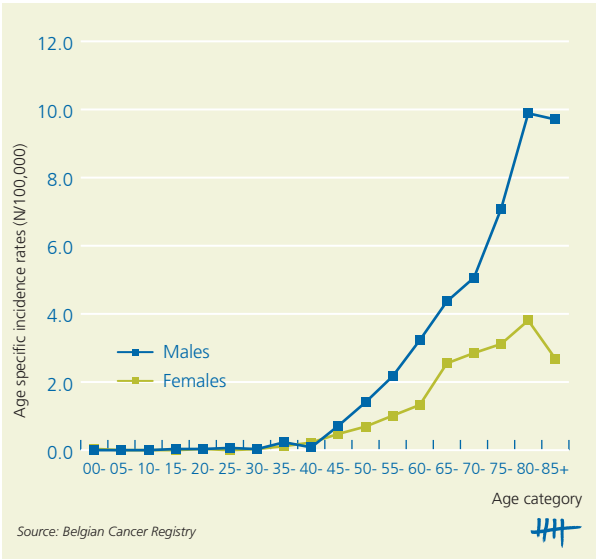
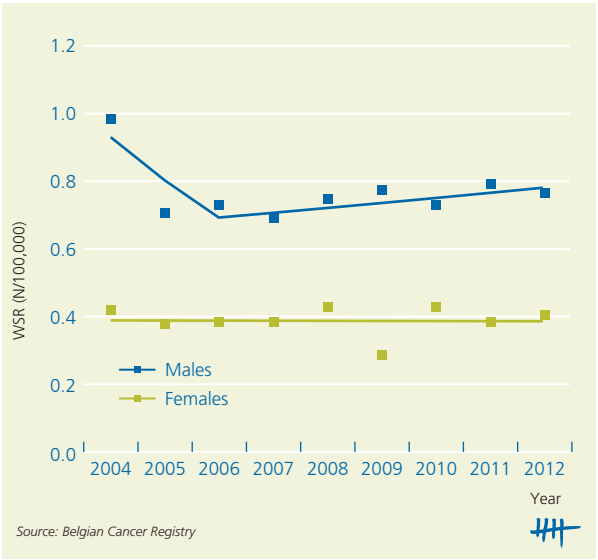


FIGURE 44 IMMUNOPROLIFERATIVE DISEASES / WALDENSTRÖM MACROGLOBULINAEMIA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



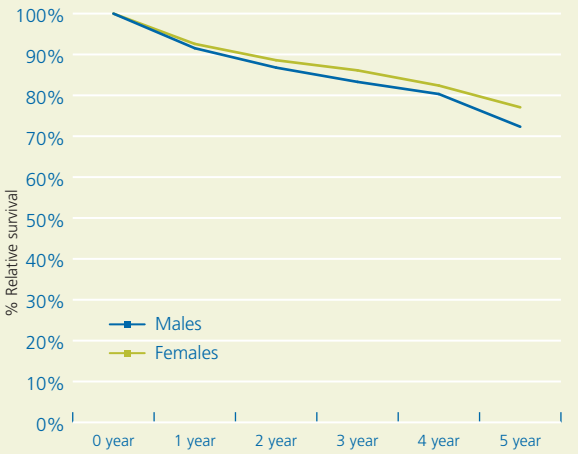
Trends

- No significant trends are observed in males or females **(Figure 44)**.
  - Males: The AAPC over the entire period was -2.2% [-5.2:0.9]. A joinpoint was identified in 2006. In the most recent period (2006-2012), the incidence rates increase annually with 1.6% [-1.2:4.5].
  - Females: no change is observed in the incidence rates (AAPC = -0.1% [-3.7:3.7]).

Relative Survival

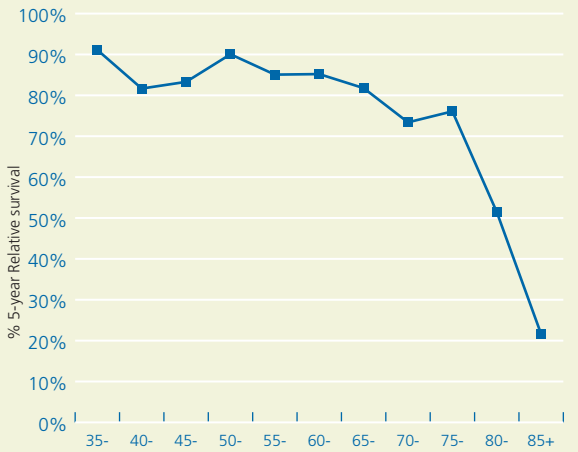
- Five-year relative survival **(Figure 45).**
  - Males: 72%
  - Females: 77%
- Prognosis by age group **(Figure 46)**.
  - Age-specific 5-year relative survival rates remain above 80% until the age of 70 years.
  - The survival rates for the oldest age groups are very low and reach 20% in patients of 85 years of age and older.

FIGURE 45 IMMUNOPROLIFERATIVE DISEASES / WALDENSTRÖM MACROGLOBULINAEMIA: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 46 IMMUNOPROLIFERATIVE DISEASES / WALDENSTRÖM MACROGLOBULINAEMIA: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL, BELGIUM 2004-2012



Source: Belgian Cancer Registry

Key note for registration:
Look for the t(11;14) chromosome translocation, a typical feature that is present in almost all cases of mantle cell lymphoma

3.1.2.3 MANTLE CELL LYMPHOMA

Incidence

- Belgium 2012: 122 new diagnoses.
  - 91 males (75%)
  - 31 females (25%)
- Mean age at diagnosis: 68 years in males and 70 years in females.
  - Age-specific incidence rates increase from the age of 40 years **(Figure 47).**
  - The increasing pattern is much more pronounced in males than in females, which is reflected in a high male/female ratio of 3.0.

FIGURE 47 MANTLE CELL LYMPHOMA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

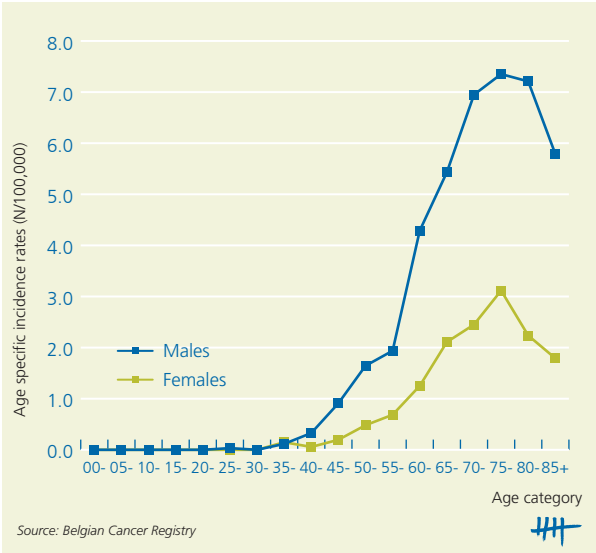
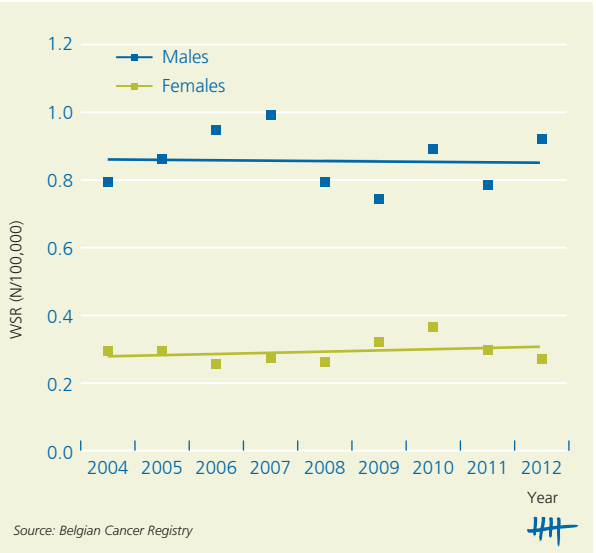


FIGURE 48 MANTLE CELL LYMPHOMA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



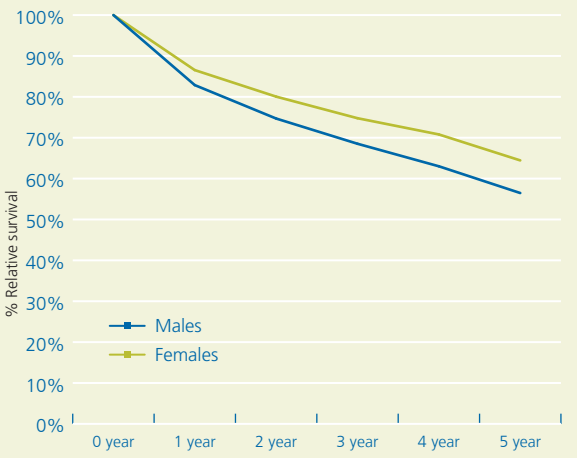
Trends

- No significant trends are observed in the incidence rates in males and females **(Figure 48)**.
  - Males: AAPC = -0.1% [-3.3:3.1]
  - Females: AAPC = 1.2% [-2.5:5.0]

Relative Survival

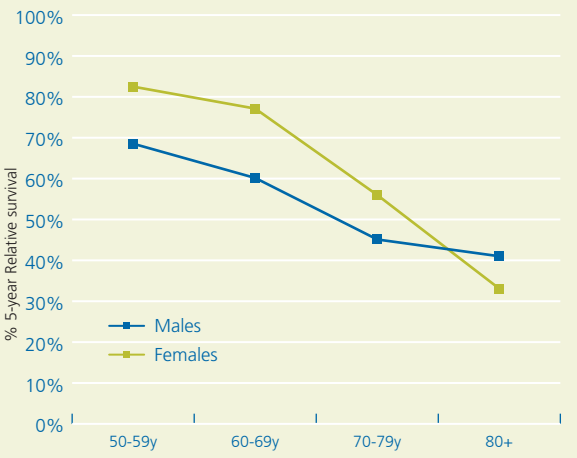
- Females have higher survival rates than males **(Figure 49).**
  - Males: 56%
  - Females: 65%
- Age-specific 5-year survival rates decrease rapidly with increasing age **(Figure 50).** The difference in the survival rates between males and females is more apparent at a younger age.

FIGURE 49 MANTLE CELL LYMPHOMA: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 50 MANTLE CELL LYMPHOMA: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

3.1.2.4 FOLLICULAR B-CELL LYMPHOMA

Incidence

- Belgium 2012: 402 new diagnoses.
  - 180 males (45%)
  - 222 females (55%)
- Average age at diagnosis: 62 years in males and 65 years in females.
  - The age-specific incidence rates in males and females are very comparable **(Figure 51)**; the male/female ratio is 1.1.
  - Under the age of 30 years, almost no follicular lymphoma diagnoses are registered.
  - Between the age of 30 and 65 years, an increase in the age-specific incidence rates is observed.
- **Figure 52** gives an overview of the distribution of new diagnoses of follicular lymphoma by grade (15).
  - 80% of cases with known grade are low grade lymphoma (grade 1 or 2)
  - Grade 3 follicular lymphoma accounts for 20% of cases with known grade.
  - Three out of four diagnoses of grade 3 lymphoma could be further classified into grade 3A/3B.
    - 73% of the specified grade 3 cases are grade 3A
    - 27% are grade 3B.
- The occurrence of the different follicular lymphoma subtypes differs with age **(Figure 52)**.
  - Follicular lymphoma is very rare under the age of 30 years, but cases that occur are more frequently diagnosed as grade 3.
  - Between the age of 30 and 59 years, grade 1 and 2 follicular lymphoma represent more than 80% of all follicular lymphoma diagnoses.
  - With increasing age, the relative frequency of grade 3 follicular lymphoma increases.

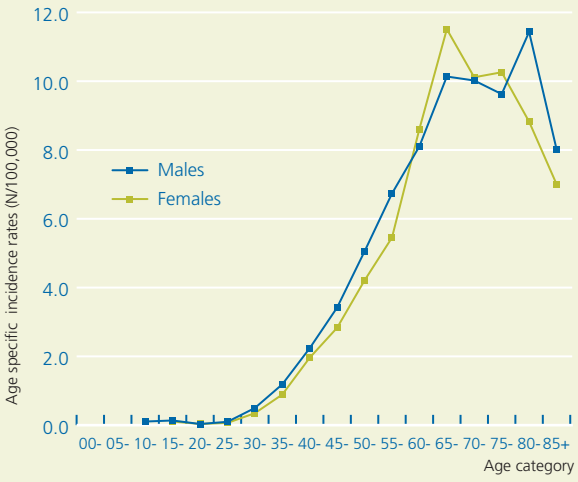
Key note for registration:

ICD-O-3 code depends on the grade

Microscopy	Grade	ICD-O-3
0-5 centroblasts per HPF	1	9695/3
6-15 centroblasts per HPF	2	9691/3
>15 centroblasts per HPF	3	9698/3
Centrocytes present	3A	9698/3
Solid sheets of centroblasts	3B	9698/3

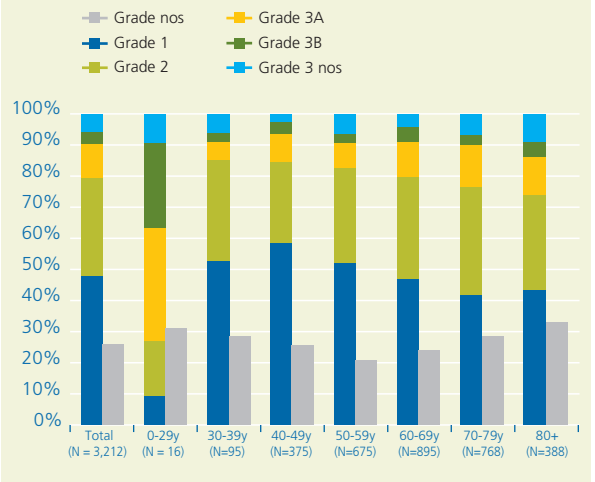
HPF: High Power Field

FIGURE 51 FOLLICULAR LYMPHOMA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 52 FOLLICULAR LYMPHOMA: INCIDENCE BY GRADE AND AGE GROUP, BELGIUM 2004-2012 (EXCL. 30 CASES OF PRIMARY CUTANEOUS FOLLICLE CENTRE LYMPHOMA (9597/3))

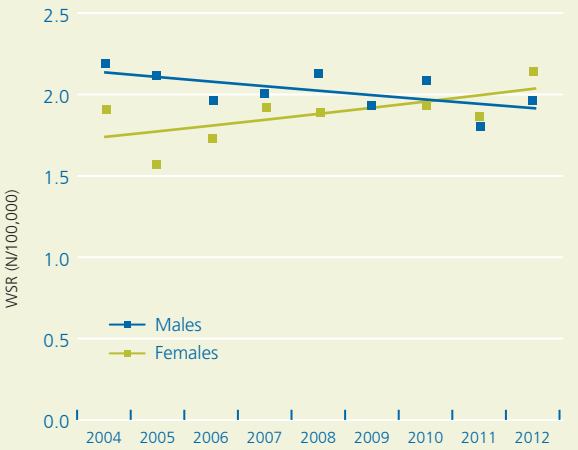


Source: Belgian Cancer Registry

Trends

- Incidence rates for follicular lymphoma reveal an opposite trend in males and females **(Figure 53 and Table 11).**
- Trends by age group do not reveal statistically significant changes over time **(Figure 54).**
  - In every age group above 45 years of age, the different trend between males and females is confirmed.
  - The incidence rates in females in the age group 60-74 years are higher than in the over 75 years old, however both age groups show a similar evolution over time.

FIGURE 53 FOLLICULAR LYMPHOMA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

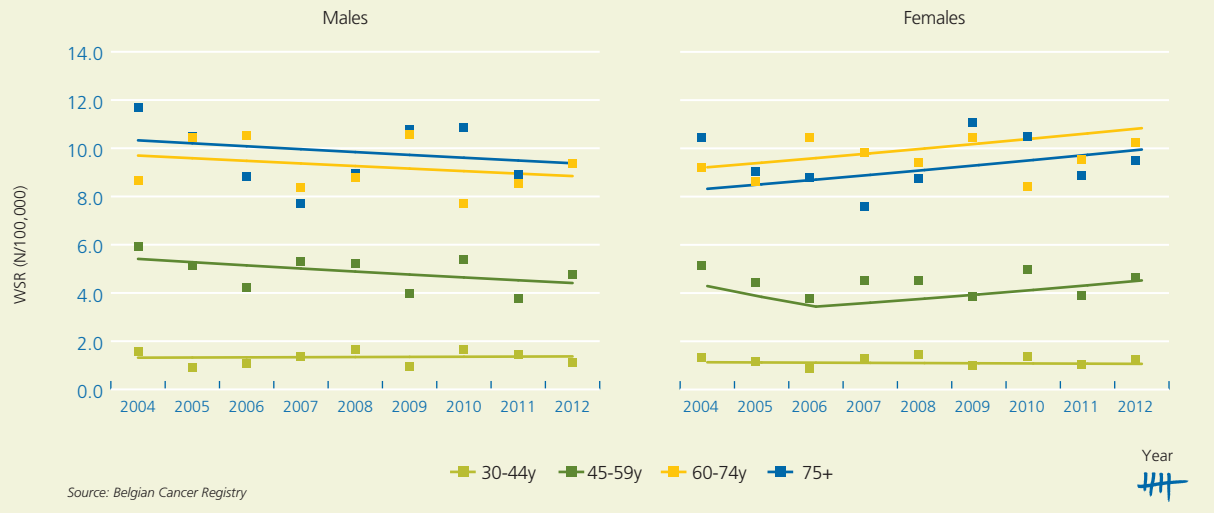
TABLE 11 FOLLICULAR LYMPHOMA: AAPC(%) BY SEX AND AGE GROUP, BELGIUM 2004-2012

	Males		Females		
Age	AAPC(%)	95%CI	AAPC(%)	95%CI	Period
All Ages	1.4	[-2.8:0.1]	2.0	[-0.0:4.1]	
30-44 y	0.5	[-6.8:8.3]	-0.8	[-8.1:7.1]	
45-59 y	-2.5	[-6.6:1.7]	0.7	[-4.2:5.8]	
			-10.5	[-30.4:15.1]	2004 2006
			4.7	[0.5:9.1]	2006 2012
60-74 y	-1.1	[-4.6:2.4]	2.0	[-1.9:6.2]	
75+	-1.2	[-5.0:2.8]	2.3	[-1.7:6.4]	

AAPC: average annual percentage change (2004-2012)

Period: When a joinpoint occured, APC's are calculated for the period before and after the joinpoint. This column represents the corresponding interval. AAPC's are always calculated over the entire study-period (2004-2012).

FIGURE 54 FOLLICULAR LYMPHOMA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

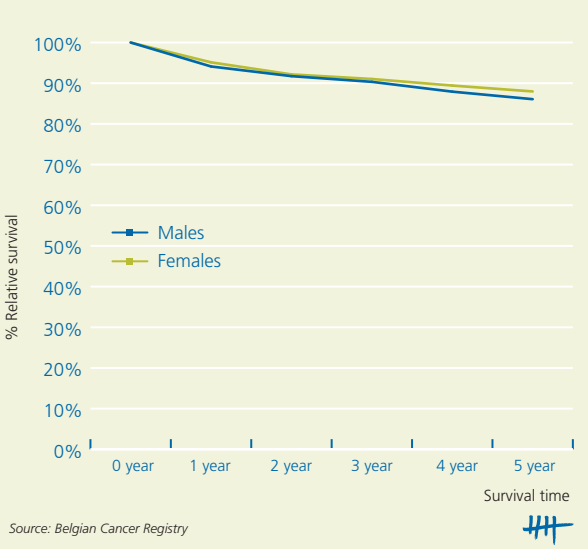


Source: Belgian Cancer Registry

Relative Survival

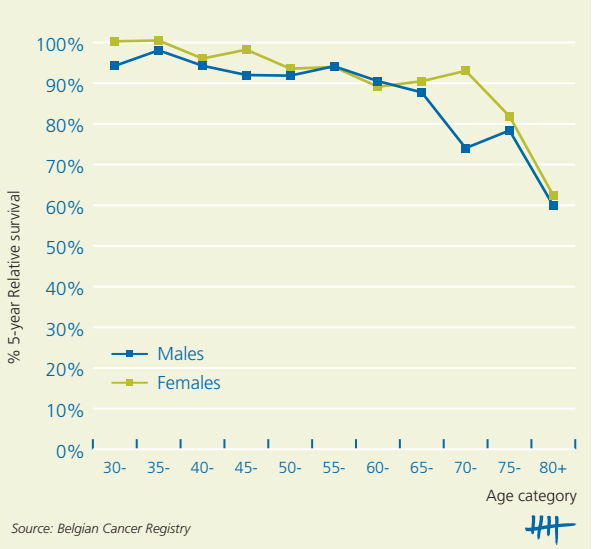
- The 5-year relative survival rates for follicular lymphoma are high in both sexes **(Figure 55)**.
- Five-year relative survival decreases gradually by age but remains above 80%, except for the oldest age groups **(Figure 56).**
- The prognosis of follicular lymphoma differs by grade **(Figure 57).** Grade 1 and 2 follicular lymphomas have the highest 5-year relative survival rates, grade 3 and grade NOS the lowest.

FIGURE 55 FOLLICULAR LYMPHOMA: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



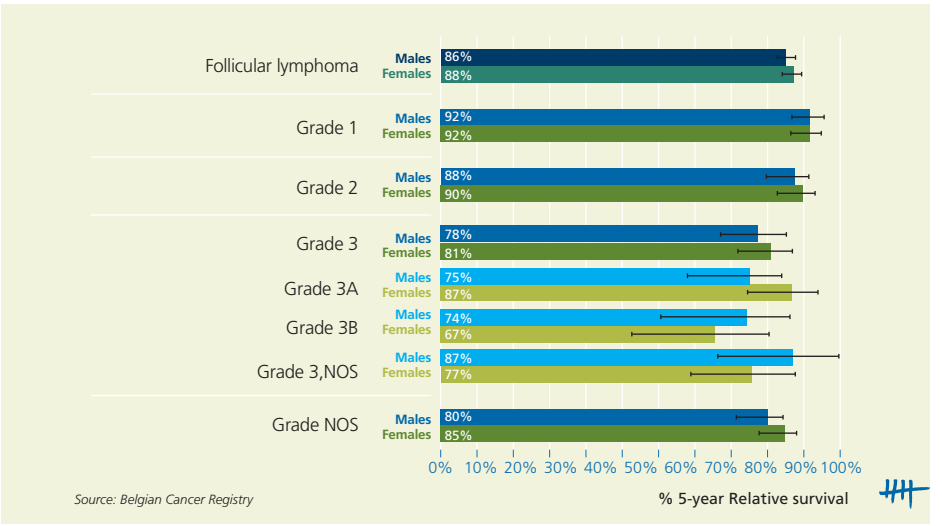
Source: Belgian Cancer Registry

FIGURE 56 FOLLICULAR LYMPHOMA: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 57 FOLLICULAR LYMPHOMA: RELATIVE SURVIVAL BY GRADE, BELGIUM 2004-2012



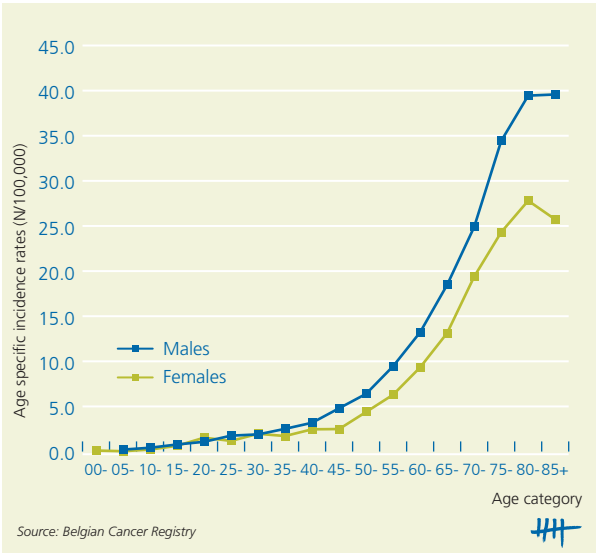
Source: Belgian Cancer Registry

3.1.2.5 DIFFUSE LARGE B-CELL LYMPHOMA

Incidence

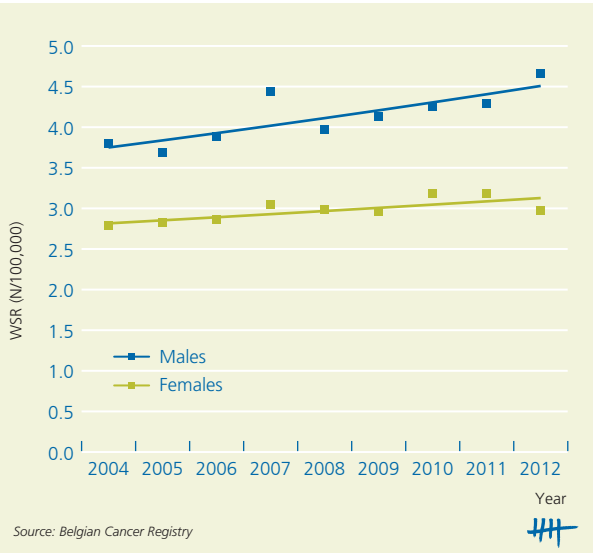
- Belgium 2012: 829 new diagnoses
  - 460 males (55%)
  - 369 females (45%)
- Mean age at diagnosis: 65 years in males and 68 years in females.
  - Diffuse large B-cell lymphoma is already diagnosed in young adults **(Figure 58).**
  - From the age of 40 years, incidence rates increase more rapidly and diagnoses are more common in males than females (male/female ratio is 1.4)
- Diffuse large B-cell lymphomas are a large group of different neoplasms. Morphological, biological and clinical studies have subdivided them in separate distinct entities (15). However, 93% of all cases remain 'unspecified' since a lot of the specific variants did not receive a distinct code by the WHO.

FIGURE 58 DIFFUSE LARGE B-CELL LYMPHOMA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 59 DIFFUSE LARGE B-CELL LYMPHOMA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

Trends

- Significant increases are observed in both sexes **(Figure 59 and Table 12)**
- Incidence rates increase more rapidly in older age groups **(Table 12 and Figure 60).**

TABLE 12 DIFFUSE LARGE B-CELL LYMPHOMA: AAPC(%) BY SEX AND AGE GROUP, BELGIUM 2004-2012

	Males			Females		
Age	AAPC(%)	95%CI	period	AAPC(%)	95%CI	period
All ages	2.3	[0.8:3.8]		1.3	[0.3:2.4]	
0-29 years	1.8	[-3.0:6.9]		-2.9	[-8.2:2.6]	
30-44 years	0.7	[-2.1:3.5]		-1.5	[-6.1:3.3]	
45-59 years	1.5	[-3.4:6.6]		0.8	[-3.1:4.9]]	
60-74 years	3.7	[0.3:7.3]		2.6	[0.9:4.2]	
	1.3	[-1.9:4.6]	2004-2010			
	11.4	[-5.6:31.4]	2010-2012			
75+	2.3	[-0.7:5.4]		6.0	[3.5:8.6]	
				19.6	[5.5:35.6]	2004-2006
				1.8	[0.1:3.6]]	2006-2012

AAPC: average annual percentage change (2004-2012)

Period: When a joinpoint occured, APC's are calculated for the period before and after the joinpoint. This column represents the corresponding interval. AAPC's are always calculated over the entire study-period (2004-2012).

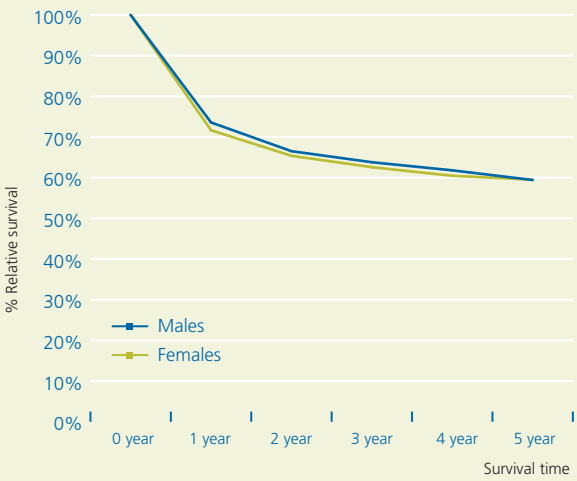
FIGURE 60 DIFFUSE LARGE B-CELL LYMPHOMA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

Source: Belgian Cancer Registry

Relative Survival

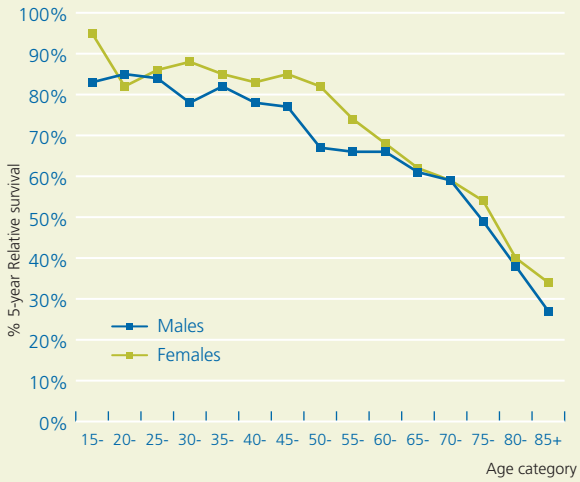
- The 5-year relative survival rates are similar in males and females **(Figure 61).**
  - Males: 59%
  - Females: 60%
- Age-specific survival rates decrease rapidly after the age of 50 years **(Figure 62).**
  - Five-year relative survival rates in patients younger than 50 years are somewhat higher in females (above 80%), but remain quite high in males (above 75% in each age group).
  - In the older age groups survival decreases but the rates are more comparable between both sexes.

FIGURE 61 DIFFUSE LARGE B-CELL LYMPHOMA: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 62 DIFFUSE LARGE B-CELL LYMPHOMA: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

3.1.2.6 BURKITT LYMPHOMA/LEUKAEMIA

Incidence

- Belgium 2012: 37 new diagnoses.
  - 28 males (76%)
  - 9 females (24%)
- Average age at diagnosis: 37 years in males and 46 years in females.
  - The majority of the Burkitt lymphoma/leukaemia are diagnosed in younger patients **(Figure 63).**
  - More than 1 out of 3 cases is diagnosed in children and adolescents (0-19 years of age).
  - A peak in the incidence rates is observed between 5 and 9 years of age.
  - New diagnoses are predominantly found in males (male/female ratio = 2.4); especially in children, the risk for boys is much higher than for girls.
    - Children & adolescents (0-19y): male/female ratio = 3.1
    - Adults (20+): male/female ratio = 1.8

FIGURE 63 BURKITT LYMPHOMA/LEUKAEMIA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

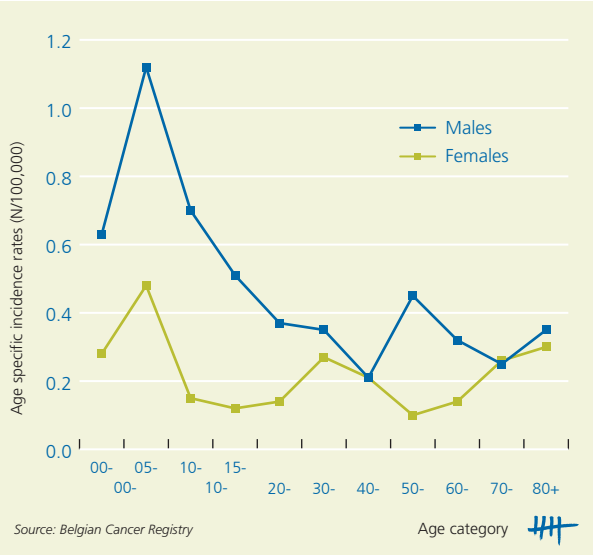
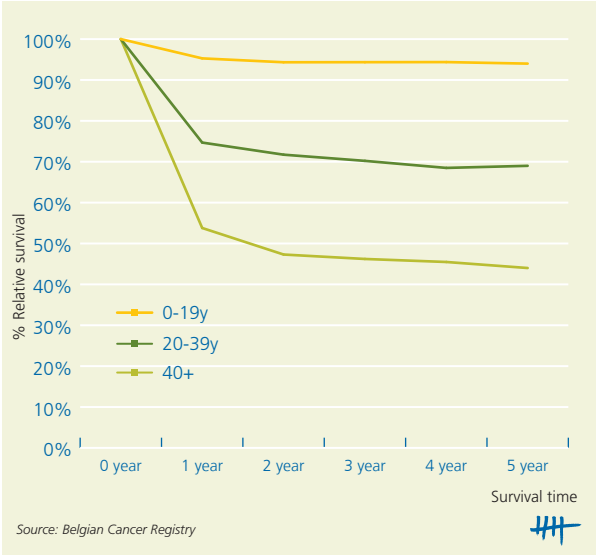


FIGURE 64 BURKITT LYMPHOMA/LEUKAEMIA: RELATIVE SURVIVAL BY AGE GROUP, BELGIUM 2004-2012



Relative Survival

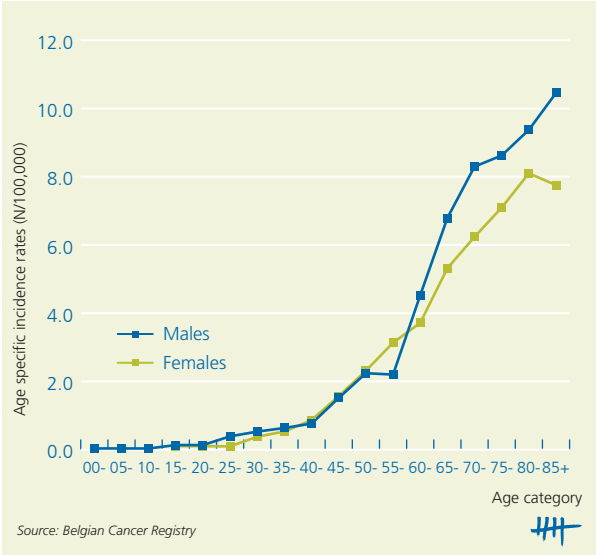
- Prognosis is very good in children, but 5-year relative survival rates decrease with age **(Figure 64).**
  - Children and adolescents (0-19 years): 94%
  - Adults (20-39): 69%
  - Adults (40+): 44%

3.1.2.7 MARGINAL ZONE LYMPHOMA

Incidence

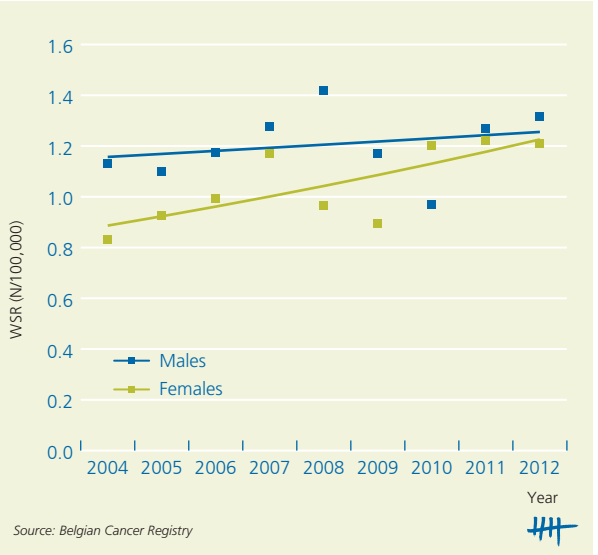
- Belgium 2012: 282 new diagnoses.
  - 132 males (47%)
  - 150 females (53%)
- Average age at diagnosis: 65 years in males and 68 years in females.
  - From the age of 40 years, incidence rates increase rapidly with age **(Figure 65).**
  - Under the age of 60 years, the incidence rates in males and females are very comparable (M/F ratio = 1.0).
  - Only after the age of 60 years, a clear difference between the sexes is observed, corresponding to a male/female ratio of 1.3.

FIGURE 65 MARGINAL ZONE LYMPHOMA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 66 MARGINAL ZONE LYMPHOMA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

Trends

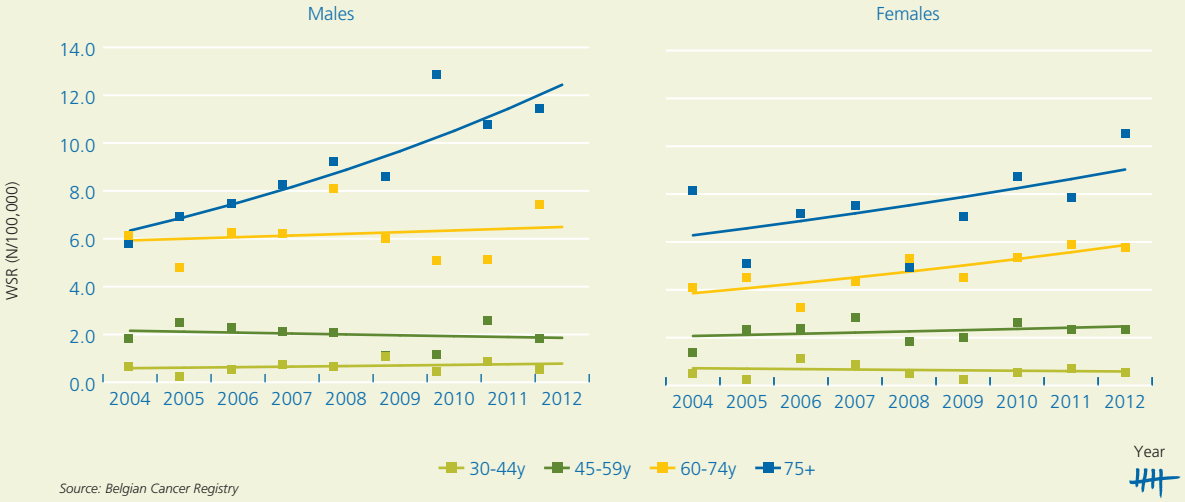
- Incidence rates in females increase more rapidly than in males **(Figure 66).**
- Large increases over time are observed in the oldest age groups **(Table 13 and Figure 67).**

TABLE 13 MARGINAL ZONE LYMPHOMA: AAPC(%) BY SEX AND AGE GROUP, BELGIUM 2004-2012

	Males		Females	
Age	AAPC(%)	95%CI	AAPC(%)	95%CI
All ages	1.0	[-2.5:4.7]	4.1	[0.9:7.5]
30-44 years	3.6	[-8.0:16.6]	-2.6	[-16.2:13.3]
45-59 years	-1.8	[-9.8:6.8]	2.2	[-3.9:8.7]
60-74 years	1.1	[-4.4:7.0]	5.4	[1.7:9.2]
75+	8.8	[4.8:12.9]	4.6	[-1.5:11.1]

AAPC: average annual percentage change (2004-2012)

FIGURE 67 MARGINAL ZONE LYMPHOMA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

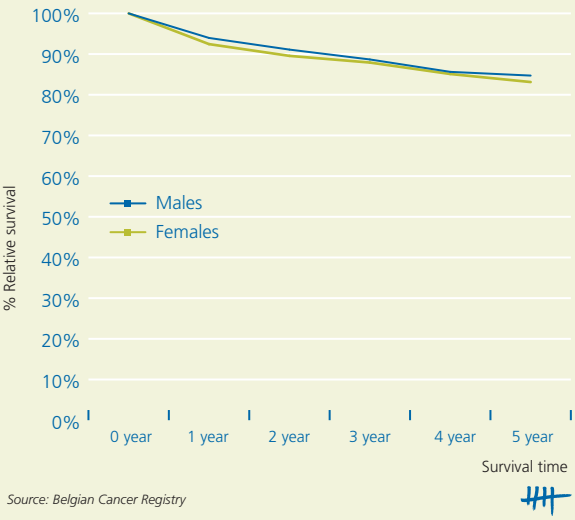


Source: Belgian Cancer Registry

Relative Survival

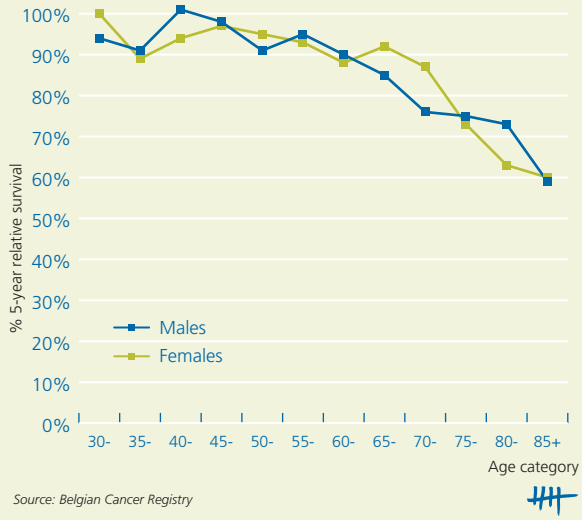
- Marginal zone lymphomas have high 5-year relative survival rates in males and females **(Figure 68).**
  - Males: 85%
  - Females: 83%
- Age-specific 5-year survival rates are above 90% until the age of 60 years; then the rates decline gradually **(Figure 69).**

FIGURE 68 MARGINAL ZONE LYMPHOMA: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 69 MARGINAL ZONE LYMPHOMA: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

3.1.2.8 MATURE B-CELL LEUKAEMIA

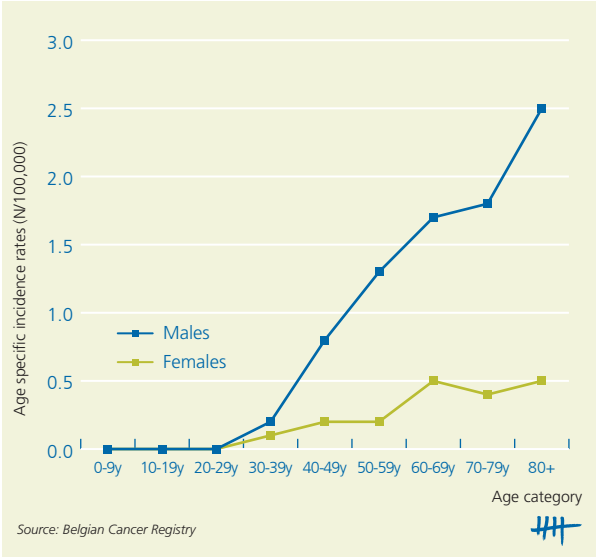
Incidence

- Belgium 2012: 45 new diagnoses.
  - 36 males (80%)
  - 9 females (20%)
- This category regroups 36 diagnoses of hairy cell leukaemia and 9 cases of B-cell prolymphocytic leukaemia.
- Average age at diagnosis: 61 years in males and 65 years in females.
  - From the age of 40 years, the incidence rates increase rapidly in males **(Figure 70),** while the rates in females remain very low.
  - High male predominance: male/female ratio = 4.6.

Relative Survival

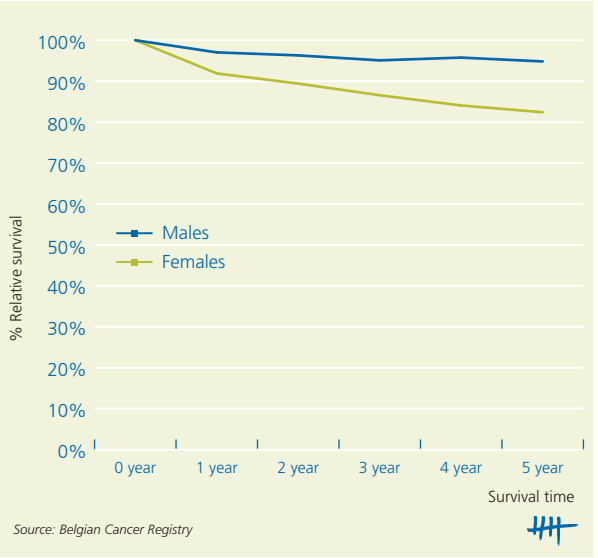
- Males have a better prognosis than females; the respective 5-year relative survival rates are 95% and 82% **(Figure 71)**.

FIGURE 70 MATURE B-CELL LEUKAEMIA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 71 MATURE B-CELL LEUKAEMIA: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

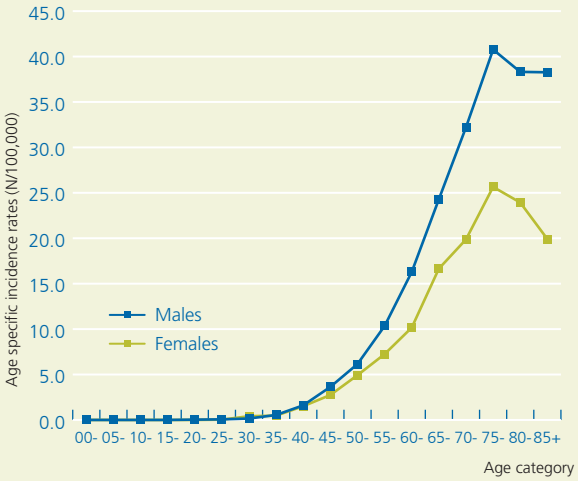
Key note for registration:
Non-secretory myeloma, indolent myeloma and smouldering myeloma are variants of multiple myeloma and must be coded as 9732/3

3.1.2.9 PLASMA CELL NEOPLASMS

Incidence

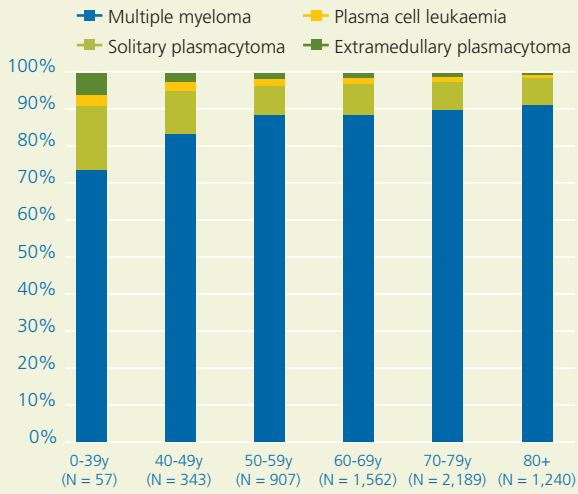
- Belgium 2012: 757 new diagnoses.
  - 429 males (57%)
  - 328 females (43%)
- Mean age at diagnosis: 69 years in males and 70 years in females.
  - Under the age of 40 years, plasma cell neoplasms are extremely rare **(Figure 72).**
  - Incidence rates increase with age from the age of 40 years.
  - The increase occurs more rapidly in males, resulting in a male/female ratio of 1.5.
- The majority of plasma cell neoplasm diagnoses are multiple myeloma **(Figure 73).**
  - In younger patients, the relative frequency of solitary plasmacytoma, plasma cell leukaemia and extramedullary plasmacytoma is higher compared to older age groups.

FIGURE 72 PLASMA CELL NEOPLASMS: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 73 PLASMA CELL NEOPLASMS: INCIDENCE BY SUBTYPE AND AGE GROUP, BELGIUM 2004-2012

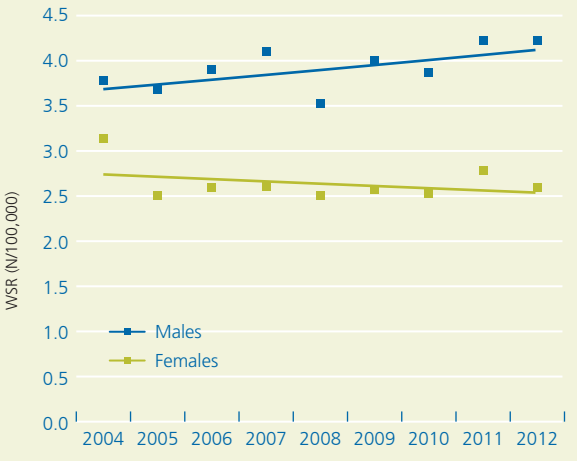


Source: Belgian Cancer Registry

Trends

- The incidence rates are increasing in males and decreasing in females **(Figure 74).**
- Trends by age group are represented in **Table 14 and Figure 75.**

FIGURE 74 PLASMA CELL NEOPLASMS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

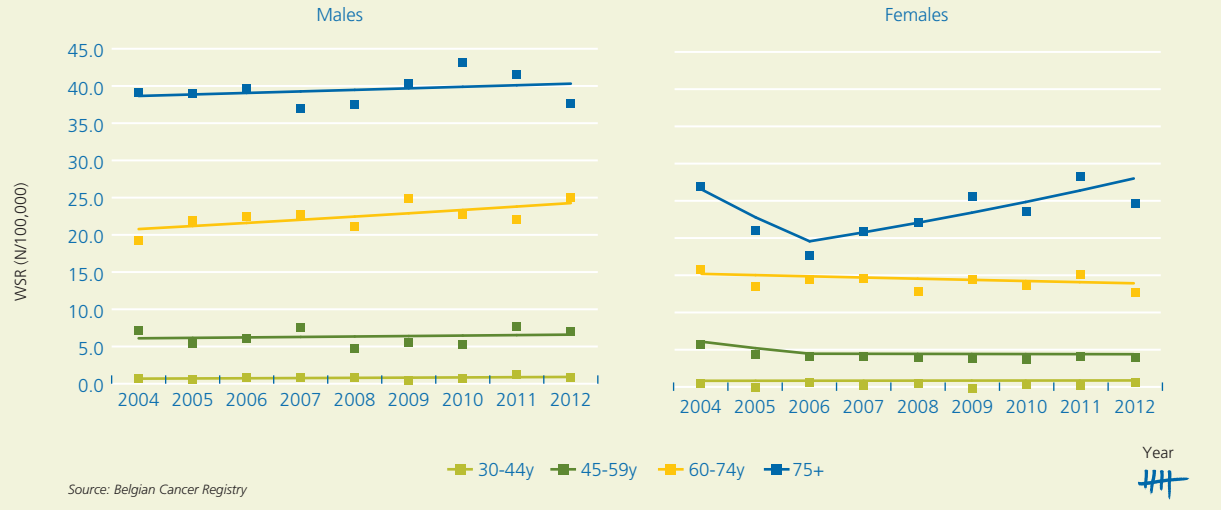
TABLE 14 PLASMA CELL NEOPLASMS: AAPC(%) BY SEX AND AGE GROUP: BELGIUM 2004-2012

	Males		Females		
Age	AAPC(%)	95%CI	AAPC(%)	95%CI	Period
All Ages	1.4	[-0.1:3.0]	-0.9	[-3.1:1.3]	
30-44 y	3.7	[-3.9:11.8]	0.7	[-9.2:11.7]	
45-59 y	1.0	[-4.4:6.7]	-4.0	[-6.4:-1.4]	
			-14.3	[-24.7:-2.4]	2004 2006
			-0.3	[-2.6:2.1]	2006 2012
60-74 y	2.0	[0.0:3.9]	-1.1	[-3.1:1.0]	
75+	0.5	[-1.1:2.2]	0.7	[-5.8:7.6]	
			-14.1	[-38.7:20.3]	2004 2006
			6.2	[0.4:12.2]	2006 2012

AAPC: average annual percentage change (2004-2012)

Period: When a joinpoint occured, APC's are calculated for the period before and after the joinpoint. This column represents the corresponding interval. AAPC's are always calculated over the entire study-period (2004-2012).

FIGURE 75 PLASMA CELL NEOPLASMS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

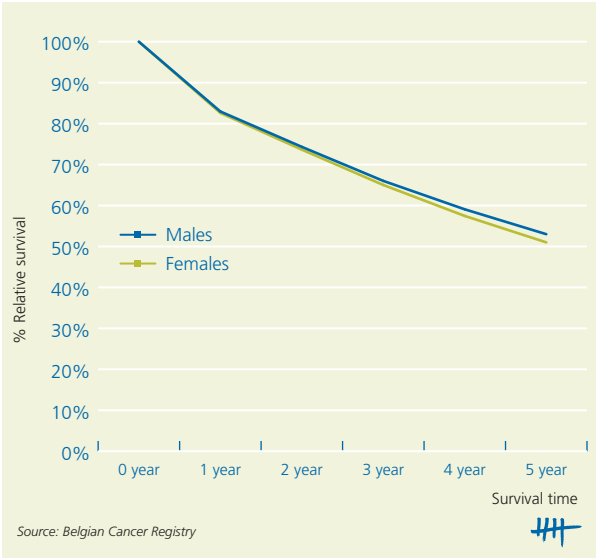


Source: Belgian Cancer Registry

Relative Survival

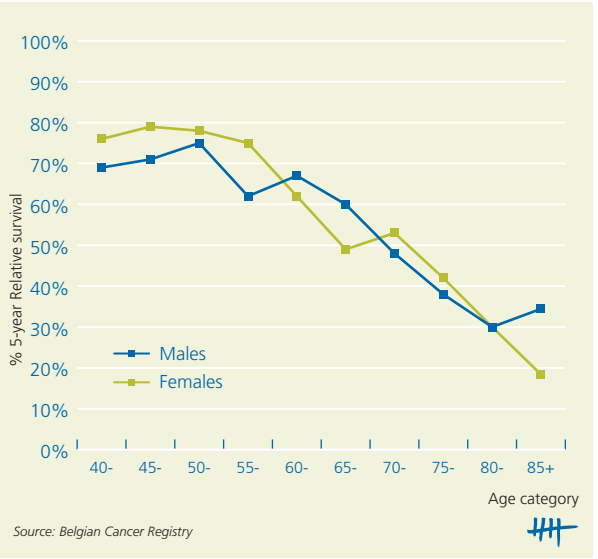
- The 5-year relative survival rates for plasma cell neoplasms are low in both sexes **(Figure 76).**
  - Males: 53%
  - Females: 51%
- Young patients have the highest 5-year relative survival rates. After the age of 55 years, the age-specific survival rates decline rapidly with increasing age **(Figure 77).**

FIGURE 76 PLASMA CELL NEOPLASMS: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 77 PLASMA CELL NEOPLASMS: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

3.1.3 MATURE T-CELL AND NK-CELL NEOPLASMS

Incidence

- Belgium 2012: 282 new diagnoses.
  - 170 males (60%)
  - 112 females (40%)
- Average age at diagnosis: 61 years in males and 62 years in females.
  - Mature T-cell and NK-cell neoplasms already occur in young adults **(Figure 78).**
  - The incidence rates increase gradually with age until the age of 50 years.
  - After the age of 50 years, the incidence rates increase more rapidly, especially in males, resulting in a male/female ratio of 1.7.
- Haemacare/WHO classification (see chapter 2.1) identifies two major categories of Mature T-cell and NK-cell neoplasms.
  - Cutaneous T-cell lymphomas: representing 40% of the mature T-/NK-cell neoplasms.
  - All other subtypes (60%) are grouped together in the 'Other T-/NK-cell lymphomas' category.

FIGURE 78 MATURE T- AND NK-CELL NEOPLASMS: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

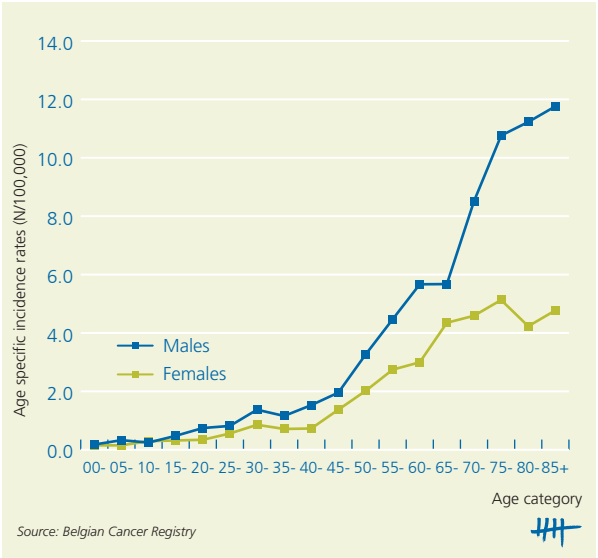
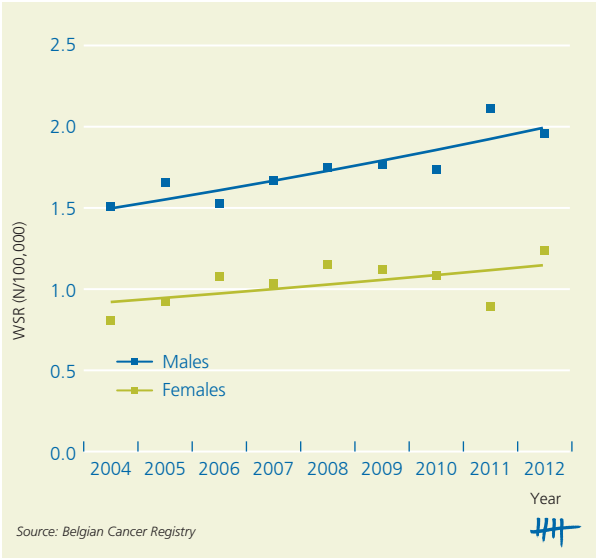


FIGURE 79 MATURE T- AND NK-CELL NEOPLASMS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



Trends

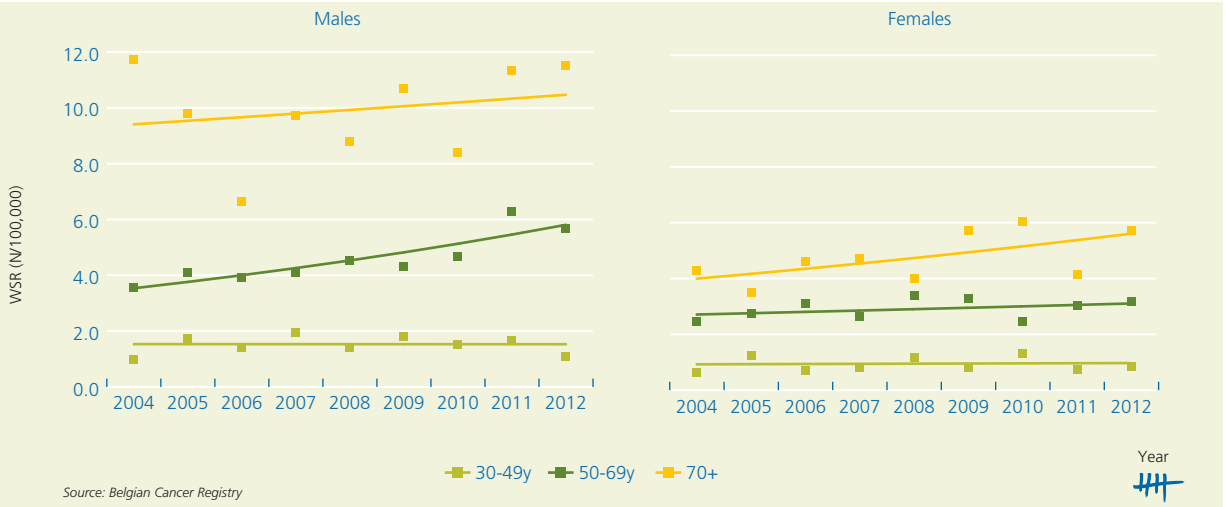
- Incidence rates increase in both sexes **(Figure 79).**
- **Table 15 and Figure 80** give an overview of the changes over time for different age groups.

TABLE 15 MATURE T- AND NK-CELL NEOPLASMS: AAPC(%) BY SEX AND AGE GROUP: BELGIUM 2004-2012

	Males		Females	
Age	AAPC(%)	95%CI	AAPC(%)	95%CI
All ages	3.6	[1.9:5.4]	2.8	[-1.0:6.7]
30-49 years	0.0	[-7.2:7.7]	0.6	[-8.3:10.3]
50-69 years	6.4	[3.4:9.4]	1.7	[-1.9:5.5]
70+	1.3	[-3.8:6.8]	4.3	[-0.7:9.6]

AAPC: average annual percentage change (2004-2012)

FIGURE 80 MATURE T- AND NK-CELL NEOPLASMS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

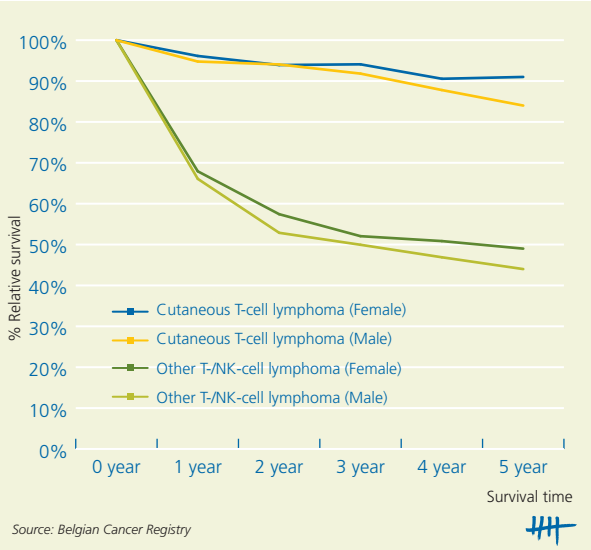


Source: Belgian Cancer Registry

Relative Survival

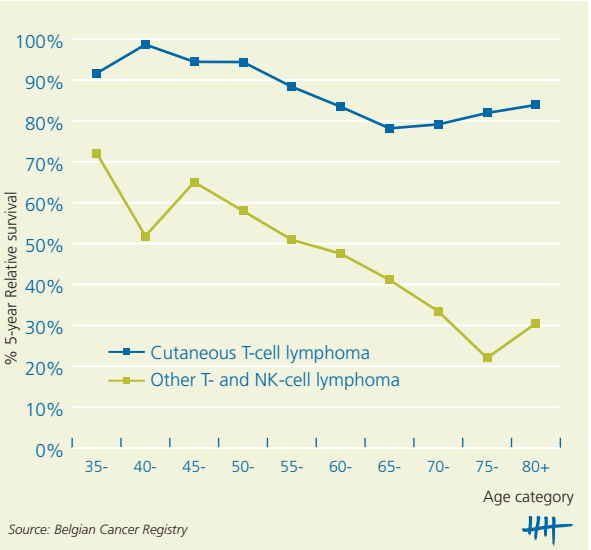
- Cutaneous T-cell lymphomas have higher survival rates than the group of other T-/NK-cell lymphomas **(Figure 81).** For both subtypes, the 5-year relative survival rates decrease with age **(Figure 82).**
  - Cutaneous T-cell lymphomas: 84% in males and 91% in females
  - Other T-/NK-cell lymphomas: 44% in males and 49% in females

FIGURE 81 MATURE T- AND NK-CELL NEOPLASMS: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 82 MATURE T- AND NK-CELL NEOPLASMS: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

3.1.3.1 CUTANEOUS T-CELL LYMPHOMA

Incidence

- Belgium 2012: 114 new diagnoses.
  - 66 males (58%)
  - 48 females (42%)
- Mean age at diagnosis: 62 years in both males and females.
  - Under the age of 30 years, cutaneous T-cell lymphomas are extremely rare **(Figure 83).**
  - Age-specific incidence rates increase gradually after the age of 30 years, especially in males, resulting in a male/female ratio of 1.7.

FIGURE 83 CUTANEOUS T-CELL LYMPHOMA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

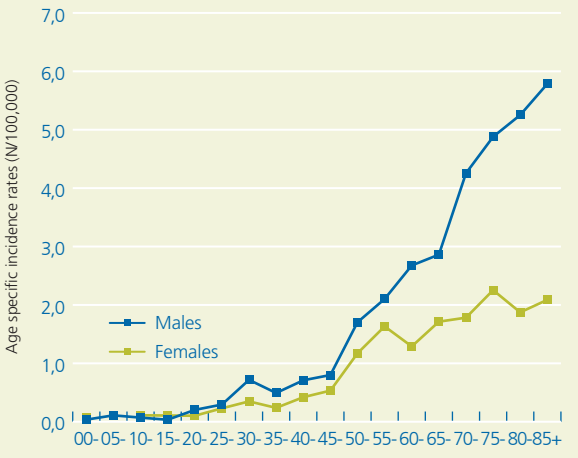
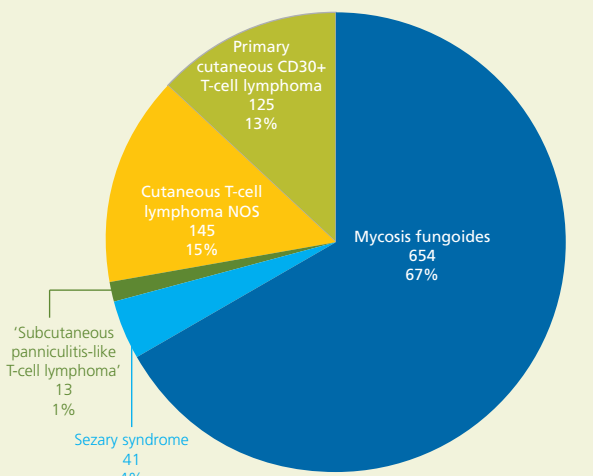


FIGURE 84 CUTANEOUS T-CELL LYMPHOMA: INCIDENCE BY SUBTYPE, BELGIUM 2004-2012



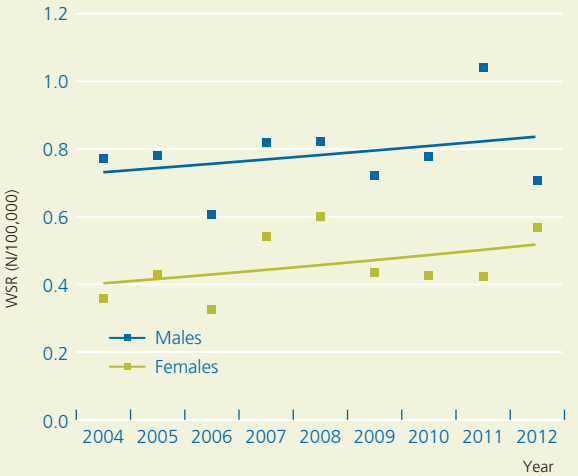
- Cutaneous T-cell lymphomas regroup 5 entities **(Figure 84).**
  - **Mycosis fungoides:** 67% of cutaneous T-cell lymphoma diagnoses.
    - Male predominance (male/female ratio = 1.9).
    - The mean age at diagnosis is 63 years in males and 64 years in females.
  - **Primary cutaneous CD30+ T-cell lymphoma:** 13% of the cutaneous T-cell lymphoma.
    - Male/female ratio: 2.2.
    - The mean age at diagnosis is 56 years in males and 52 years in females.
  - **Sézary syndrome and 'Subcutaneous panniculitis-like T-cell lymphoma'** are very rare and represent respectively 4% and 1% of the cutaneous T-cell lymphoma.
  - **Cutaneous T-cell lymphoma NOS:** 15% of the cutaneous T-cell lymphoma.
    - Male/female ratio: 1.1.
    - The mean age at diagnosis is 63 years in males and 65 years in females.

Key note for registration:
Sézary syndrome is a rare condition with poor prognosis. Diagnosis depends on the identification of Sézary cells in peripheral blood or bone marrow and can not be made solely on routine pathological examination of skin lesions.

Trends

- Incidence rates for cutaneous T-cell lymphoma are increasing in both sexes **(Figure 85)**
- Trends by age group are shown in **Table 16** and **Figure 86.**

FIGURE 85 CUTANEOUS T-CELL LYMPHOMA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



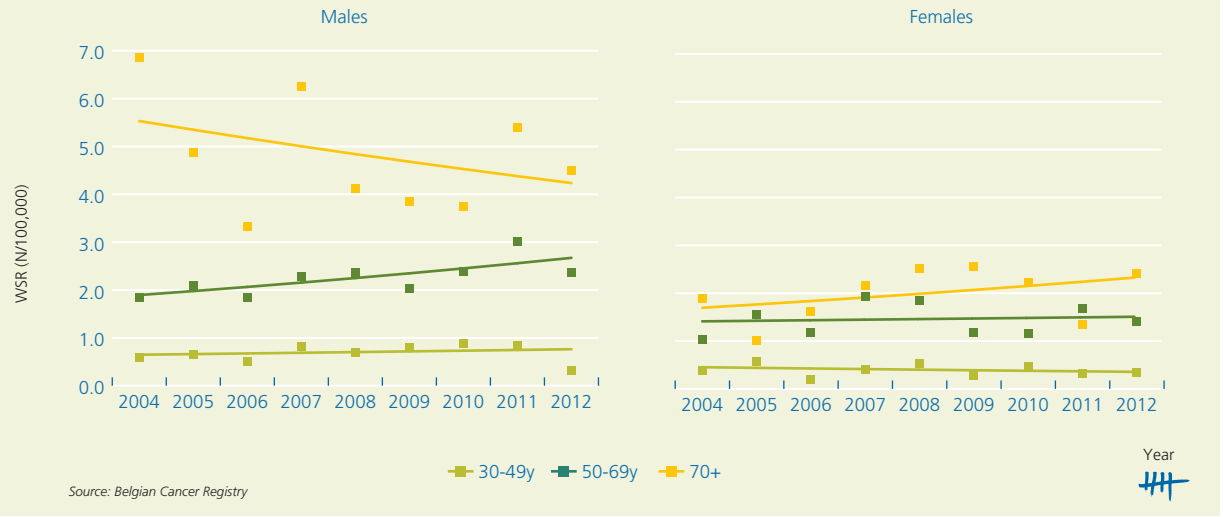
Source: Belgian Cancer Registry

TABLE 16 CUTANEOUS T-CELL LYMPHOMA: AAPC(%) BY SEX AND AGE GROUP, BELGIUM 2004-2012

	Males		Females	
Age	AAPC(%)	95%CI	AAPC(%)	95%CI
All Ages	1.7	[-2.9:6.5]	3.2	[-3.1:9.8]
30-49 years	2.1	[-7.1:12.1]	-2.9	[-12.2:7.2]
50-69 years	4.4	[0.7:8.2]	0.8	[-6.6:8.8]
70+	-3.3	[-9.9:3.8]	4.0	[-4.7:13.6]

AAPC: average annual percentage change (2004-2012)

FIGURE 86 CUTANEOUS T-CELL LYMPHOMA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

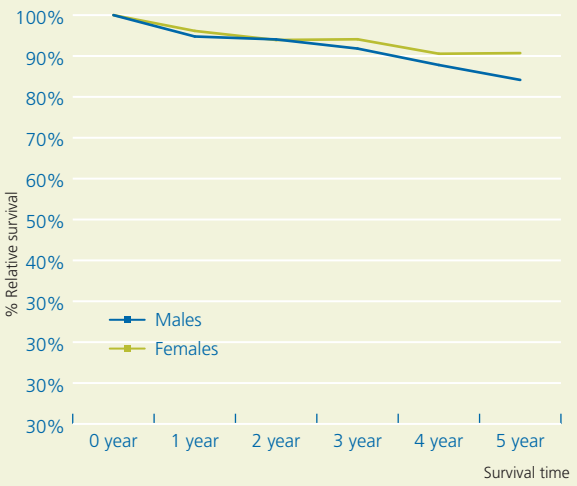


Source: Belgian Cancer Registry

Relative Survival

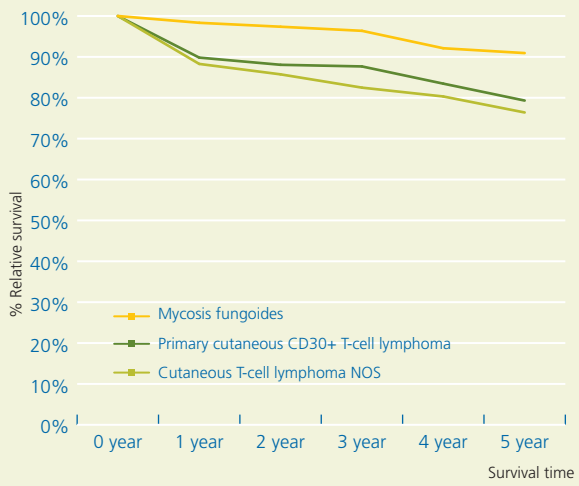
- Five-year relative survival rates are 84% in males and 91% in females **(Figure 87).**
- Prognosis depends on the subtype, with the highest survival rates for mycosis fungoides **(Figure 88).**
  - **Mycosis fungoides:** 91%
  - **Primary cutaneous CD30+ T-cell lymphoma:** 79%
  - **Cutaneous T-cell lymphoma NOS:** 76%
- The age-specific survival rates decrease only slightly with age **(Figure 89).**

FIGURE 87 CUTANEOUS T-CELL LYMPHOMA: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



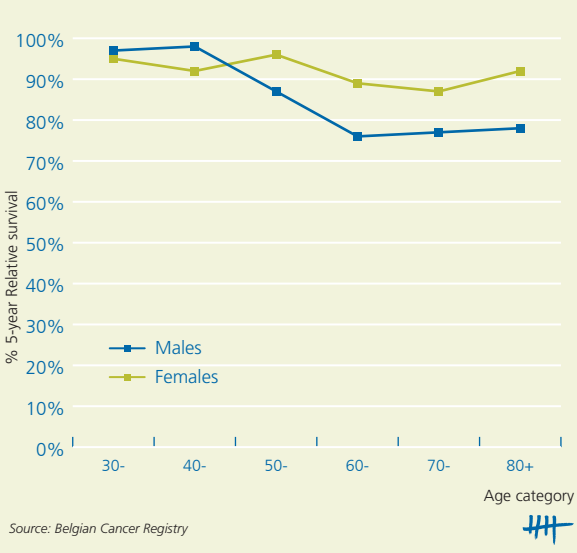
Source: Belgian Cancer Registry

FIGURE 88 CUTANEOUS T-CELL LYMPHOMA: RELATIVE SURVIVAL BY SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 89 CUTANEOUS T-CELL LYMPHOMA: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

3.1.3.2 OTHER T-/NK-CELL LYMPHOMA

Incidence

- Belgium 2012: 168 new diagnoses.
  - 104 males (62%)
  - 64 females (38%)
- Mean age at diagnosis: 60 years in males and 62 years in females.
  - The incidence rates increase gradually in young adults **(Figure 90).**
  - From the age of 50 years, the incidence rates increase more rapidly.
  - Male/female ratio is 1.7.

FIGURE 90 OTHER T-/NK-CELL LYMPHOMA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

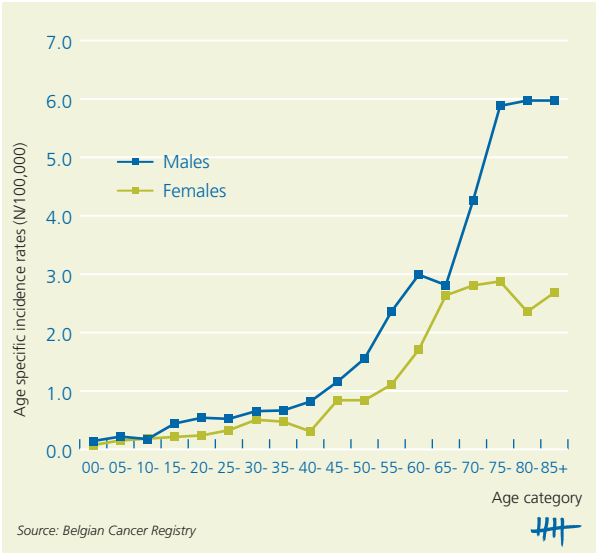
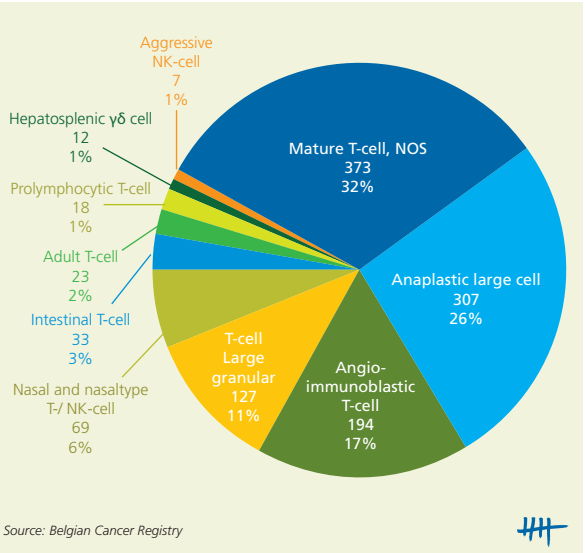


FIGURE 91 OTHER T-/NK-CELL LYMPHOMA: INCIDENCE BY SUBTYPE, BELGIUM 2004-2012



- The group of other T-/NK-cell lymphoma comprises a diverse group of different T-/NK-cell malignancies **(Figure 91).**
  - Anaplastic large cell lymphoma (26% of all other T-/NK-cell lymphoma)
  - Angioimmunoblastic T-cell lymphoma (17%)
  - T-cell large granular lymphocytic leukaemia (11%)
  - Nasal and nasaltype T-/ NK-cell, Intestinal T-cell, Adult T-cell, Prolymphocytic T-cell, Hepatosplenic **γδ** cell and Aggressive NK-cell lymphomas are very rare (between 1% and 6% of all other T-/NK-cell lymphoma).
  - 32% of the other T-/NK-cell lymphomas diagnoses are unspecified mature T-cell lymphoma, NOS[+].

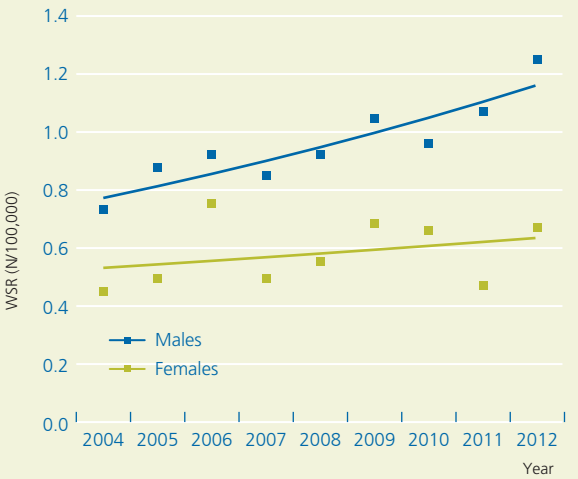
Key note for registration:
Avoid the use of code 9702/3, *(Mature T-cell lymphoma, NOS).*
Actively look for more information in order to obtain a more specific diagnosis.

[+]*This is a heterogeneous category of nodal and extra nodal mature T-cell lymphomas. Due to the lack of more detailed information, these diagnoses cannot be classified into any of the specific entities of mature T-cell lymphoma in the current classification.*

Trends

- Incidence rates are increasing in males and females **(Figure 92).**
- Trends by age group are shown in **Figure 93 and Table 17.**

FIGURE 92 OTHER T-/NK-CELL LYMPHOMA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

TABLE 17 OTHER T-/NK-CELL LYMPHOMA: AAPC(%) BY SEX AND AGE GROUP, BELGIUM 2004-2012

	Males		Females	
Age	AAPC(%)	95%CI	AAPC(%)	95%CI
All Ages	5.2	[3.0:7.5]	2.2	[-3.7:8.6]
30-49 years	-1.5	[-10.4:8.2]	2.7	[-7.7:14.4]
50-69 years	8.4	[4.7:12.2]	2.0	[-6.5:11.2]
70+	5.9	[-0.7:12.8]	4.3	[-2.4:11.5]

AAPC: average annual percentage change (2004-2012)

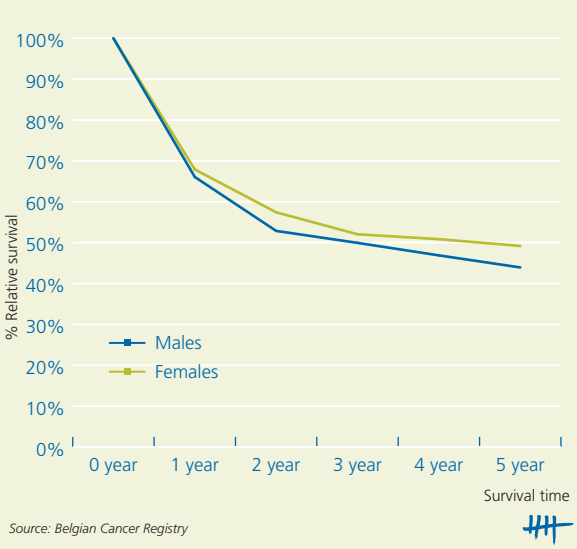
FIGURE 93 OTHER T-/NK-CELL LYMPHOMA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

Source: Belgian Cancer Registry

Relative Survival

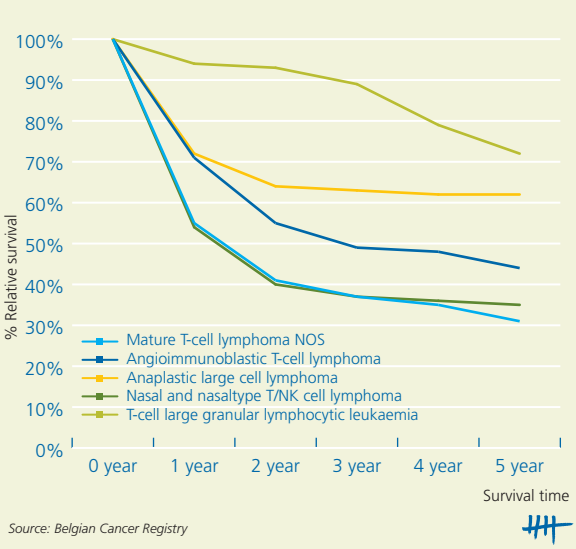
- The 5-year relative survival rates are 44% in males and 49% in females **(Figure 94).**
- Five-year survival rates differ per subtype **(Figure 95).**
  - The highest survival rates are observed for **T-cell large granular lymphocytic leukaemia** (72%) and **anaplastic large cell lymphomas** (62%).
  - The 5-year survival rates for **Angioimmunoblastic T-cell lymphoma, Nasal and nasal-type T/NK cell lymphoma** and **Mature T-cell lymphoma NOS** are lower, respectively 44%, 35% and 31%.
- Even in younger patients, the 5-year relative survival rates are lower than 70%. The age-specific survival rates decrease further with increasing age **(Figure 96).**

FIGURE 94 OTHER T-/NK-CELL LYMPHOMAS: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



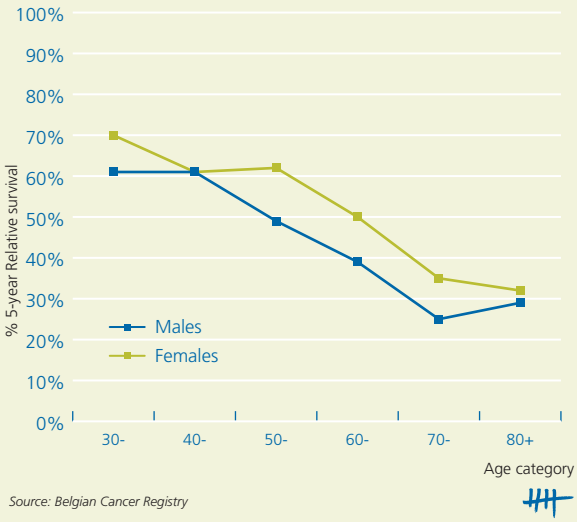
Source: Belgian Cancer Registry

FIGURE 95 OTHER T-/NK-CELL LYMPHOMAS: RELATIVE SURVIVAL BY SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 96 OTHER T-/NK-CELL LYMPHOMAS: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

3.1.4 LYMPHOBLASTIC LYMPHOMA/ACUTE (PRECURSOR CELL) LYMPHOBLASTIC LEUKAEMIA (ALL)

Incidence

- Belgium 2012: 181 new diagnoses.
  - 95 males (52%)
  - 86 females (48%)
- Average age at diagnosis: 27 years in males and 31 years in females.
  - The majority of diagnoses are found during childhood and adolescence **(Figure 97).**
  - 54% of cases between 2004 and 2012 occur before the age of 20 years.
  - About one out of four cases are diagnosed in very young children (0-4 years of age).
  - With age, the incidence rates decrease rapidly until the age of 20 years.
  - Between the age of 20 and 60 years, the rates remain low and stable. Afterwards, a small increase in incidence rates is observed, leading to a small peak at 70-75 years.
  - Male/female ratio is 1.3.

FIGURE 97 LYMPHOBLASTIC LYMPHOMA/ACUTE (PRECURSOR CELL) LYMPHOBLASTIC LEUKAEMIA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

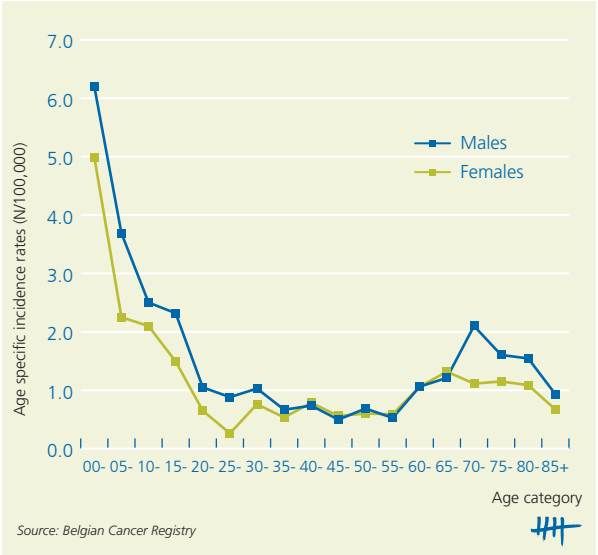
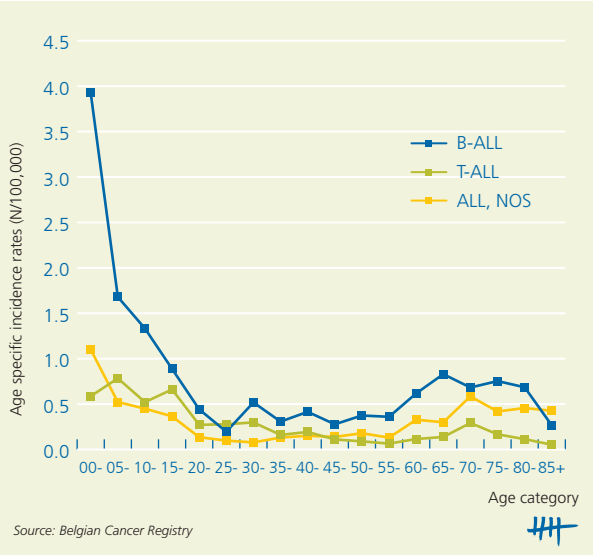


FIGURE 98 LYMPHOBLASTIC LYMPHOMA/ACUTE (PRECURSOR CELL) LYMPHOBLASTIC LEUKAEMIA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SUBTYPE, BELGIUM 2004-2012



- Lymphoblastic lymphoma/acute (precursor cell) lymphoblastic leukaemia can be separated by cell lineage **(Figure 98**).
  - 70% of the diagnoses have a known cell lineage.
  - In children, the incidence rates for the B-ALL are much higher than T-ALL.
  - Between the age of 15 and 40 years, incidence rates for both cell lines are comparable.
  - After the age of 40 years, the T-cell type is rare and the majority of cases are of B-cell lineage.

Key note for registration:
Actively look for more information to obtain the cell lineage and code accordingly.
- **B-ALL:** A variety of new ICD-O-3 codes (range 9811-9818) are available to specify different subtypes.
- **T-ALL:** Use codes 9729 and 9837

Trends

- No significant trends are observed for ALL **(Figure 99)**.
  - Males: AAPC = -0.8% [-4.7:3.3]
    - Boys (0-14 years): AAPC = -1.8% [-6.8:3.4]
    - Adults (15+): AAPC = 1.1% [-4.3:6.8]
  - Females: AAPC = 0.0% [-5.1:5.4]
    - Girls (0-14 years): AAPC = -0.6 [-5.5:4.6]
    - Adults (15+): AAPC = 1.0% [-5.7:8.2]

FIGURE 99 LYMPHOBLASTIC LYMPHOMA/ACUTE (PRECURSOR CELL) LYMPHOBLASTIC LEUKAEMIA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012

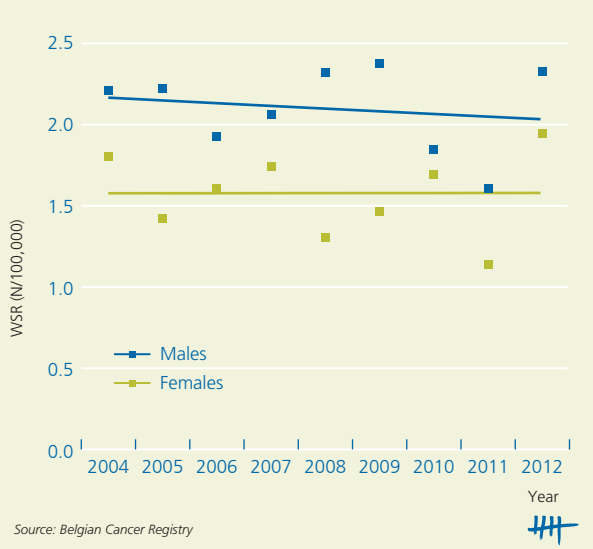
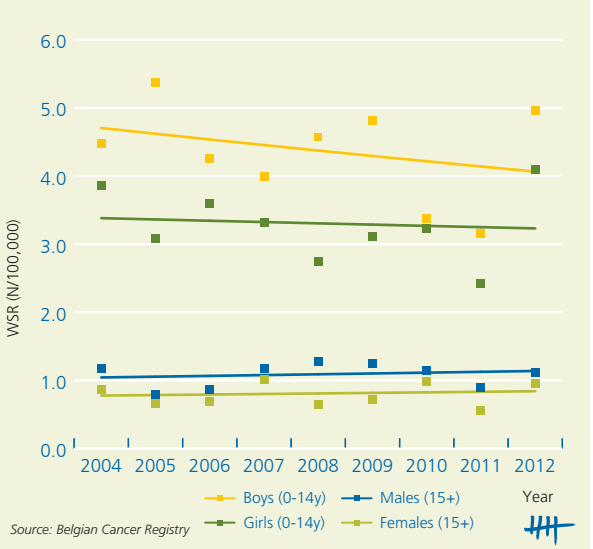


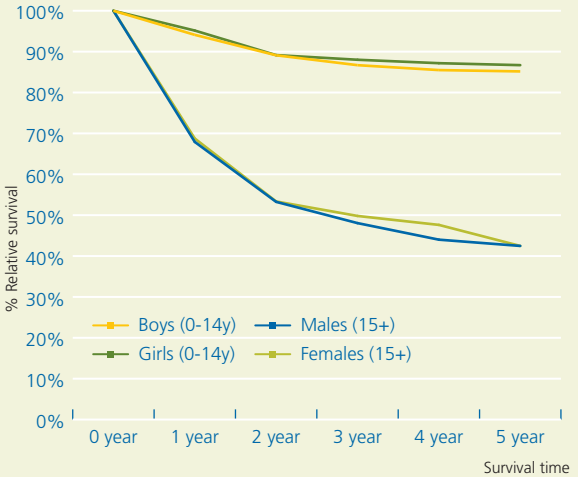
FIGURE 100 LYMPHOBLASTIC LYMPHOMA/ACUTE (PRECURSOR CELL) LYMPHOBLASTIC LEUKAEMIA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012



Relative Survival

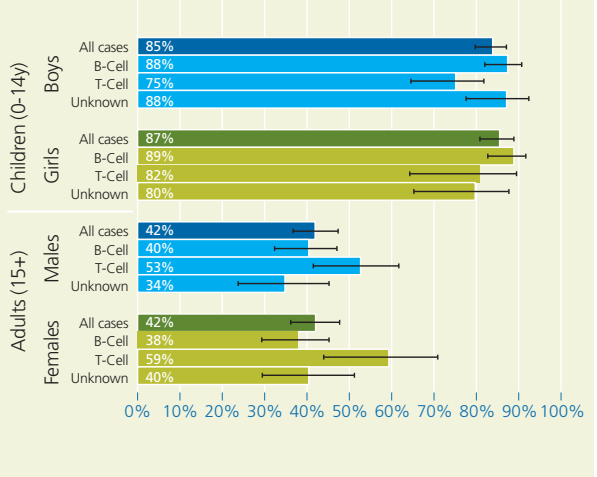
- Prognosis for ALL is comparable between males and females. Prognosis in children is much better than in adults **(Figure 101).**
- Prognosis by cell lineage differs between children and adults **(Figure 102).**
  - Children: The 5-year relative survival for B-ALL is higher than for T-ALL.
  - Adults: Survival rates for T-ALL are better than for B-ALL.

FIGURE 101 LYMPHOBLASTIC LYMPHOMA/ACUTE (PRECURSOR CELL) LYMPHOBLASTIC LEUKAEMIA: RELATIVE SURVIVAL BY SEX,



Source: Belgian Cancer Registry

FIGURE 102 LYMPHOBLASTIC LYMPHOMA/ACUTE (PRECURSOR CELL) LYMPHOBLASTIC LEUKAEMIA: 5-YEAR RELATIVE SURVIVAL BY SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

3.2 MYELOID MALIGNANCIES

Incidence

- Belgium 2012: 2,130 new diagnoses.
  - 1,136 males (53%)
  - 994 females (47%)
- Mean age: 67 years in males and females.
  - Age-specific incidence rates increase gradually from an early age **(Figure 103)** in both sexes until the age of 50 years (male/female ratio = 1.0).
  - From the age of 50 years, age-specific incidence rates increase more rapidly, especially in males, resulting in a higher risk in males (male/female ratio = 1.5).
  - All ages combined, the male/female ratio is 1.4.

FIGURE 103 MYELOID MALIGNANCIES: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

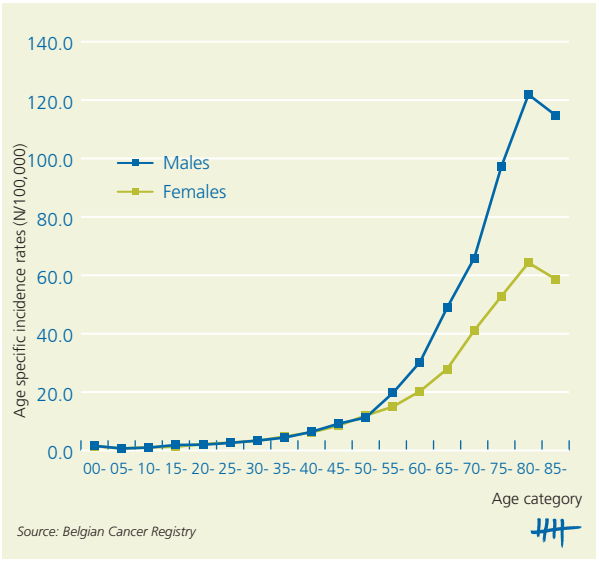
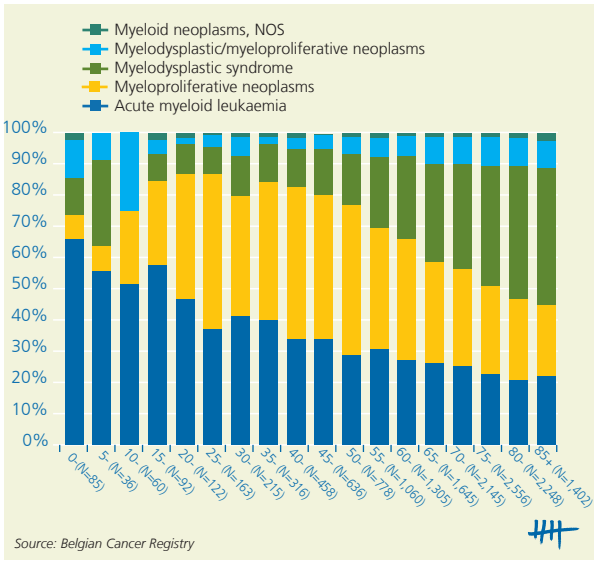


FIGURE 104 MYELOID MALIGNANCIES: INCIDENCE BY SUBTYPE AND AGE GROUP, BELGIUM 2004-2012



Haemacare/WHO classification (see chapter 2.1) identifies five major categories of myeloid malignancies **(Figure 104).** With the exception of 'myeloid neoplasms NOS', a more detailed chapter is available for each subtype.

1. Acute myeloid leukaemia (AML)

- 27% of myeloid malignancies.
- Relative frequency, within the myeloid malignancies, decreases with age from 66% in young children (<5 years of age) to around 22% in the oldest age groups.

2. Myeloproliferative neoplasms (MPN)

- 33% of myeloid malignancies.
- Their relative frequency is highest in the ages between adolescence (15 -19 years) and adults younger than 50 years of age.

3. Myelodysplastic syndrome (MDS)

- 31% of myeloid malignancies.
- Diagnosed more frequently in the elderly.

4. Myelodysplastic/myeloproliferative neoplasms (MDS/MPN)

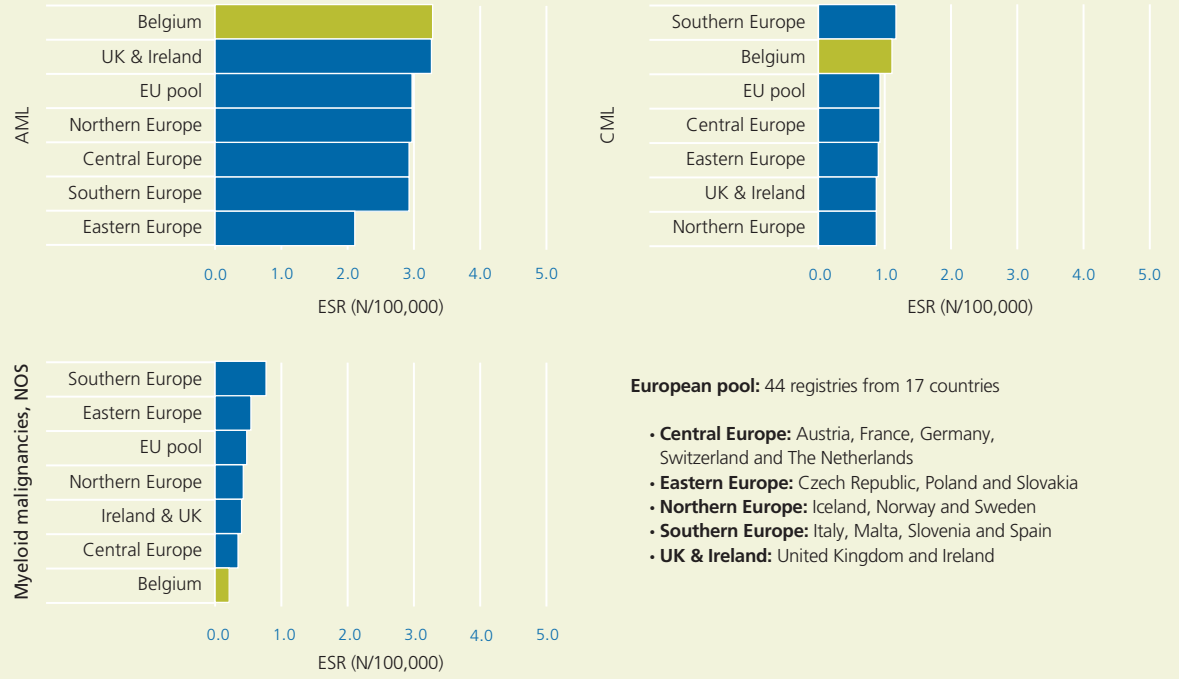
- 8% of myeloid malignancies.
- Relatively rare in each age group.

5. Myeloid neoplasms, NOS

- 2% of myeloid malignancies

The Belgian incidence rates for AML and CML **(Figure 105)** rank high in comparison with the other European regions. This finding can be influenced by the very low incidence 'Myeloid neoplasms, NOS' and due to the difference in time frame between the rates in Belgium (2004-2012) and the European regions (2000-2002).

FIGURE 105 MYELOID MALIGNANCIES: AGE-STANDARDISED INCIDENCE RATES (ESR) IN BELGIUM (2004-2012) AND EUROPEAN REGIONS (2000-2002) (31)



Trends

- The incidence rates for myeloid malignancies increase significantly in both sexes **(Figure 10).**
- Different trends can be observed for the different myeloid subtypes **(Table 18 and Figure 106).** An important part of the increase will be related to improvements in diagnosis and registration, leading to a decrease over time in the incidence rates for myeloid malignancies, NOS. An important example, explaining the large increase in incidence rates for MDS and MPN, is the increased recognition of specific entities based on molecular biology (such as the JAK2-mutation for MPN) (15).
- Increase in incidence rates are observed in most age groups **(Table 18 and Figure 107).**

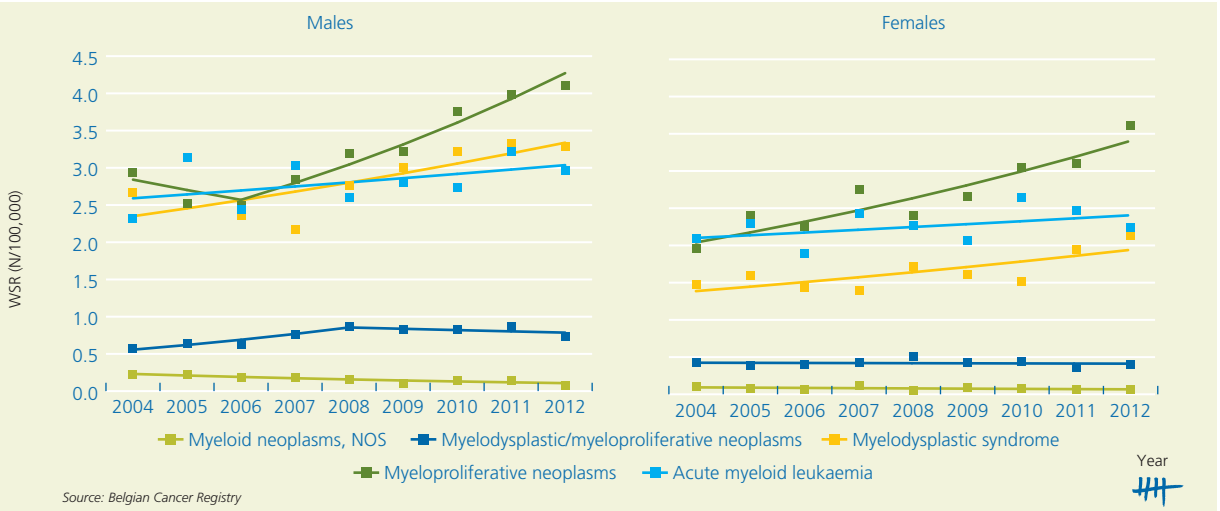
TABLE 18 MYELOID MALIGNANCIES: AAPC(%) BY SEX, SUBTYPE AND AGE GROUP, BELGIUM 2004-2012

	Males			Females		
Subtype	AAPC(%)	95%CI	period	AAPC(%)	95%CI	period
Myeloid malignancies	4.1	[2.5:5.8]		3.9	[2.3:5.5]	
Acute myeloid leukaemia	2.0	[-1.2:5.3]		1.7	[-1.3:4.8]	
Myelodysplastic syndrome	4.5	[1.6:7.5]		4.3	[1.3:7.4]	
Myelodysplastic/myeloproliferative neoplasms	4.4	[0.1:8.9]		-0.4	[-3.5:2.8]	
	11.3	[1.9:21.6]	2004-2008			
	-2.1	[-9.7:6.2]	2008-2012			
Myeloproliferative neoplasms	5.2	[2.0:8.5]		6.6	[4.2:9.0]	
	-4.9	[-18.9:11.6]	2004-2006			
	8.8	[6.4:11.4]	2006-2012			
Myeloid neoplasms, NOS	-9.1	[-13.9:-4.2]		-4.0	[-12.5:5.3]	
Age	AAPC(%)	95%CI	period	AAPC(%)	95%CI	period
0-29 years	4.3	[-1.8:10.8]		5.3	[-0.7:11.7]	
30-44 years	2.7	[0.4:5.1]		0.0	[-4.2:4.5]	
45-59 years	4.5	[1.6:7.5]		5.5	[2.4:8.8]	
60-74 years	3.2	[1.6:4.9]		3.2	[1.2:5.2]	
75+	5.9	[2.9:9.0]		4.9	[2.1:7.7]	

AAPC: average annual percentage change (2004-2012)

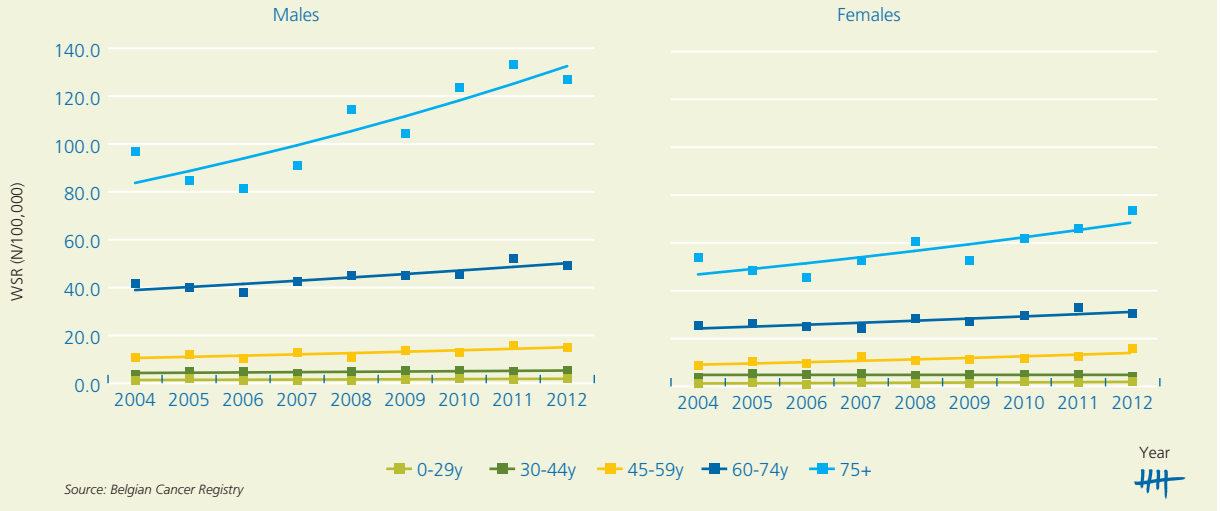
Period: When a joinpoint occured, APC's are calculated for the period before and after the joinpoint. This column represents the corresponding interval. AAPC's are always calculated over the entire study-period (2004-2012).

FIGURE 106 MYELOID MALIGNANCIES: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 107 MYELOID MALIGNANCIES: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

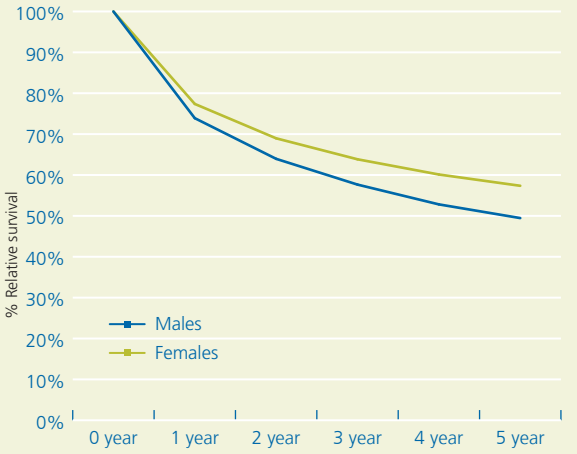


Source: Belgian Cancer Registry

Relative Survival

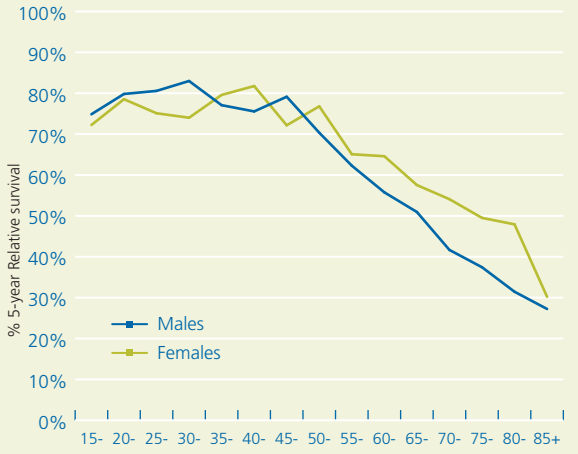
- Prognosis for myeloid malignancies is worse in males (49%) than in females (57%) **(Figure 108).**
- The age-specific 5-year relative survival rates remain quite stable (above 70%) until the age of 50 years. After the age of 50 years, the survival rates decrease with increasing age **(Figure 109).**
- Survival rates differ between the different myeloid subtypes **(Figure 14)**. Compared to the Eurocare-5 results (based on the incidence years 2000-2007), the 5-year relative survival rates in Belgium are high **(Figure 110).**

FIGURE 108 MYELOID MALIGNANCIES: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 109 MYELOID MALIGNANCIES: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 110 MYELOID MALIGNANCIES (AML AND CML): AGE-STANDARDISED 5-YEAR RELATIVE SURVIVAL, BELGIUM (2004-2012) AND EUROCARE-5 RESULTS (2000-2007) (32). (RESULTS FOR BELGIUM FROM THE EUROCARE-5 STUDY REPRESENTED DATA FOR THE FLEMISH REGION 2000-2007)

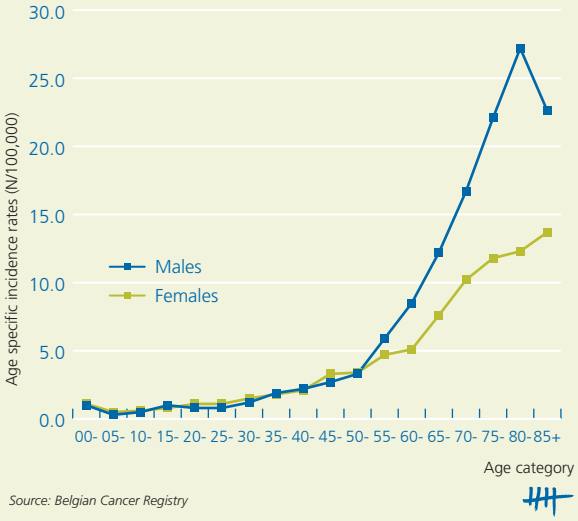
Source: Belgian Cancer Registry

3.2.1 ACUTE MYELOID LEUKAEMIA (AML)

Incidence

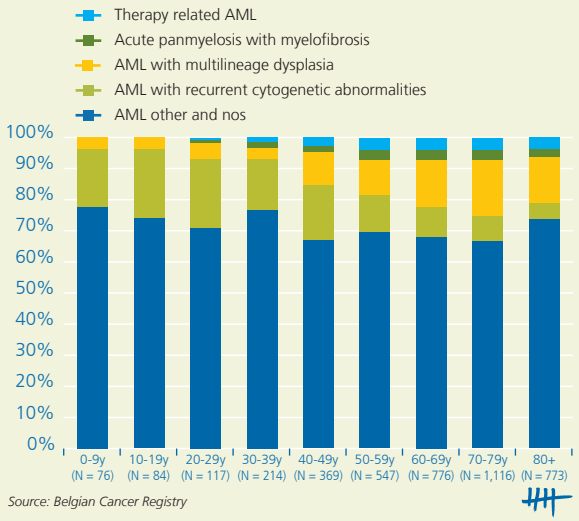
- Belgium 2012: 502 new diagnoses
  - 281 males (56%)
  - 221 females (44%)
- Average age at diagnosis: 64 years in males, 63 years in females.
  - A gradual increase is observed in age-specific incidence rates until the age of 50 years **(Figure 111).**
  - In these young age groups, slightly more females are diagnosed than males (M/F ratio = 0.9).
  - After the age of 50 years, the rates increase more rapidly with age, especially in males resulting in a male/female ratio of 1.5.
  - The all ages male/female ratio is 1.3.

FIGURE 111 ACUTE MYELOID LEUKAEMIA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 112 ACUTE MYELOID LEUKAEMIA: INCIDENCE BY SUBTYPE AND AGE GROUP, BELGIUM 2004-2012



Source: Belgian Cancer Registry

In the WHO classification of 2008 (15) AMLs are divided into four hierarchical groups. The code for the group "AML other and NOS" is assigned only if the case cannot be assigned to any of the three other categories. Haemacare classified the acute panmyelosis with myelofibrosis in an additional fifth subgroup (16; 31).

1. **AML other and NOS** (70%)
   - The majority of AML diagnoses could not be assigned to any of the other AML subtypes.
2. **AML with recurrent cytogenetic abnormalities** (10%)
   - Their relative frequency is higher in younger age groups.
3. **AML with multilineage dysplasia** (14%)
   - Their relative frequency increases with age.
4. **Acute panmyelosis with myelofibrosis** (4%)
5. **Therapy related AML** (5%)

Key note for registration:

Actively look for more information in order to obtain a more specific disease characterisation.

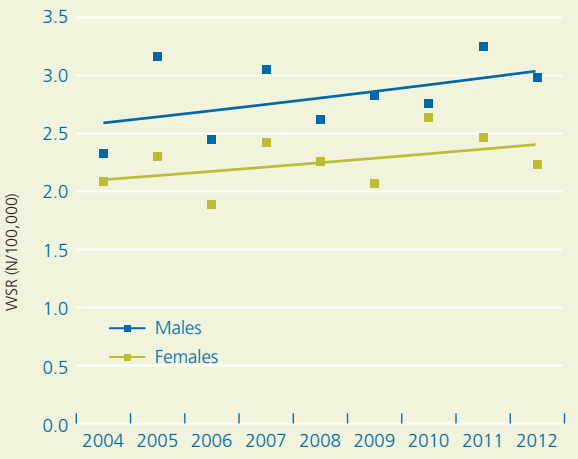
In hierarchical order, AML should be specified by:

1. Searching for **cytogenetic features** to identify AML with recurrent cytogenetic abnormalities.
2. Then by looking for information to potentially diagnose AML with **multilineage dysplasia**
3. If still no result, check previous **chemotherapy/radio-therapy** regimens (therapy related AML)
4. The last step is to try and characterise AML (using the remaining 'AML other' codes) by incorporating **cytological or immunophenotypic** features.

Trends

- The incidence rates in males and females increase over time **(Figure 113).**
- Trends by age group reveal a significant increase in males older than 75 years of age **(Table 19 and Figure 114).**

FIGURE 113 ACUTE MYELOID LEUKAEMIA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



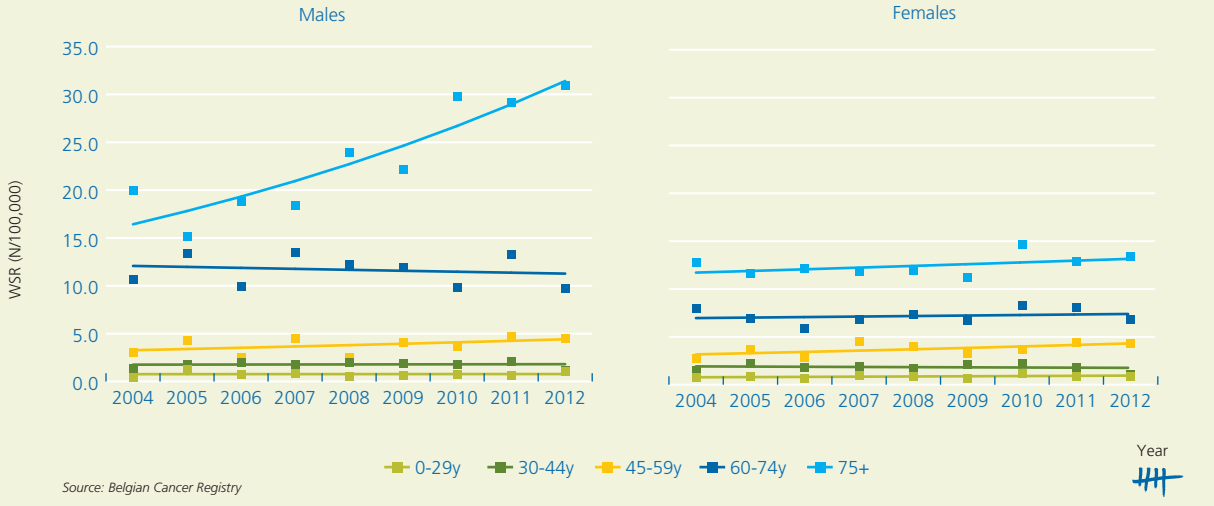
Source: Belgian Cancer Registry

TABLE 19 ACUTE MYELOID LEUKAEMIA: AAPC(%) BY SEX AND AGE GROUP, BELGIUM 2004-2012

	Males		Females	
Age	AAPC(%)	95%CI	AAPC(%)	95%CI
All Ages	2.0	[-1.2:5.3]	1.7	[-1.3:4.8]
0-29 years	0.2	[-9.3:10.7]	2.5	[-3.3:8.7]
30-44 years	0.3	[-5.7:6.8]	-1.0	[-7.5:5.9]
45-59 years	3.8	[-2.8:10.9]	3.9	[-0.7:8.8]
60-74 years	-0.9	[-5.2:3.7]	0.8	[-2.6:4.2]
75+	8.4	[4.7:12.2]	1.5	[-1.0:4.0]

AAPC: average annual percentage change (2004-2012)

FIGURE 114 ACUTE MYELOID LEUKAEMIA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012



Source: Belgian Cancer Registry

Relative Survival

- AML has a poor prognosis, the 5-year relative survival rates are 24% in males and 29% in females **(Figure 115).**
- The highest survival rates are observed below the age of 50 years. From the age of 50 years, survival rates decrease rapidly **(Figure 116).**
- Different survival rates are observed between the AML subgroups **(Figure 117).**
  - AML with recurrent cytogenetic abnormalities has higher 5-year relative survival rates than AML other and NOS and AML with multilineage dysplasia.
  - Five-year survival rates could not be calculated for therapy-related AML and acute panmyelosis with myelofibrosis due to the low numbers at risk.

FIGURE 115 ACUTE MYELOID LEUKAEMIA RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012

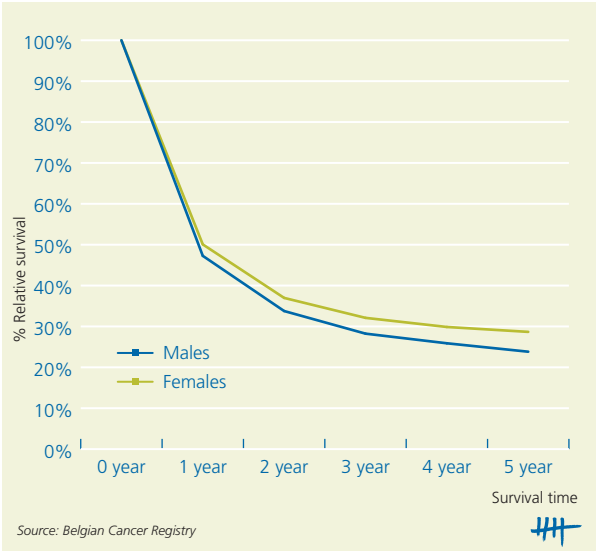


FIGURE 116 ACUTE MYELOID LEUKAEMIA: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012

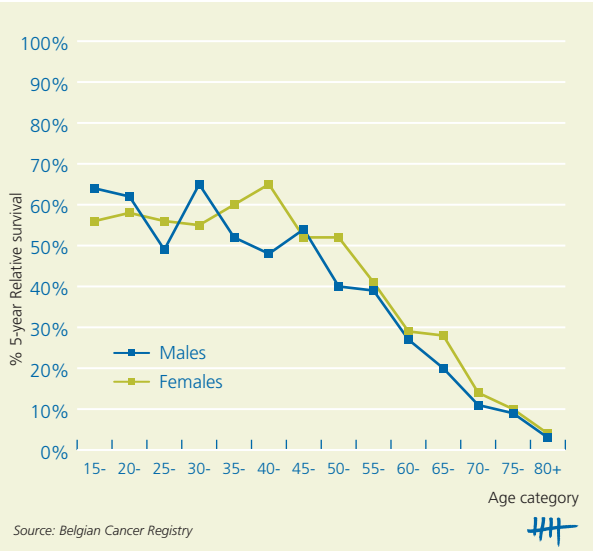
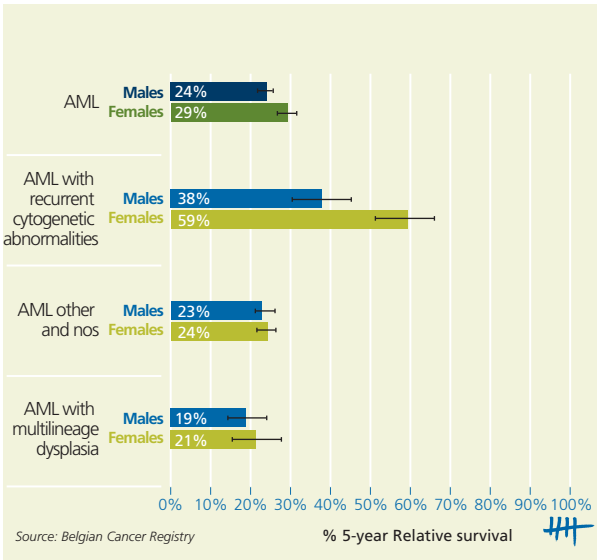


FIGURE 117 ACUTE MYELOID LEUKAEMIA 5-YEAR RELATIVE SURVIVAL BY SEX AND SUBTYPE, BELGIUM 2004-2012



3.2.1.1 AML OTHER AND NOS*

Incidence

- Belgium 2012: 343 new diagnoses
  - 189 males (55%)
  - 154 females (45%)
- Average age at diagnosis: 64 years in males and 63 years in females.
  - A gradual increase is observed in age-specific incidence rates until the age of 50 years **(Figure 118).** In these young age groups, slightly more females are diagnosed than males (M/F ratio = 0.9).
  - After the age of 50 years, the rates increase more rapidly with age, especially in males resulting in a male/female ratio of 1.5.
  - The all ages male/female ratio is 1.2.

FIGURE 118 ACUTE MYELOID LEUKAEMIA OTHER AND NOS: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

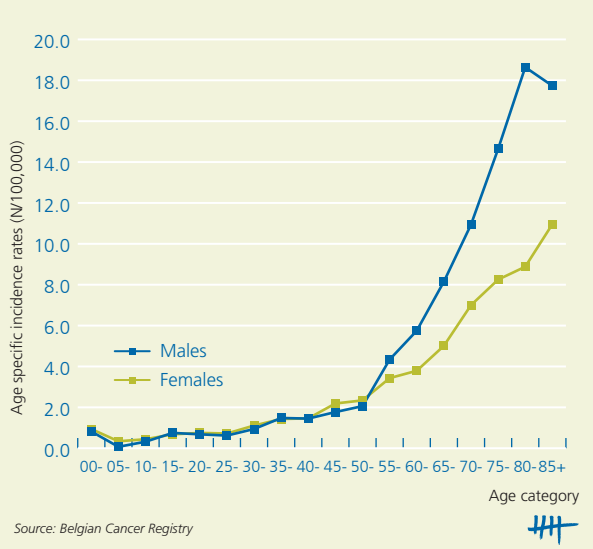
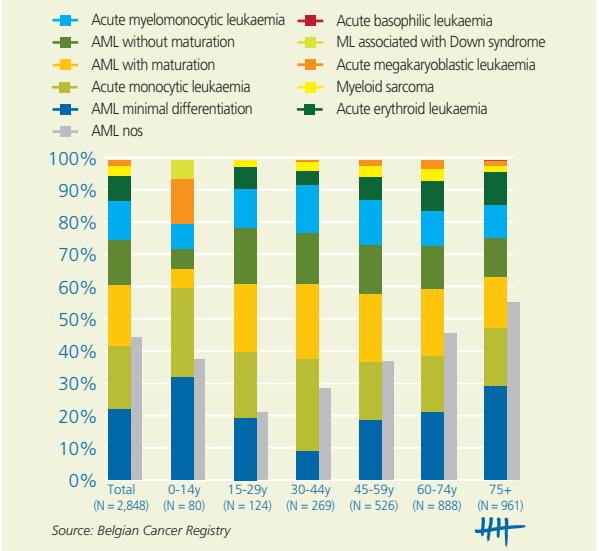


FIGURE 119 ACUTE MYELOID LEUKAEMIA OTHER AND NOS: INCIDENCE BY SUBTYPE AND AGE GROUP, BELGIUM 2004-2012



AML other and NOS is a large group which consists of 11 histological malignancies **(Figure 119).**

1. AML, NOS (44%)
- Belgium 2004-2012: 1,256 new diagnoses, 653 males and 603 females.
- Relatively less frequent in young adults (15-29 years). With increasing age more cases are diagnosed as AML, NOS.

2. AML with minimal differentiation (22% excl. AML, NOS)
- Belgium 2004-2012: 344 new diagnoses, 182 males and 162 females.

3. Acute monocytic leukaemia (20% excl. AML, NOS)
- Belgium 2004-2012: 314 new diagnoses, 165 males and 149 females.

4. AML with maturation (19% excl. AML, NOS)
- Belgium 2004-2012: 310 new diagnoses, 173 males and 137 females.

5. AML without maturation (14% excl. AML, NOS)
- Belgium 2004-2012: 221 new diagnoses, 104 males and 117 females.

6. Acute myelomonocytic leukaemia (12% excl. AML, NOS)
- Belgium 2004-2012: 189 new diagnoses, 105 males and 84 females.

**In the WHO classification of 2008 (15) AMLs are divided into four hierarchical groups. The code for the group "AML other and NOS" is assigned only if the case cannot be assigned to any of the three other categories. Haemacare classified the acute panmyelosis with myelofibrosis in an additional fifth subgroup (16; 31).*

7. Acute erythroid leukaemia (8% excl. AML, NOS)

- Belgium 2004-2012: 130 new diagnoses, 78 males and 52 females.

8. Myeloid sarcoma (3% excl. AML, NOS)

- Belgium 2004-2012: 44 new diagnoses, 24 males and 20 females.

9. Acute megakaryoblastic leukaemia (2% excl. AML, NOS)

- Belgium 2004-2012: 36 new diagnoses, 19 males and 17 females.

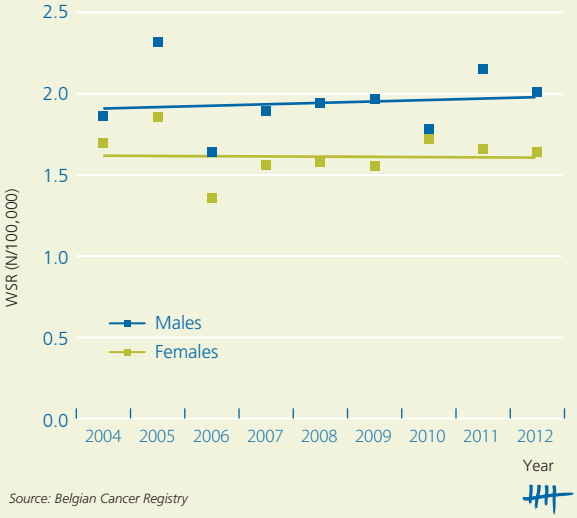
10. Myeloid leukaemia associated with Down syndrome: 3 children are registered in Belgium between 2004 and 2012

11. Acute basophilic leukaemia: Only 1 case is registered in Belgium between 2004 and 2012

Trends

- No significant changes are observed in the incidence for AML other and NOS **(Figure 120).**
- In the oldest age group, incidence rates increase in males and decrease in females **(Table 20 and Figure 121).**

FIGURE 120 ACUTE MYELOID LEUKAEMIA OTHER AND NOS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

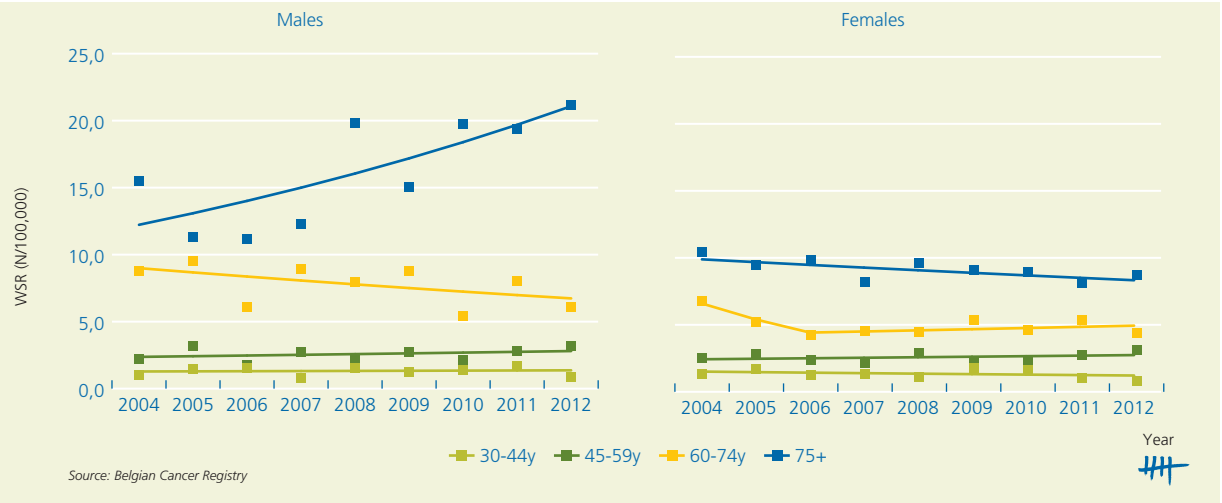
TABLE 20 ACUTE MYELOID LEUKAEMIA OTHER AND NOS: AAPC(%) BY SEX AND AGE GROUP, BELGIUM 2004-2012

	Males		Females		
Age	AAPC(%)	95%CI	AAPC(%)	95%CI	Period
All Ages	0.5	[-2.7:3.7]	-0.1	[-2.8:2.7]	
30-44 y	0.8	[-7.3:9.6]	-2.7	[-9.6:4.9]	
45-59 y	2.1	[-3.5:8.1]	1.5	[-2.4:5.6]	
60-74 y	-3.6	[-8.7:1.8]	-3.5	[-10.6:4.1]	
			-18.1	[-44.1:19.9]	2004 2006
			1.9	[-4.9:9.1]	2006 2012
75+	7.0	[1.6:12.8]	-2.1	[-4.0:-0.2]	

AAPC: average annual percentage change (2004-2012)

Period: When a joinpoint occured, APC's are calculated for the period before and after the joinpoint. This column represents the corresponding interval. AAPC's are always calculated over the entire study-period (2004-2012).

FIGURE 121 ACUTE MYELOID LEUKAEMIA OTHER AND NOS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

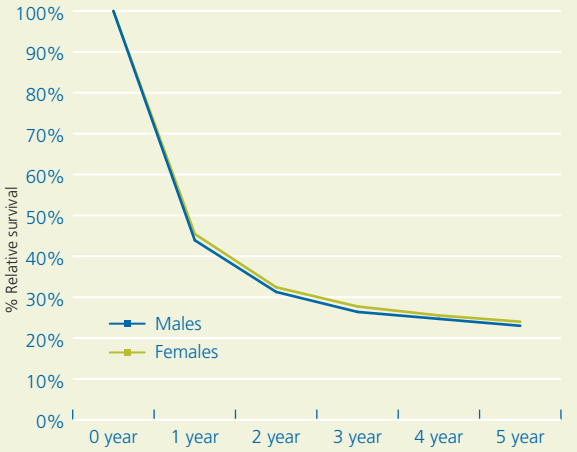


Source: Belgian Cancer Registry

Relative Survival

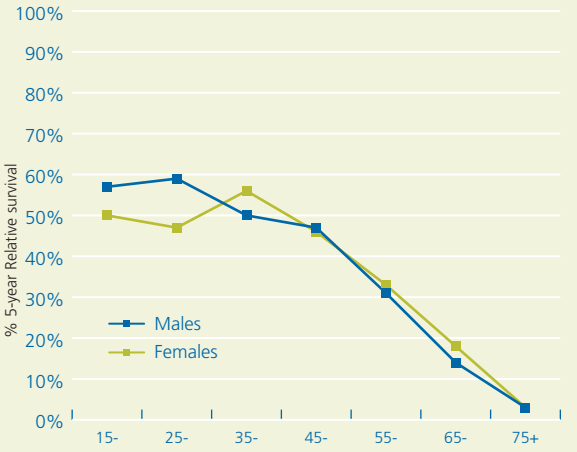
- The five-year relative survival rates are 23% in males and 24% in females **(Figure 122).**
- The age-specific survival rates decrease rapidly with increasing age and become very low in the oldest age groups **(Figure 123).**
- Rapid decrease in age-specific 5-year relative survival rates. Patients older than 75 years of age have a 5-year relative survival rate of 3 %.
- Survival is low for all subtypes **(Figure 124).**

FIGURE 122 ACUTE MYELOID LEUKAEMIA OTHER AND NOS: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



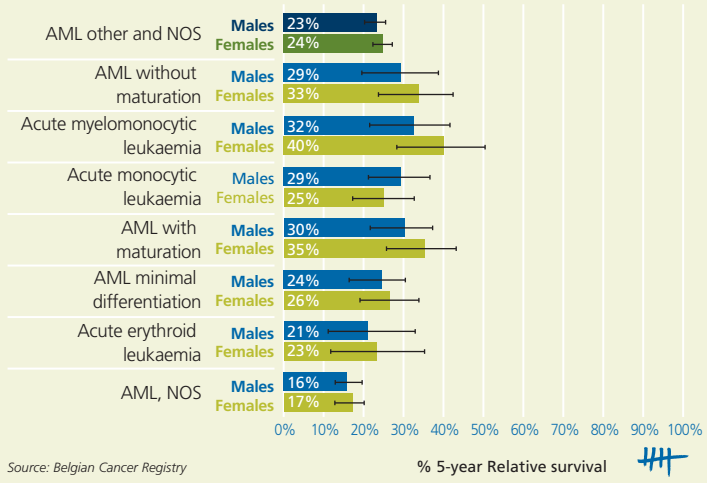
Source: Belgian Cancer Registry

FIGURE 123 ACUTE MYELOID LEUKAEMIA OTHER AND NOS: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 124 ACUTE MYELOID LEUKAEMIA OTHER AND NOS: 5-YEAR RELATIVE SURVIVAL BY SEX AND SUBTYPE, BELGIUM 2004-2012



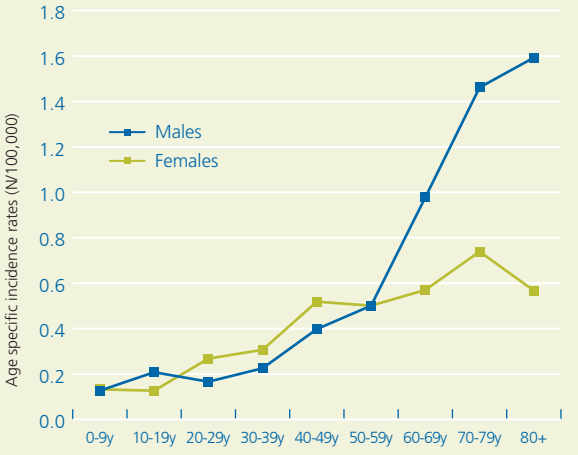
Source: Belgian Cancer Registry

3.2.1.2 AML WITH RECURRENT CYTOGENETIC ABNORMALITIES

Incidence

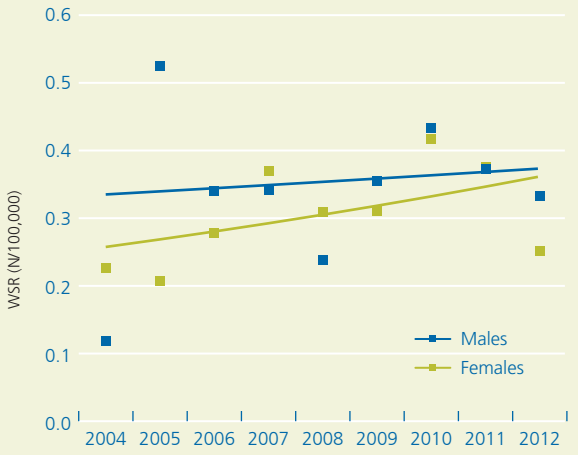
- Belgium 2012: 46 new diagnoses.
  - 23 males (50%)
  - 23 females (50%)
- Average age at diagnosis: 57 years in males, 53 years in females.
  - Age-specific incidence rates increase gradually with age **(Figure 125).**
  - In males, a steep increase in incidence rates is observed from the age of 60 years.
  - The male/female ratio is 1.1.

FIGURE 125 ACUTE MYELOID LEUKAEMIA WITH RECURRENT CYTOGENETIC ABNORMALITIES: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 126 ACUTE MYELOID LEUKAEMIA WITH RECURRENT CYTOGENETIC ABNORMALITIES: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

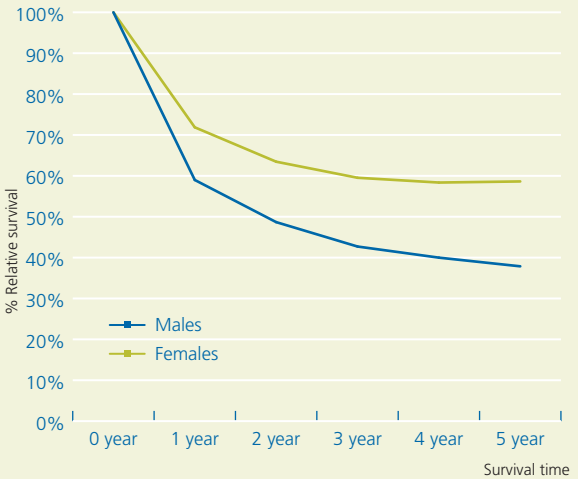
Trends

- The incidence rates for AML with recurrent cytogenetic abnormalities increase in males and females **(Figure 126),** but the trend was not statistically significant.
  - Males: AAPC = 1.4% [-9.3:13.2]
  - Females: AAPC = 4.3% [-2.9:12.0]

Relative Survival

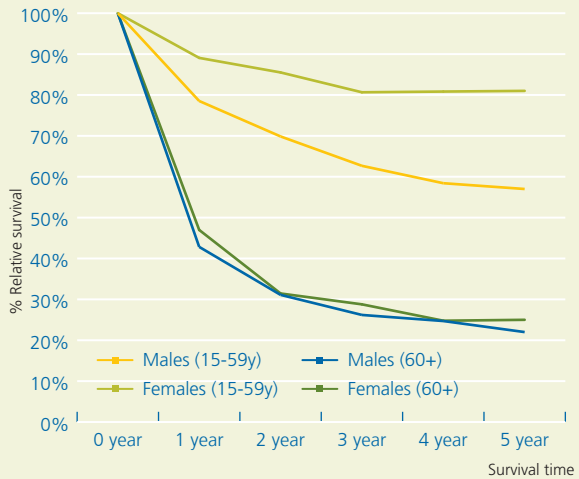
- The 5-year relative survival rates for AML with recurrent cytogenetic abnormalities are lower in males (38%) than in females (59%) **(Figure 127).**
- However, in the oldest patients, this difference cannot be observed. Above the age of 60 years, 5-year relative survival rates are 22% and 25% in males and females respectively. In patients under the age of 60 years, the 5-year relative survival rate in males (57%) is worse than in females (81%) **(Figure 128).**

FIGURE 127 ACUTE MYELOID LEUKAEMIA WITH RECURRENT CYTOGENETIC ABNORMALITIES: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 128 ACUTE MYELOID LEUKAEMIA WITH RECURRENT CYTOGENETIC ABNORMALITIES: RELATIVE SURVIVAL BY SEX AND AGE GROUP, BELGIUM 2004-2012



Source: Belgian Cancer Registry

3.2.1.3 AML WITH MULTILINEAGE DYSPLASIA

Incidence

- Belgium 2012: 70 new diagnoses.
  - 44 males (63%)
  - 26 females (37%)
- Average age at diagnosis: 68 years in males and 69 years in females.
  - Incidence rates increase from the age of 50 years **(Figure 129).**
  - Male predominance: male/female ratio = 1.9.

FIGURE 129 ACUTE MYELOID LEUKAEMIA WITH MULTILINEAGE DYSPLASIA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

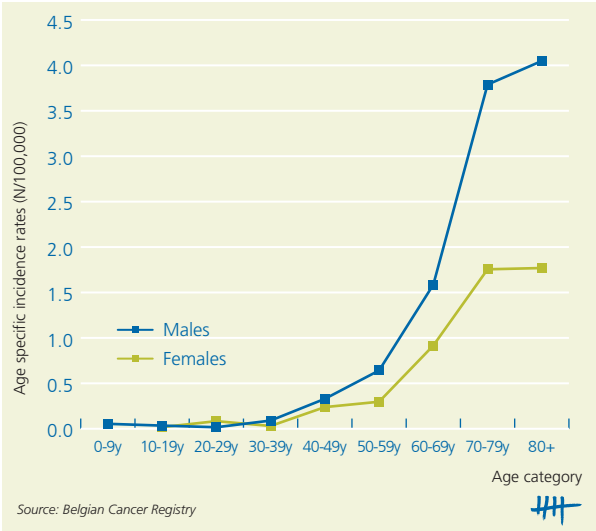


FIGURE 130 ACUTE MYELOID LEUKAEMIA WITH MULTILINEAGE DYSPLASIA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012

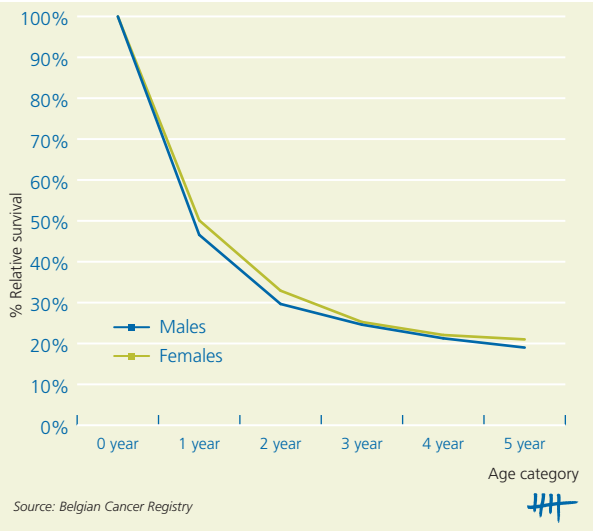
Trends

- Between 2004 and 2012, the incidence rates seem to increase in both sexes **(Figure 130).**
  - Males: AAPC = 2.6% [-7.3:13.6]
  - Females: AAPC = 2.3% [-12.1:19.0]

Relative Survival

- Prognosis is poor; the 5-year relative survival rates are comparable in males (19%) and females (21%) **(Figure 131).**

FIGURE 131 ACUTE MYELOID LEUKAEMIA WITH MULTILINEAGE DYSPLASIA: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



3.2.1.4 ACUTE PANMYELOSIS WITH MYELOFIBROSIS

Incidence

- Belgium 2012: 18 new diagnoses
  - 12 males (67%)
  - 6 females (33%)
- Average age at diagnosis: 67 years in males and 68 years in females.
  - The disease mainly affects patients of 50 years and older **(Figure 132).**
  - Male/female ratio is 2.0.

FIGURE 132 ACUTE PANMYELOSIS WITH MYELOFIBROSIS: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

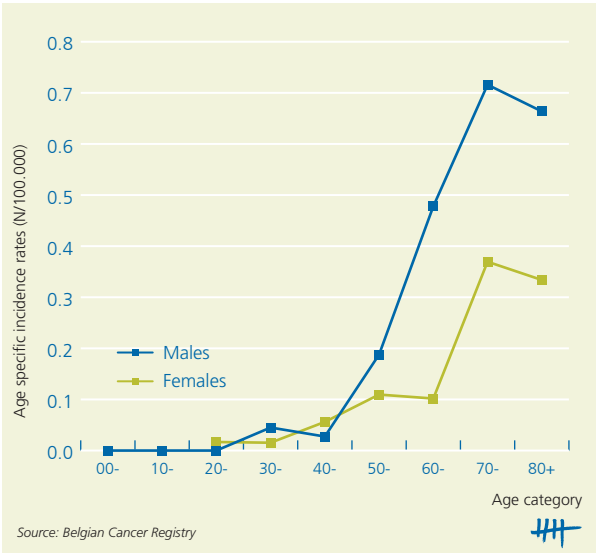
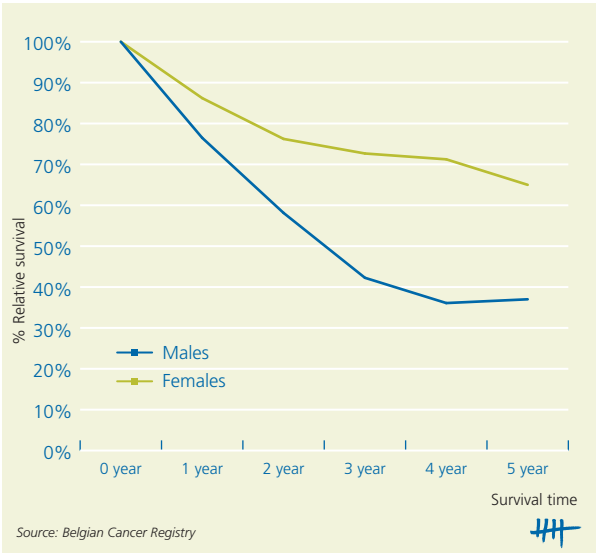


FIGURE 133 ACUTE PANMYELOSIS WITH MYELOFIBROSIS: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Relative Survival

- Females (65% 5-year relative survival) have a better prognosis than males (37% 5-year relative survival) **(Figure 133)**.

3.2.1.5 THERAPY-RELATED AML

Incidence

- Belgium 2012: 25 new diagnoses
  - 13 males (52%)
  - 12 females (48%)
- Average age at diagnosis: 70 years in males and 66 years in females.
  - The majority of cases are diagnosed after the age of 50 years **(Figure 134).**
  - Between 2004 and 2012, more females were diagnosed than males (M/F ratio = 0.8).

FIGURE 134 THERAPY-RELATED AML: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

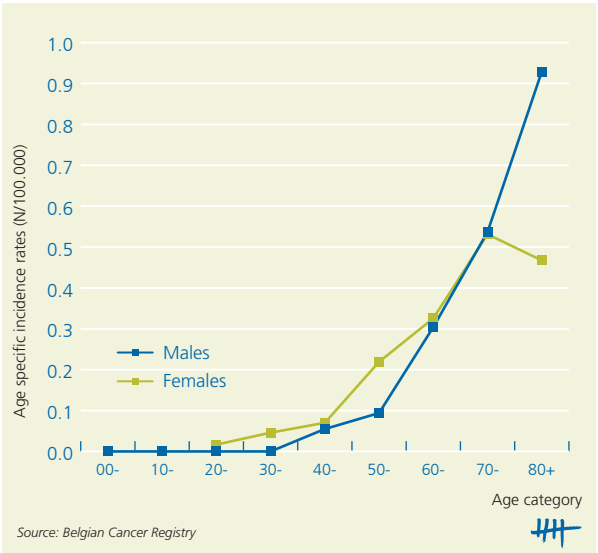
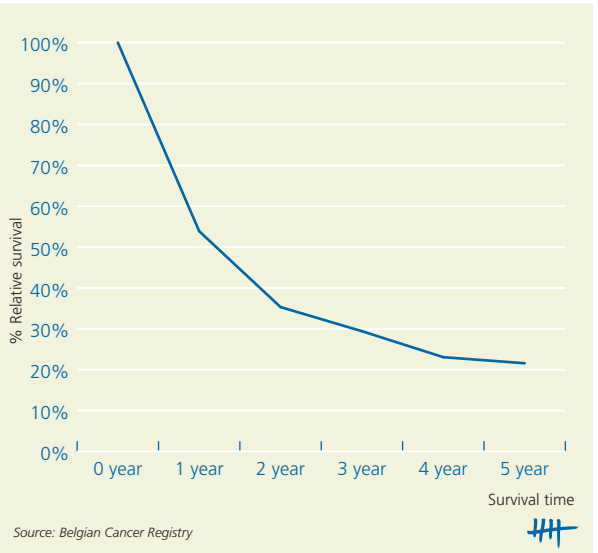


FIGURE 135 THERAPY-RELATED AML: RELATIVE SURVIVAL IN BOTH SEXES, BELGIUM 2004-2012



Relative Survival

- Therapy-related AML has a poor prognosis (22% 5-year relative survival) **(Figure 135).**

3.2.2 MYELOPROLIFERATIVE NEOPLASMS (MPN)

Incidence

- Belgium 2012: 761 new diagnoses
  - 374 males (49%)
  - 387 females (51%)
- Average age at diagnosis: 64 years in males and 65 years in females.
  - Age-specific incidence rates increase gradually at an early age **(Figure 136).**
  - After the age of 50 years, the rates increase more rapidly.
  - Male/female ratio is 1.2.

FIGURE 136 MYELOPROLIFERATIVE NEOPLASMS: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

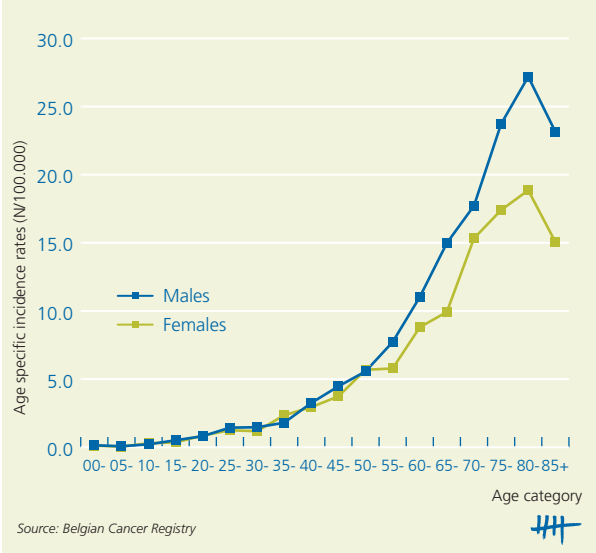
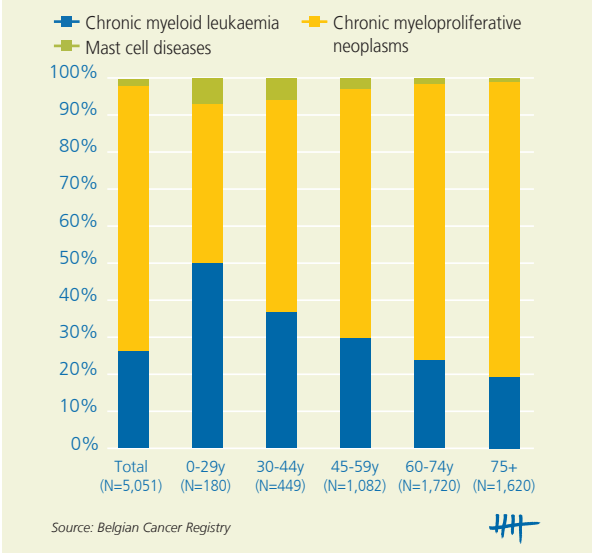


FIGURE 137 MYELOPROLIFERATIVE NEOPLASMS: INCIDENCE BY SUBTYPE AND AGE GROUP, BELGIUM 2004-2012



Haemacare/WHO classification (see chapter 2.1) differentiates the MPN into chronic myeloid leukaemia (CML) and other MPN. The latter group is separated into a group combining all specified chronic MPN, another group with just the unspecified chronic MPN and a third group with mast cell diseases. In this publication, we focussed on three separate groups, namely CML, chronic MPN (specified + unspecified in one chapter) and mast cell diseases **(Figure 137).**

1. Chronic myeloid leukaemia (CML)

- Accounts for 25% of MPN.
- Relative frequency decreases with age from 51% in patients younger than 30 years of age to 19% in the age group 75+.

2. Chronic myeloproliferative neoplasms

- Represents 73% of the MPN cases.
- Relative frequency increases with age from 43% in patients younger than 30 years of age to 80% in the age group 75+.

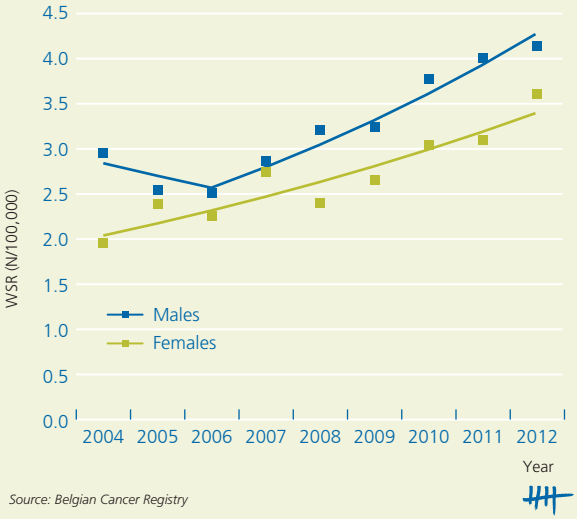
3. Mast cell diseases

- 2% of the MPN diagnoses.
- Represent 7% of all cases in patients younger than 30 years.

Trends

- Incidence rates for MPN increase significantly in both sexes **(Figure 138).** New findings in the molecular biology (JAK-2 and similar activating mutations) have probably contributed to the rise in incidence rates for MPN, due to an increased recognition of different MPN subtypes (15).
- The incidence rates increase in all age groups **(Table 21 and Figure 139).**

FIGURE 138 MYELOPROLIFERATIVE NEOPLASMS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

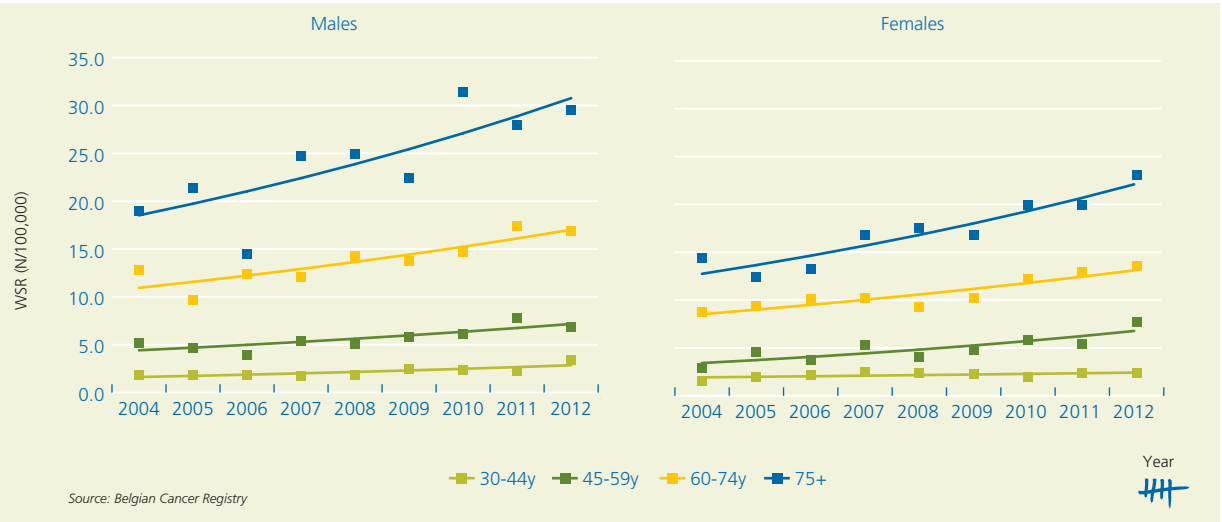
TABLE 21 MYELOPROLIFERATIVE NEOPLASMS: AAPC(%) BY SEX AND AGE GROUP, BELGIUM 2004-2012

	Males			Females	
Age	AAPC(%)	95%CI	Period	AAPC(%)	95%CI
All Ages	5.2	[2.0:8.5]		6.6	[4.2:9.0]
	-4.9	[-18.9:11.6]	2004 2006		
	8.8	[6.4:11.4]	2006 2012		
30-44 y	7.3	[2.9:11.9]		2.9	[-0.7:6.7]
45-59 y	6.2	[2.4:10.2]		8.9	[3.7:14.4]
60-74 y	5.7	[2.7:8.7]		5.5	[3.4:7.7]
75+	6.5	[1.8:11.5]		7.1	[4.6:9.7]

AAPC: average annual percentage change (2004-2012)

Period: When a joinpoint occured, APC's are calculated for the period before and after the joinpoint. This column represents the corresponding interval. AAPC's are always calculated over the entire study-period (2004-2012).

FIGURE 139 MYELOPROLIFERATIVE NEOPLASMS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

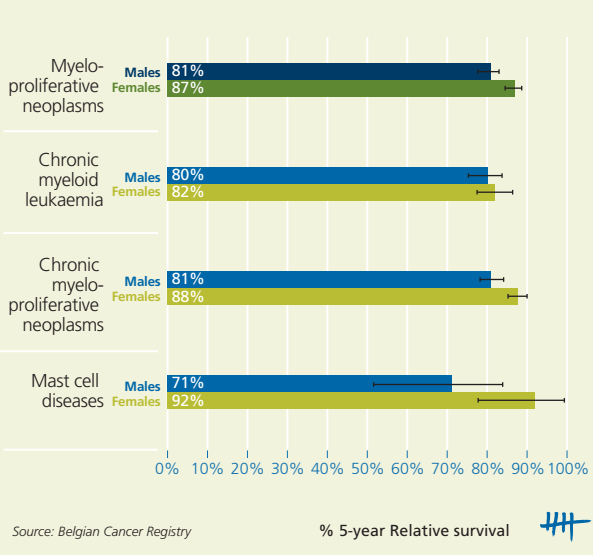


Source: Belgian Cancer Registry

Relative Survival

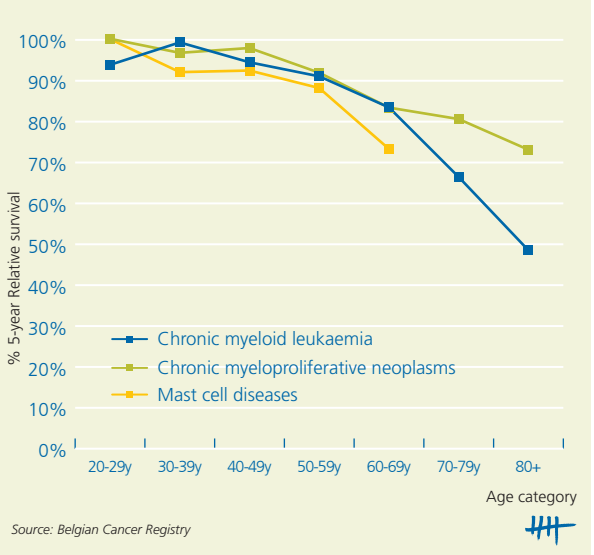
- MPN have a rather good prognosis: 5-year relative survival of 81% in males and 87% in females **(Figure 140).**
- Between the different subtypes, the survival rates are fairly similar **(Figure 140).**
- Age-specific survival rates decrease gradually with age **(Figure 141).** In the oldest age groups, there is more difference between the main subtypes.

FIGURE 140 MYELOPROLIFERATIVE NEOPLASMS: 5-YEAR RELATIVE SURVIVAL BY SEX AND SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 141 MYELOPROLIFERATIVE NEOPLASMS: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

3.2.2.1 CHRONIC MYELOID LEUKAEMIA (CML)

Key note for registration:
Actively look for more information in order to obtain a more specific disease characterisation:
- 9875: CML BCR/ABL positive
- 9876: atypical CML BCR/ABL negative

Incidence

- Belgium 2012: 166 new diagnoses.
  - 67 males (40%)
  - 99 females (60%)
- CML contains two entities.
  - CML, NOS (N = 98 cases in 2012)
  - Chronic myelogenous leukaemia, BCR/ABL positive (N = 68 cases in 2012)*
- Average age: 59 years in males and 61 years in females.
  - Age-specific incidence rates increase gradually with age **(Figure 142).**
  - Male/female ratio is 1.3.

FIGURE 142 CHRONIC MYELOID LEUKAEMIA: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

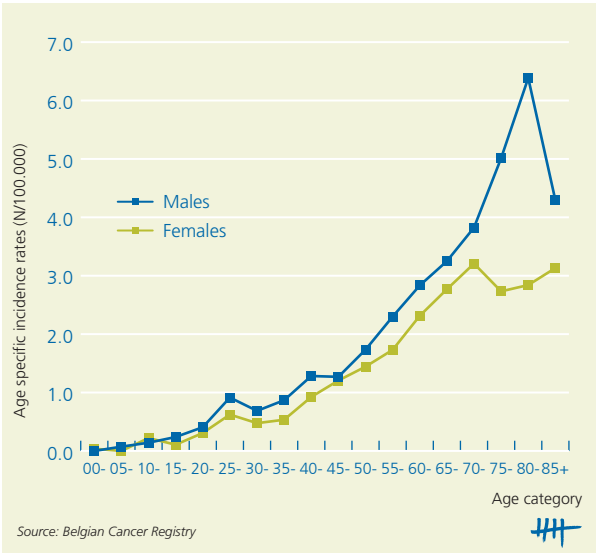
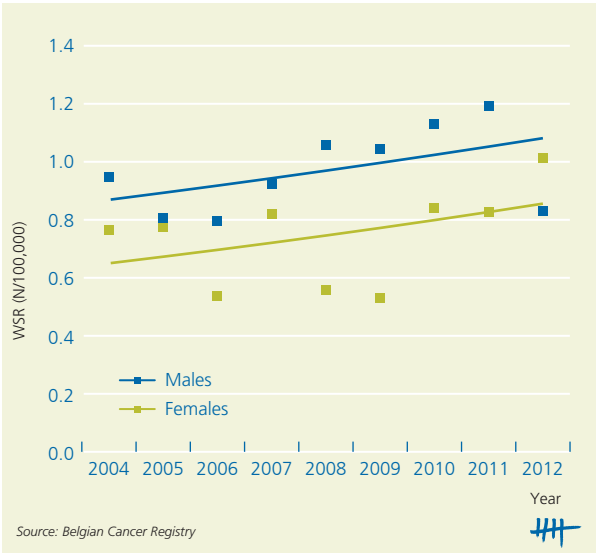


FIGURE 143 CHRONIC MYELOID LEUKAEMIA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



Trends

- The incidence rates of CML increase in both sexes **(Figure 143).**
- Trends by age group reveal significant increases in young males and older females **(Table 22 and Figure 144).**

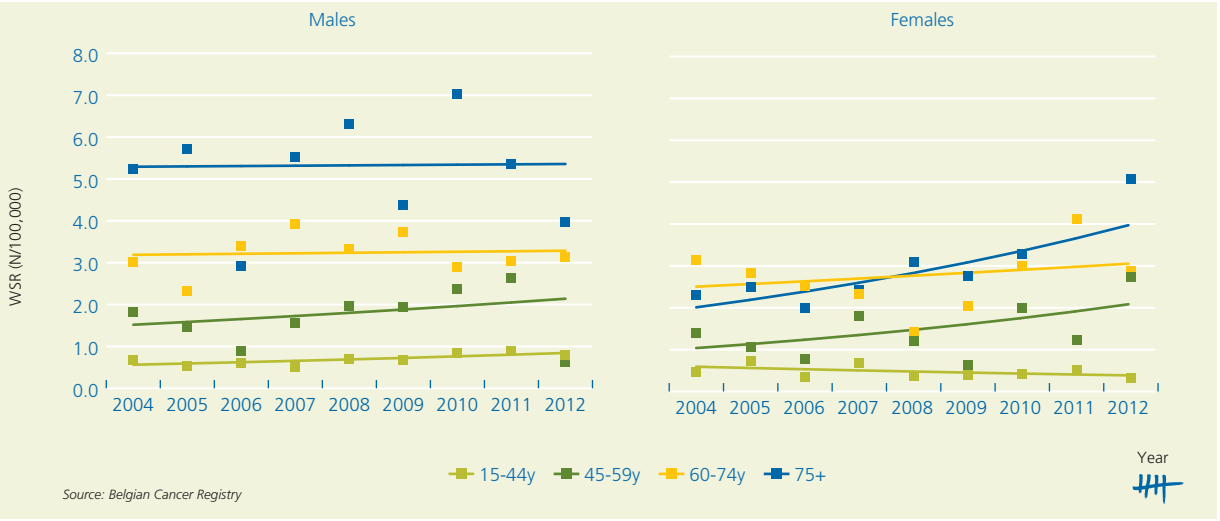
**Due to international registration practices, CML, NOS may include some cases of atypical chronic myeloid leukaemia, BCR/ABL-negative. This entity is reported in the category of myelodysplastic/myeloproliferative neoplasms. When the necessary cytogenetic or molecular biology examinations have not been performed or are not available to distinguish between BCR/ABL positive or negative CML, the diagnosis is, according to the international guidelines, coded as chronic myeloid leukaemia, NOS and thus reported here.*

TABLE 22 CHRONIC MYELOID LEUKAEMIA: AAPC(%) BY SEX AND AGE GROUP, BELGIUM 2004-2012

	Males		Females	
Age	AAPC(%)	95%CI	AAPC(%)	95%CI
All Ages	2.8	[-1.6:7.3]	3.5	[-2.7:10.1]
15-44 years	5.2	[1.1:9.5]	-5.2	[-13.1:3.3]
45-59 years	4.4	[-7.6:18.0]	9.1	[-2.6:22.2]
60-74 years	0.4	[-4.4:5.4]	2.5	[-5.5:11.2]
75+	0.2	[-7.5:8.4]	8.9	[1.9:16.3]

AAPC: average annual percentage change (2004-2012)

FIGURE 144 CHRONIC MYELOID LEUKAEMIA: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

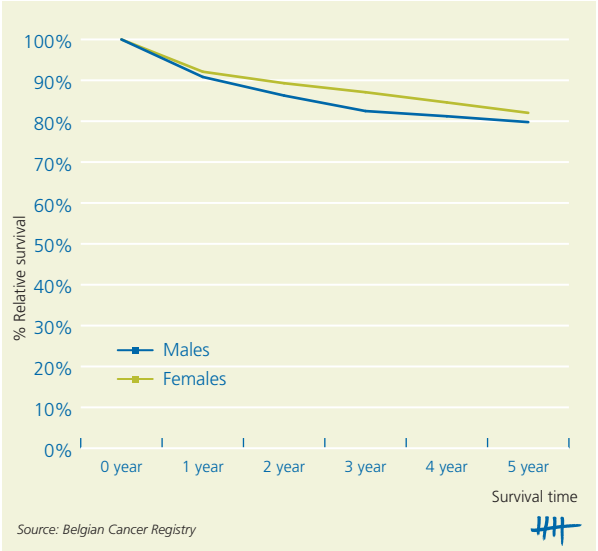


Source: Belgian Cancer Registry

Relative Survival

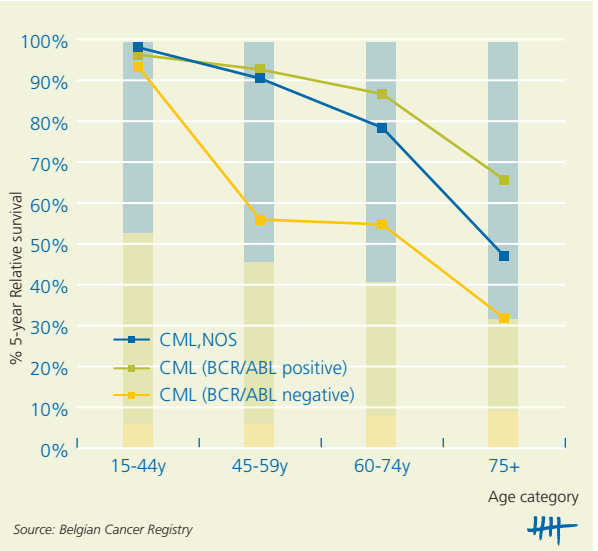
- CML has a rather good prognosis: 5-year relative survival is 80% in males and 82% in females **(Figure 145).**
- The age-specific survival rates decrease gradually with age. From the age of 50 years, the decrease for CML, NOS is more rapid than for CML (BCR/ABL positive), resulting in a poorer survival in the oldest age groups **(Figure 146).**
  - Due to international coding guidelines*, we cannot exclude that diagnoses of atypical CML (regrouped in MDS/MPN), are coded as CML, NOS. In older patients, we observe a higher percentage of CML, NOS (up to 70%), and on the other hand a higher relative frequency of atypical CML (BCR/ABL negative). It is not unlikely, that in CML, NOS in older patients more atypical CML are included than in younger patients. This could potentially explain the lower age-specific survival rates for CML, NOS when compared to CML (BCR/ABL positive) cases in older patients **(Figure 146).**

FIGURE 145 CHRONIC MYELOID LEUKAEMIA: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 146 CHRONIC MYELOID LEUKAEMIA (INCL. CML (BCR/ABL NEGATIVE)) AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL AND RELATIVE FREQUENCY BY SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

3.2.2.2 CHRONIC MYELOPROLIFERATIVE NEOPLASMS

Incidence

- Belgium 2012: 580 new diagnoses.
  - 297 males (51%)
  - 283 females (49%)
- Average age: 66 years in males and 67 years in females.
  - From the age of 35 years: rapid increase in the age-specific incidence rates **(Figure 147).**
  - Male/female ratio is 1.2.

FIGURE 147 CHRONIC MYELOPROLIFERATIVE NEOPLASMS: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

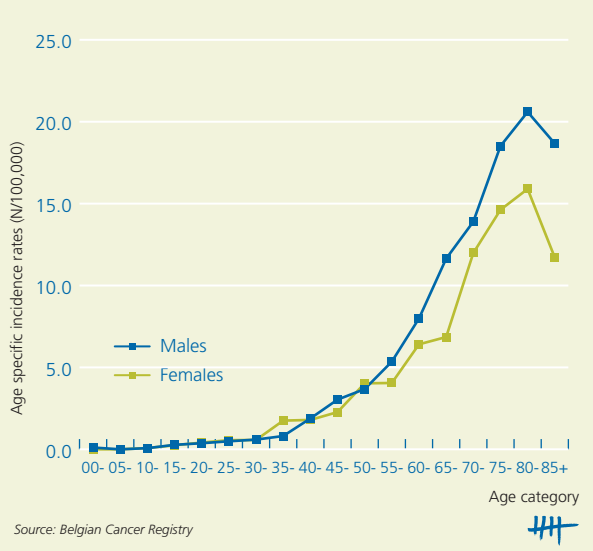


FIGURE 148 CHRONIC MYELOPROLIFERATIVE NEOPLASMS: INCIDENCE BY SUBTYPE AND AGE GROUP, BELGIUM 2004-2012

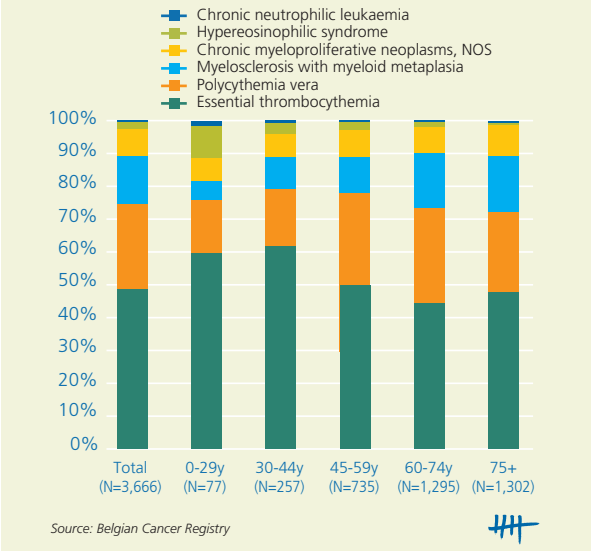


Figure 148 gives an overview of the distribution of the different histological subtypes of chronic MPN.

1. Essential thrombocythaemia (48%)
- Belgium 2012: 254 new diagnoses, 105 males and 149 females
- Male/female ratio: 0.9.

2. Polycythaemia vera (26%)
- Belgium 2012: 150 new diagnoses, 89 males and 61 females
- Male/female ratio: 1.4.

3. Myelosclerosis with myeloid metaplasia (15%)
- Belgium 2012: 110 new diagnoses, 74 males and 36 females
- Male/female ratio: 2.0.

4. Chronic myeloproliferative neoplasms, NOS (8%)
- Belgium 2012: 53 new diagnoses, 21 males and 32 females
- Male/female ratio: 1.4.

5. Hypereosinophilic syndrome (2%)
- Belgium 2012: 13 new diagnoses, 8 males and 5 females.

6. Chronic neutrophilic leukaemia (<1%)
- No cases are registered in 2012. Between 2004 and 2012, a total of 16 cases (12 males, 4 females) are registered.

Key note for registration:
Actively look for more information in order to obtain a more specific disease characterisation.
'Chronic myeloproliferative neoplasm NOS' should only be assigned to cases that have definite clinical, laboratory and morphologic features of a myeloproliferative disease, but which fail to meet the criteria for any of the specific chronic MPN entities (see codes **9950, 9961 to 9967**).

Trends

- The incidence rates for chronic MPN increase significantly in both sexes **(Figure 149).**
- Increases are observed for the different histological subtypes **(Table 23 and Figure 150).**
- The incidence rates increase in every age group **(Table 23 and Figure 151).**

FIGURE 149 CHRONIC MYELOPROLIFERATIVE NEOPLASMS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012

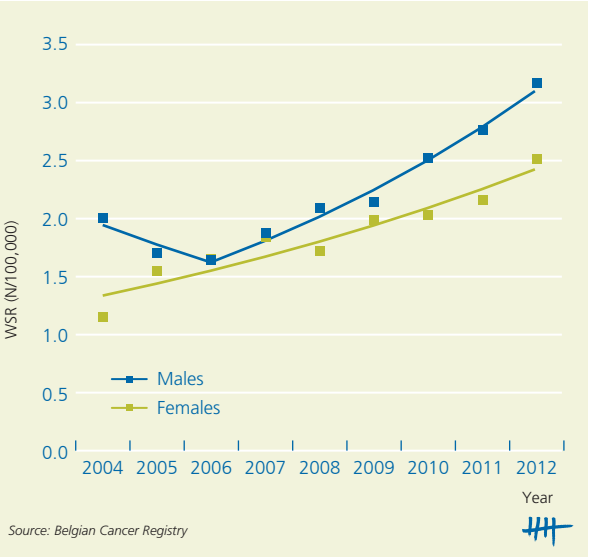


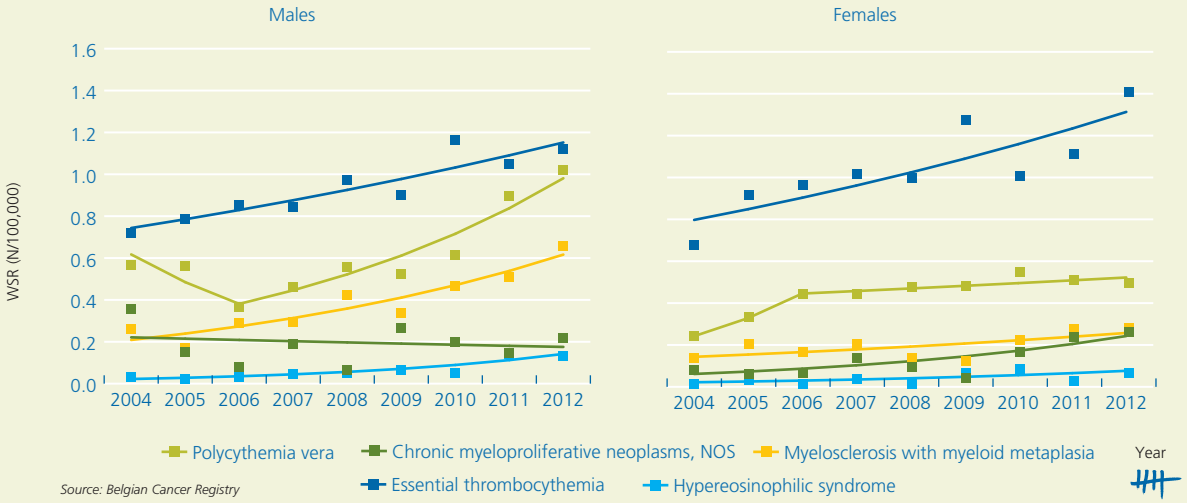
TABLE 23 CHRONIC MYELOPROLIFERATIVE NEOPLASMS: AAPC(%) BY SEX, SUBTYPE AND AGE GROUP, BELGIUM 2004-2012

	Males			Females		
Subtype	AAPC(%)	95%CI	period	AAPC(%)	95%CI	period
Chronic myeloproliferative neoplasms	6.0	[2.9:9.2]		7.7	[5.3:10.2]	
	-8.6	[-21.6:6.5]	2004-2006			
	11.4	[9.0:13.8]	2006-2012			
Chronic myeloproliferative neoplasms, NOS	-2.9	[-15.5:11.7]		18.7	[7.7:30.9]	
Essential thrombocythemia	5.6	[3.5:7.8]		6.4	[2.6:10.5]	
Myelosclerosis with myeloid metaplasia	14.5	[9.1:20.1]		7.6	[0.4:15.3]	
Polycythemia vera	6.0	[-4.0:17.0]		10.1	[3.5:17.1]	
	-21.5	[-52.9:30.9]	2004-2006	35.7	[-2.4:88.6]	2004-2006
	17.1	[8.5:26.3]	2006-2012	2.7	[-1.2:6.8]	2006-2012
Age	AAPC(%)	95%CI	period	AAPC(%)	95%CI	period
30-44 years	9.7	[2.9:17.1]		3.8	[-3.8:12.0]	
45-59 years	8.0	[2.5:13.8]		8.7	[2.2:15.6]	
	2.4	[-2.9:8.1]	2004-2010			
	26.8	[-1.0:62.5]	2010-2012			
60-74 years	7.0	[2.9:11.2]		6.7	[4.7:8.8]	
75+	8.4	[4.1:13.0]		6.8	[4.0:9.6]	

AAPC: average annual percentage change (2004-2012)

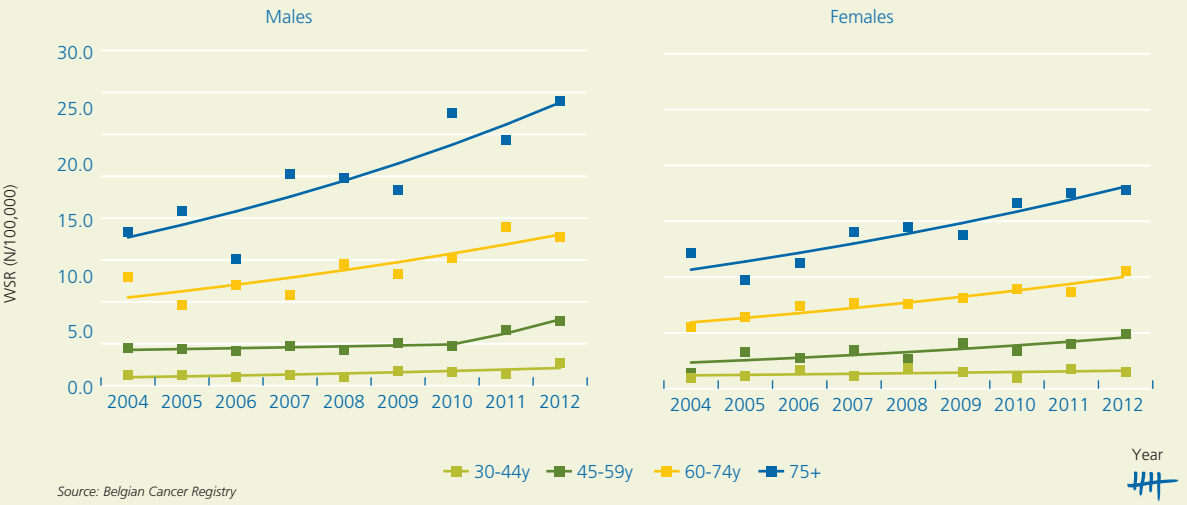
Period: When a joinpoint occured, APC's are calculated for the period before and after the joinpoint. This column represents the corresponding interval. AAPC's are always calculated over the entire study-period (2004-2012).

FIGURE 150 CHRONIC MYELOPROLIFERATIVE NEOPLASMS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 151 CHRONIC MYELOPROLIFERATIVE NEOPLASMS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012



Source: Belgian Cancer Registry

Relative Survival

- Five-year relative survival rates for chronic MPN are 81% in males and 88% in females **(Figure 152).**
- The survival rates differ by subtype **(Figure 153).**
- Age-specific survival rates decrease with increasing age **(Figure 154).** The 5-year survival rates for chronic myeloproliferative neoplasms, NOS and for myelosclerosis with myeloid metaplasia, which has the worst prognosis in all age groups, decreases more rapidly with increasing age.

FIGURE 152 CHRONIC MYELOPROLIFERATIVE NEOPLASMS: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012

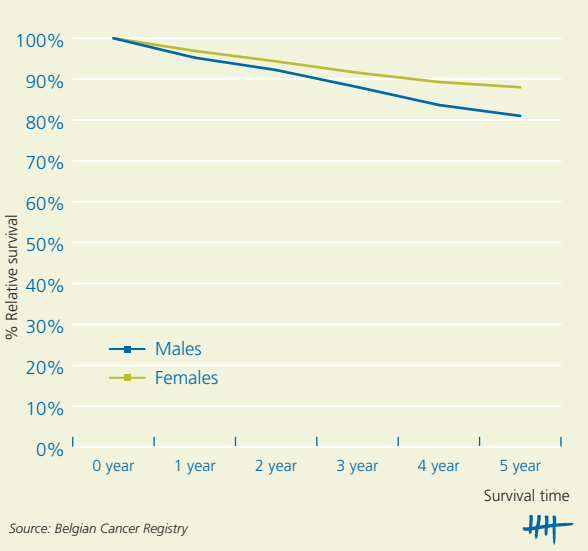


FIGURE 153 CHRONIC MYELOPROLIFERATIVE NEOPLASMS: 5-YEAR RELATIVE SURVIVAL BY SEX AND SUBTYPE, BELGIUM 2004-2012

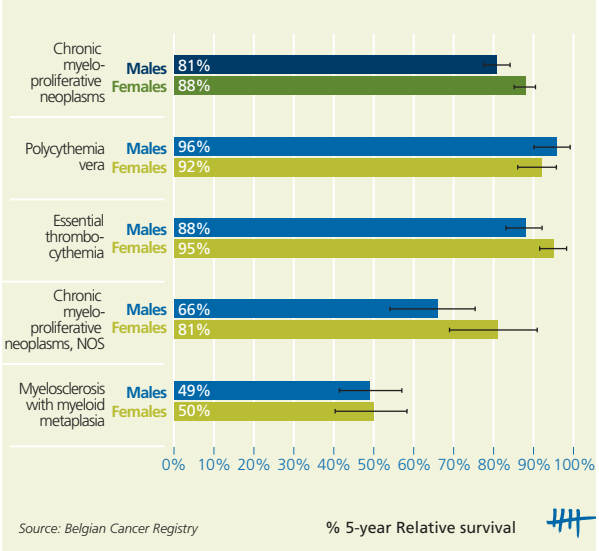
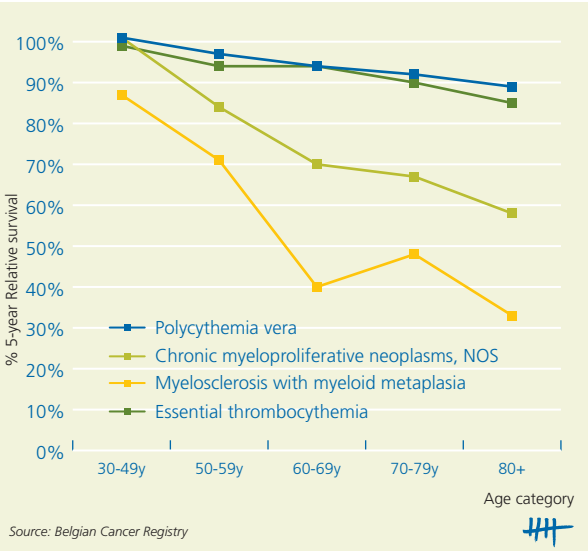


FIGURE 154 CHRONIC MYELOPROLIFERATIVE NEOPLASMS: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SUBTYPE, BELGIUM 2004-2012



3.2.2.3 MAST CELL DISEASES

Incidence

- Belgium 2012: 15 new diagnoses
  - 10 males
  - 5 females.
- Mean age at diagnosis: 50 years in males and 49 years in females.
  - Age-specific incidence rates increase with age **(Figure 155)**.
  - The male/female ratio for 2004-2012 is 0.7.

FIGURE 155 MAST CELL DISEASE: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

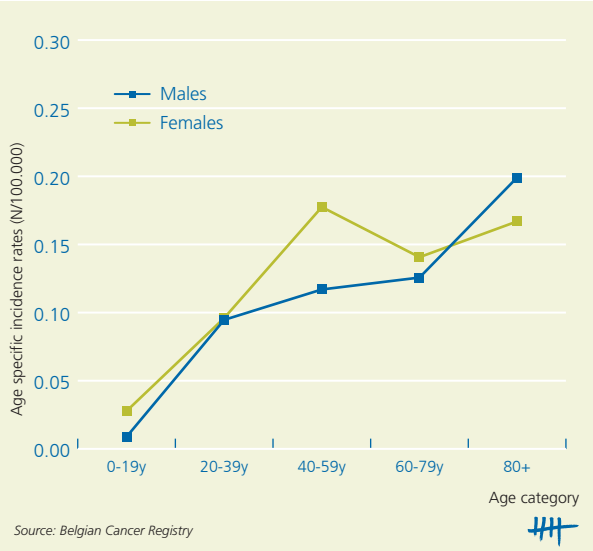
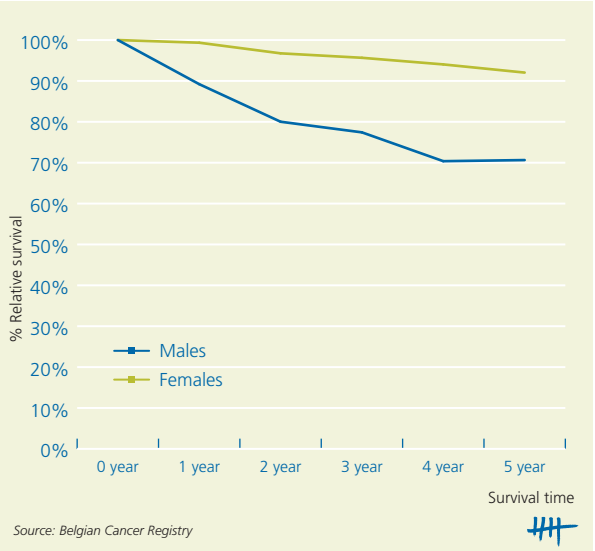


FIGURE 156 MAST CELL DISEASE: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



Relative Survival

- The 5-year relative survival rates for mast cell disease are 71% in males and 92% in females **(Figure 156).**

3.2.3 MYELODYSPLASTIC SYNDROME (MDS)

Incidence

- Belgium 2012: 700 new diagnoses
  - 386 males (55%)
  - 314 females (45%)
- Mean age at diagnosis: 72 years in males and 73 years in females.
  - Under the age of 55 years: MDS is very rare **(Figure 157).**
  - Age-specific incidence rates increase rapidly from the age of 55 years, especially in males resulting in a male/female ratio of 1.7.

FIGURE 157 MYELODYSPLASTIC SYNDROME: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

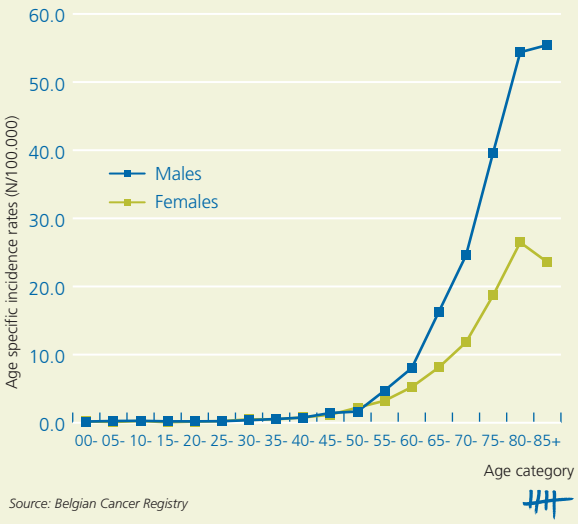
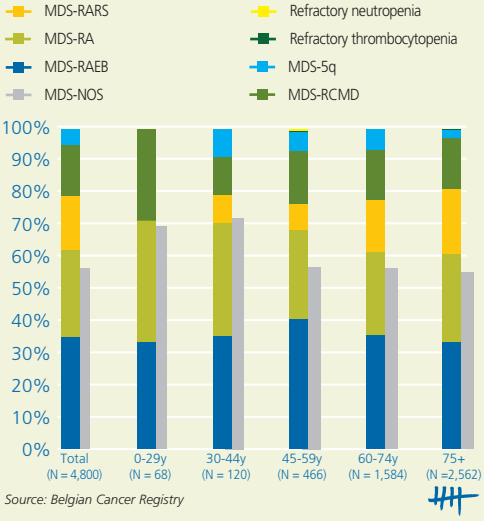


FIGURE 158 MYELODYSPLASTIC SYNDROME: INCIDENCE BY SUBTYPE AND AGE GROUP, BELGIUM 2004-2012.



MDS regroups 8 different histological subtypes **(Figure 158).**

1. Myelodysplastic syndrome unclassifiable (MDS-NOS)
- 56% of MDS diagnoses lack information appropriate for classification into another MDS category
- In young adults up to 70% of MDS cases are MDS, NOS
- Male predominance: male/female ratio: 1.7.

2. Refractory anaemia with excess blasts (MDS-RAEB)
- MDS-RAEB accounts for 35% of the MDS subtypes (excl. MDS, NOS).
- Male predominance: male/female ratio: 1.9.

3. Refractory anaemia (MDS-RA)
- MDS-RA accounts for 27% of the MDS subtypes (excl. MDS, NOS).
- Male predominance: male/female ratio: 1.7.

4. Refractory anaemia with ringed sideroblasts (MDS-RARS)
- MDS-RARS accounts for 17% of the MDS subtypes (excl. MDS, NOS).
- Male predominance: male/female ratio: 2.2.

Key note for registration:
Actively look for more information in order to obtain a more specific disease characterisation. *'Myelodysplastic syndrome NOS'* should only be assigned to cases where information to specify MDS is unavailable.
Use codes **9980, 9982, 9983, 9985, 9986, 9991, 9992** whenever possible.

5. Refractory cytopenia with multilineage dysplasia (MDS-RCMD)

- MDS-RCMD accounts for 16% of the MDS subtypes (excl. MDS, NOS).
- Male predominance: male/female ratio: 2.9.

6. Myelodysplastic syndrome 5q deletion (5q-) (MDS-5q)

- MDS-5q accounts for 4% of the MDS subtypes (excl. MDS, NOS).
- Female predominance: male/female ratio: 0.4.

Two entities, **refractory thrombocytopenia** and **refractory neutropenia,** are newly defined by the WHO in the ICD-O-3 coding manuals and can be registered since 2010. Since then, we have registered respectively 4 and 2 cases.

Trends

- Incidence rates for MDS increase significantly in both sexes **(Figure 159).**
- Increases in the incidence rates for MDS can be observed in almost every age group **(Table 24 and Figure 160).**

FIGURE 159 MYELODYSPLASTIC SYNDROME: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012

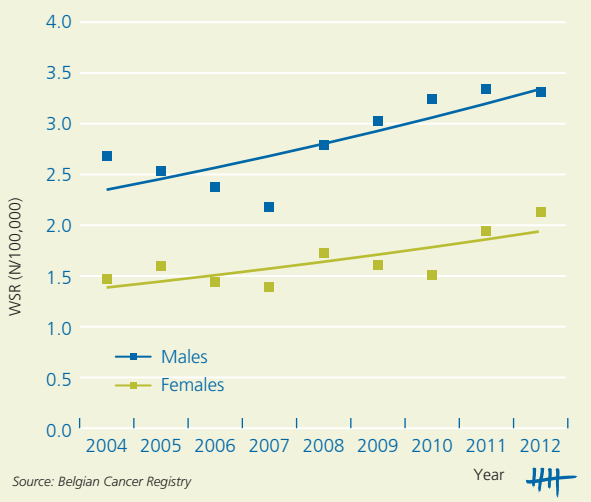


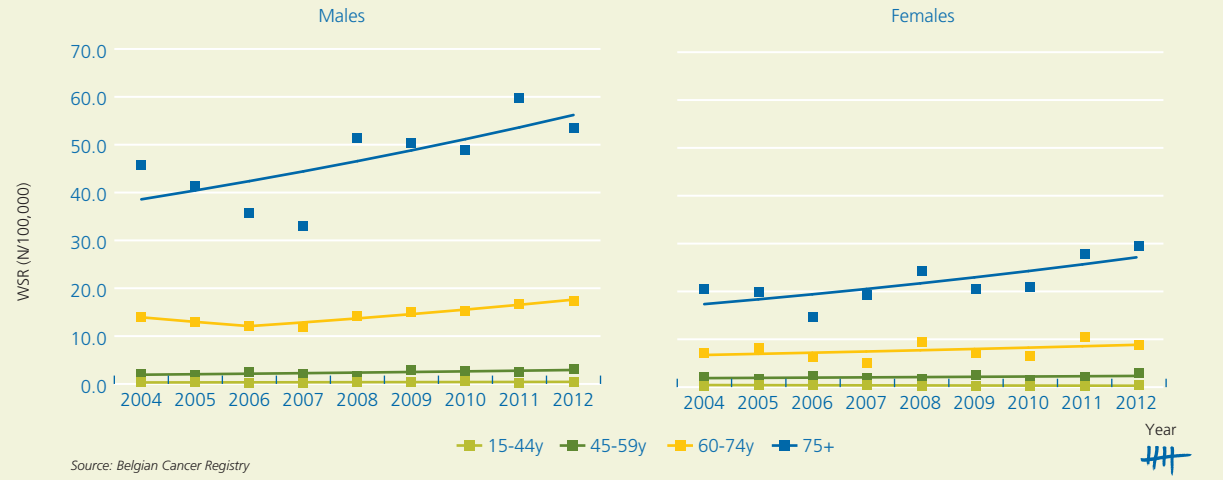
TABLE 24 MYELODYSPLASTIC SYNDROME: AAPC(%) BY SEX AND AGE GROUP, BELGIUM 2004-2012

	Males			Females	
Age	AAPC(%)	95%CI	Period	AAPC(%)	95%CI
All Ages	4.5	[1.6:7.5]		4.3	[1.3:7.4]
15-44 y	4.2	[-3.4:12.3]		-4.8	[-15.1:6.8]
45-59 y	5.3	[0.6:10.2]		2.8	[-3.7:9.6]
60-74 y	3.0	[-0.6:6.7]		3.5	[-2.6:10.0]
	-6.9	[-22.5:11.9]	2004 2006		
	6.5	[3.5:9.6]	2006 2012		
75+	4.8	[0.4:9.5]		5.7	[1.3:10.4]

AAPC: average annual percentage change (2004-2012)

Period: When a joinpoint occured, APC's are calculated for the period before and after the joinpoint. This column represents the corresponding interval. AAPC's are always calculated over the entire study-period (2004-2012).

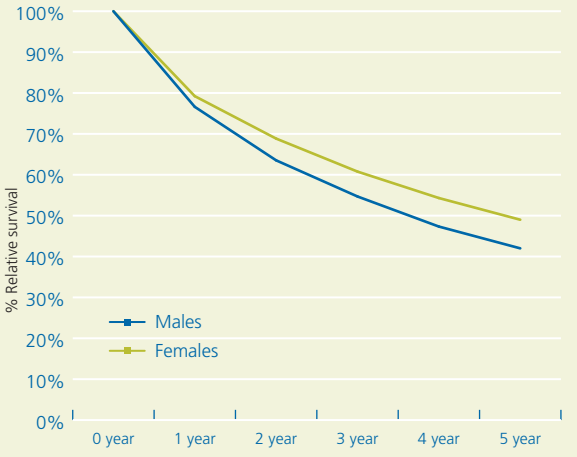
FIGURE 160 MYELODYSPLASTIC SYNDROME: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012



Relative Survival

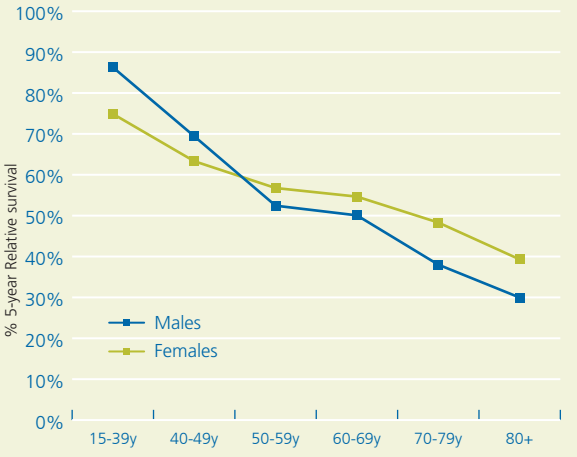
- The 5-year relative survival rates for MDS are 42% in males and 49% in females **(Figure 161).**
- The age-specific survival rates decline with age **(Figure 162).** In the youngest age groups (where the number of patients is low), the survival rates in males are higher than in females; from the age of 50 years, prognosis in males is worse than in females.
- The higher relative survival rates in females are observed for every subtype **(Figure 163).**
- The age-specific survival rates decline for every subtype. MDS-RAEB has the poorest prognosis in every age group. The 5-year relative survival rate in patients younger than 50 years is 61% which decreases to 13% in patients older than 80 years **(Figure 164).**

FIGURE 161 MYELODYSPLASTIC SYNDROME: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



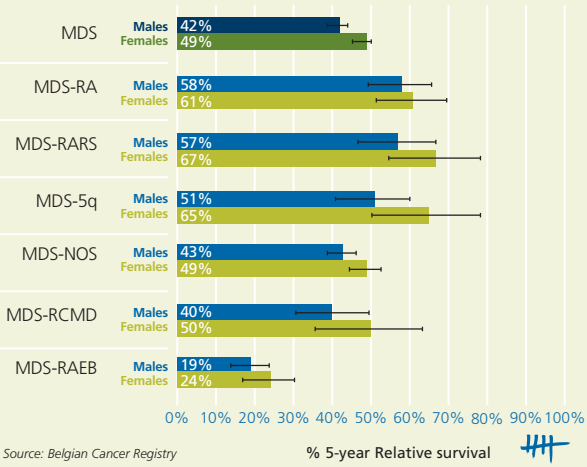
Source: Belgian Cancer Registry

FIGURE 162 MYELODYSPLASTIC SYNDROME: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012



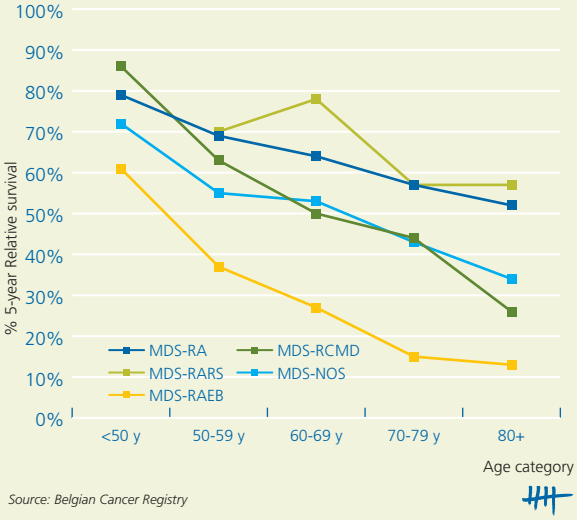
Source: Belgian Cancer Registry

FIGURE 163 MYELODYSPLASTIC SYNDROME: 5-YEAR RELATIVE SURVIVAL BY SEX AND SUBTYPE, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 164 MYELODYSPLASTIC SYNDROME: 5-YEAR RELATIVE SURVIVAL BY SUBTYPE AND AGE GROUP, BELGIUM 2004-2012



Source: Belgian Cancer Registry

3.2.4 MYELODYSPLASTIC/MYELOPROLIFERATIVE NEOPLASMS (MDS/MPN)

Incidence

- Belgium 2012: 150 new diagnoses
  - 88 males (59%)
  - 62 females (41%)
- The mean age at diagnosis: 70 years in males and 71 years in females.
  - MDS/MPN is extremely rare in children and young adults.
  - From the age of 50 years: increase in age-specific incidence rates **(Figure 165).**
  - The male/female ratio is 1.8.

FIGURE 165 MYELODYSPLASTIC/MYELOPROLIFERATIVE NEOPLASMS: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012

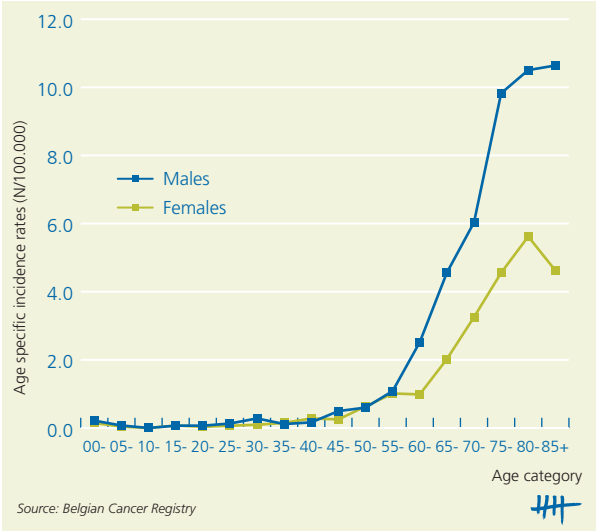
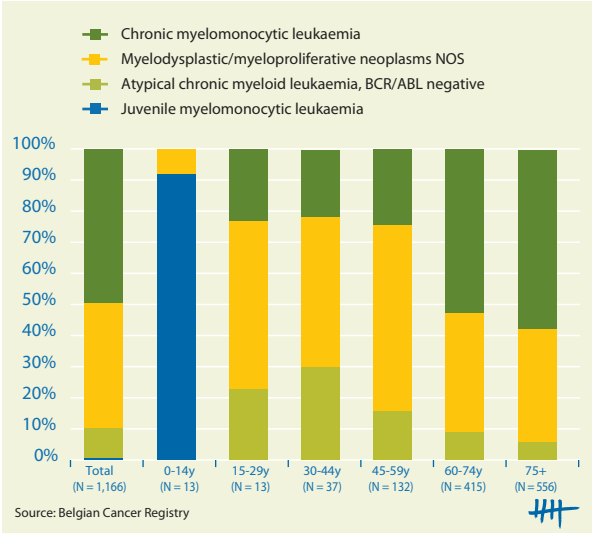


FIGURE 166 MYELODYSPLASTIC/MYELOPROLIFERATIVE NEOPLASMS: INCIDENCE BY SUBTYPE AND AGE GROUP, BELGIUM 2004-2012



The category 'myelodysplastic/myeloproliferative neoplasms' was created because some neoplasms have characteristics of both myeloproliferative neoplasms and myelodysplastic syndromes (16; 15). Four entities have been grouped in the MDS/MPN **(Figure 166).**

1. Chronic myelomonocytic leukaemia
- 50% of MDS/MPN
- Male predominance: male/female ratio: 2.5.

2. Juvenile chronic myelomonocytic leukaemia
- 1% of MDS/MPN
- All diagnoses occurred in children younger than 5 years of age.

3. Atypical chronic myeloid leukaemia BCR/ABL negative
- 9% of MDS/MPN
- Male predominance: male/female ratio: 1.4.

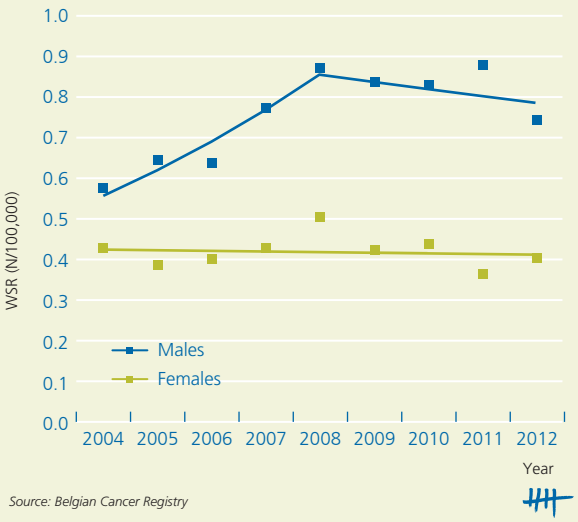
4. Myelodysplastic/myeloproliferative neoplasms, NOS
- 40% of MDS/MPN
- Male predominance: male/female ratio: 1.5.

Key note for registration:
Actively look for more information in order to obtain a more specific disease characterization.

Trends

- Trends for MDS/MPN reveal an increase in males until 2008, while the rates in females remain stable **(Figure 167).**
- The largest increases in incidence rates are observed in the oldest age groups in males **(Table 25 and Figure 168).**

FIGURE 167 MYELODYSPLASTIC/MYELOPROLIFERATIVE NEOPLASMS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

TABLE 25 MYELODYSPLASTIC/MYELOPROLIFERATIVE NEOPLASMS: AAPC(%) BY SEX AND AGE GROUP, BELGIUM 2004-2012

	Males			Females		
Age	AAPC(%)	95%CI	period	AAPC(%)	95%CI	period
All Ages	4.4	[0.1:8.9]		-0.4	[-3.5:2.8]	
	11.3	[1.9:21.6]	2004 2008			
	-2.1	[-9.7:6.2]	2008 2012			
45-59 y	-8.6	[-24.3:10.2]		2.3	[-6.8:12.2]	
60-74 y	5.9	[1.6:10.4]		-2.7	[-17.7:15.0]	
				9.8	[-3.1:24.3]	2004 2010
				-32.3	[-71.7:62.0]	2010 2012
75+	6.9	[0.3:13.9]		2.4	[-3.5:8.8]	

AAPC: average annual percentage change (2004-2012)

Period: When a joinpoint occured, APC's are calculated for the period before and after the joinpoint. This column represents the corresponding interval. AAPC's are always calculated over the entire study-period (2004-2012).

FIGURE 168 MYELODYSPLASTIC/MYELOPROLIFERATIVE NEOPLASMS: AGE-STANDARDISED INCIDENCE RATES (WSR) BY SEX AND AGE GROUP, BELGIUM 2004-2012

Source: Belgian Cancer Registry

Relative Survival

- The 5-year survival rates for MDS/MPN are 46% in males and 53% in females **(Figure 169).**
- Younger patients have a better prognosis than older patients **(Figure 170).** The age-specific survival rates decline rapidly with increasing age.
- Chronic myelomonocytic leukaemia has the worst prognosis **(Figure 171).**

FIGURE 169 MYELODYSPLASTIC/MYELOPROLIFERATIVE NEOPLASMS: RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012

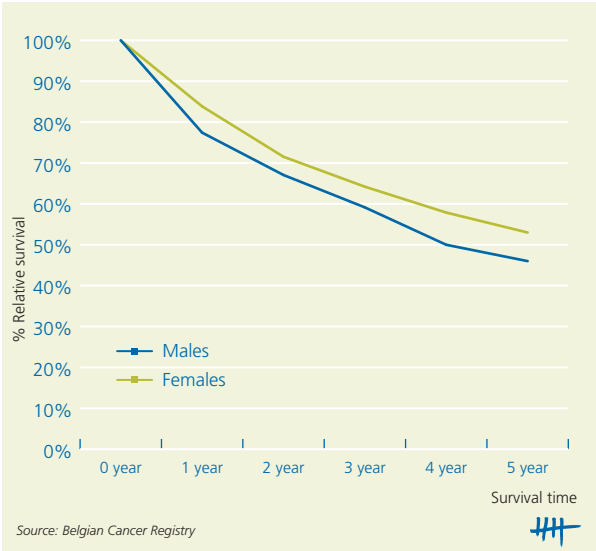


FIGURE 170 MYELODYSPLASTIC/MYELOPROLIFERATIVE NEOPLASMS: AGE-SPECIFIC 5-YEAR RELATIVE SURVIVAL BY SEX, BELGIUM 2004-2012

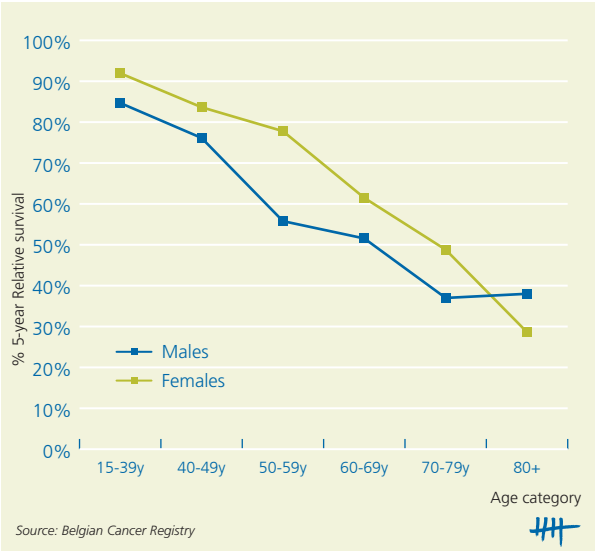
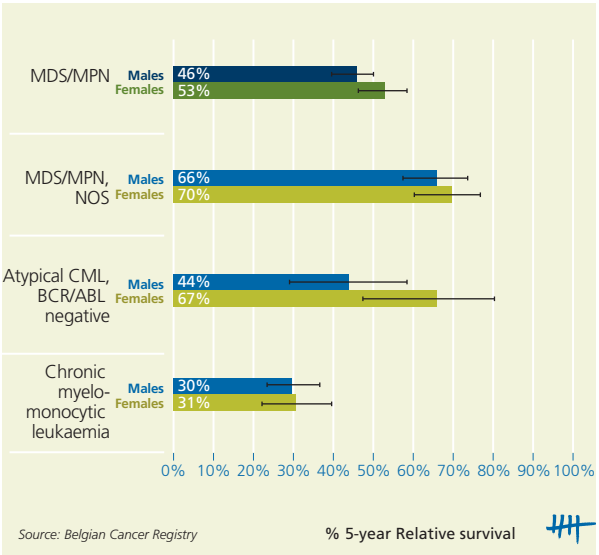


FIGURE 171 MYELODYSPLASTIC/MYELOPROLIFERATIVE NEOPLASMS: 5-YEAR RELATIVE SURVIVAL BY SEX AND SUBTYPE, BELGIUM 2004-2012

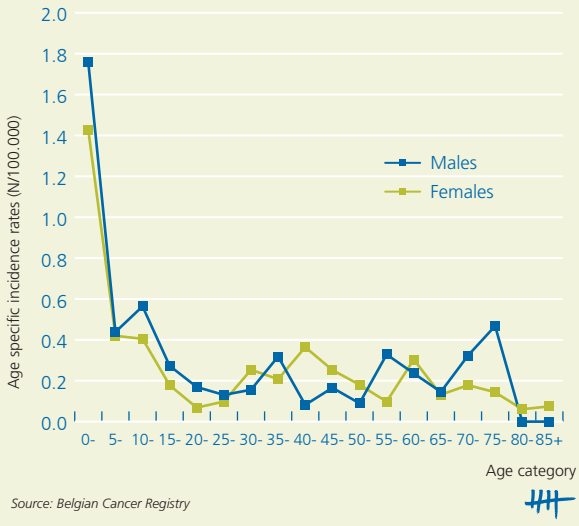


3.3 HISTIOCYTIC AND DENDRITIC CELL NEOPLASMS

Incidence

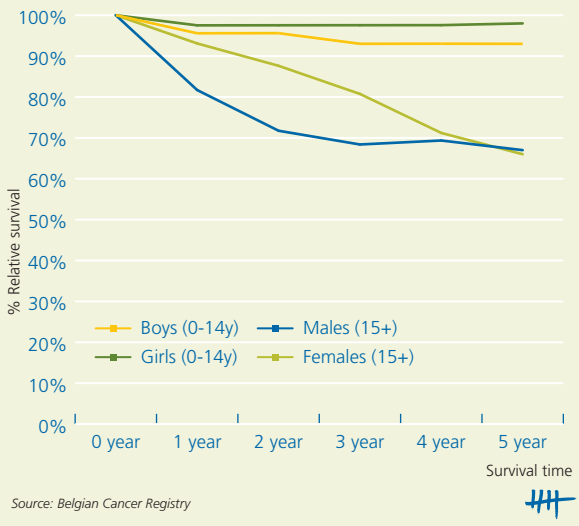
- Belgium 2012: 37 new diagnoses
  - 18 males (49%)
  - 19 females (51%)
- The average age at diagnosis is 26 years in males and 28 years in females.
  - The highest incidence rates are observed in very young children (0-4 years). In older children, incidence rates are already much lower **(Figure 172).**
  - The male/female ratio is 1.2.
- Due to changes in classification guidelines in 2010, all histiocytic and dendritic cell neoplasms changed from diagnoses with a borderline malignancy to diagnoses with a malignant behaviour. As a result, hospitals must register these cases from 2010 onwards. Information on cases diagnosed before 2010 was available through our pathological network (see chapter 1.1), however we cannot exclude an under registration and these results must be interpreted with caution. Results over the entire period 2004-2012 and survival estimates presented in this chapter include cases with a borderline behaviour registered before the incidence year 2010.

FIGURE 172 HISTIOCYTIC NEOPLASMS: AGE-SPECIFIC INCIDENCE RATES (N/100,000) BY SEX, BELGIUM 2004-2012



Source: Belgian Cancer Registry

FIGURE 173 HISTIOCYTIC NEOPLASMS: RELATIVE SURVIVAL BY SEX AND AGE GROUP, BELGIUM 2004-2012



Source: Belgian Cancer Registry

Relative Survival

- The 5-year relative survival rates are similar between the sexes, but differ between children and adults **(Figure 173).**
  - Children (0-14 years): 5-year relative survival was 93% in boys and 98% in girls.
  - Adults (15+): 5-year relative survival was 67% in males and 66% in females.

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5 APPENDICES

APPENDIX 1: HAEMACARE/WHO 2008 CLASSIFICATION

Haemacare/WHO 2008 grouping	ICD-O-3	Label
Lymphoid malignancies		
Hodgkin lymphoma		
Hodgkin lymphoma, nodular lymphocyte predominance	9659	Hodgkin lymphoma, nodular lymphocyte predominance
Classical Hodgkin Lymphoma		
Hodgkin lymphoma, NOS	9650	Hodgkin lymphoma, NOS
	9661	Hodgkin granuloma (obsolete, use 9650/3)
	9662	Hodgkin sarcoma (obsolete, use 9650/3)
Hodgkin lymphoma, lymphocyte rich	9651	Hodgkin lymphoma, lymphocyte rich
Hodgkin lymphoma, nodular sclerosis	9663	Hodgkin lymphoma, nodular sclerosis, NOS
	9664	Hodgkin lymphoma, nodular sclerosis cellular phase (obsolete, use 9663/3)
	9665	Hodgkin lymphoma, nodular sclerosis grade 1 (obsolete, use 9663/3)
	9667	Hodgkin lymphoma, nodular sclerosis grade 2 (obsolete, use 9663/3)
Hodgkin lymphoma, mixed cellularity	9652	Hodgkin lymphoma, mixed cellularity, NOS
Hodgkin lymphoma, lymphocyte depletion	9653	Hodgkin lymphoma, lymphocyte depletion, NOS
	9654	Hodgkin lymphoma, lymphocyte depletion, diffuse fibrosis (obsolete, use 9653/3)
	9655	Hodgkin lymphoma, lymphocyte depletion, reticular (obsolete, use 9653/3)
Mature B-cell neoplasms		
Small lymphocytic lymphoma/chronic lymphocytic leukaemia (SLL/CLL)	9670	Malignant lymphoma, small B-cell lymphocytic, NOS
	9823	B-cell chronic lymphocytic leukaemia/small lymphocytic lymphoma
Immunoproliferative diseases / Waldenström macroglobulinaemia	9671	Malignant lymphoma, lymphoplasmacytic
	9760	Immunoproliferative disease, NOS
	9761	Waldenström macroglobulinaemia
	9762	Heavy chain disease, NOS
	9764	Immunoproliferative small intestinal disease (Mediterranean lymphoma)
Mantle cell lymphoma	9673	Mantle cell lymphoma

Follicular B-cell lymphoma	9597	Primary cutaneous follicle centre lymphoma
	9690	Follicular lymphoma, NOS
	9695	Follicular lymphoma, grade 1
	9691	Follicular lymphoma, grade 2
	9698	Follicular lymphoma, grade 3
Diffuse large B-cell lymphoma	9675	Malignant lymphoma, mixed small and large cell, diffuse (obsolete use 9680/3 or 9690/3 if follicular)
	9678	Primary effusion lymphoma
	9679	Mediastinal large B-cell lymphoma
	9680	Malignant lymphoma, large B-cell, diffuse, NOS
	9684	Malignant lymphoma, large B-cell, diffuse, immunoblastic, NOS (obsolete, use 9680/3)
	9688	T-cell rich large B-cell lymphoma
	9712	Intravascular large B-cell lymphoma
	9735	Plasmablastic lymphoma
	9737	ALK positive large B-cell lymphoma
	9738	Large B-cell lymphoma arising in HHV8-associated multicentric Castleman disease
Burkitt lymphoma/leukaemia	9687	Burkitt lymphoma, NOS
	9826	Burkitt cell leukaemia
Marginal zone lymphoma	9689	Splenic marginal zone B-cell lymphoma
	9699	Marginal zone B-cell lymphoma, NOS/mucosa-associated lymphoid tissue lymphoma
Mature B-cell leukaemia	9833	Prolymphocytic leukaemia, B-cell type
	9940	Hairy cell leukaemia
Plasma cell neoplasms	9731	Plasmacytoma, NOS
	9732	Multiple myeloma
	9733	Plasma cell leukaemia
	9734	Plasmacytoma, extramedullary
Mature T-cell and NK-cell neoplasms		
Cutaneous T-cell lymphoma	9700	Mycosis fungoides
	9701	Sézary syndrome
	9708	Subcutaneous T panniculitis-like T-cell lymphoma
	9709	Cutaneous T-cell lymphoma, NOS
	9718	Primary cutaneous CD30+ T-cell lymphoproliferative disorder
Other T-/NK-cell lymphomas	9702	Mature T-cell lymphoma, NOS
	9705	Angioimmunoblastic T-cell lymphoma
	9714	Anaplastic large cell lymphoma, T-cell and null cell type
	9716	Hepatosplenic γδ cell lymphoma
	9717	Intestinal T-cell lymphoma
	9719	NK/T-cell lymphoma, nasal and nasal-type
	9827	Adult T-cell leukaemia/lymphoma (HTLV-1 positive)
	9831	T-cell large granular lymphocytic leukaemia
	9834	Prolymphocytic leukaemia, T-cell type
	9948	Aggressive NK-cell leukaemia

Lymphoblastic lymphoma/acute (precursor cell) lymphoblastic leukaemia (ALL)		
B-ALL	9728	Precursor B-cell lymphoblastic lymphoma
	9811	B lymphoblastic leukaemia/lymphoma, NOS
	9812	B lymphoblastic leukaemia/lymphoma with t(9;22)(q34;q11.2); BCR-ABL1
	9813	B lymphoblastic leukaemia/lymphoma with t(v;11q23); MLL rearranged
	9814	B lymphoblastic leukaemia/lymphoma with t(12;21)(p13;q22); TEL-AML1 (ETV6-RUNX1)
	9815	B lymphoblastic leukaemia/lymphoma with hyperdiploidy
	9816	B lymphoblastic leukaemia/lymphoma with hypodiploidy (Hypodiploid ALL)
	9817	B lymphoblastic leukaemia/lymphoma with t(5;14)(q31;q32); IL3-IGH
	9818	B lymphoblastic leukaemia/lymphoma with t(1;19)(q23;p13.3); E2A-PBX1 (TCF3-PBX1)
	9836	Precursor B-cell lymphoblastic leukaemia
T-ALL	9729	Precursor T-cell lymphoblastic lymphoma
	9837	Precursor T-cell lymphoblastic leukaemia
ALL, NOS	9727	Precursor cell lymphoblastic lymphoma, NOS
	9835	Precursor cell lymphoblastic leukaemia, NOS
Lymphoid neoplasms, NOS		
Lymphoid neoplasms, NOS	9590	Malignant lymphoma, NOS
	9591	Malignant lymphoma, NHL, NOS
	9820	Lymphoid leukaemia, NOS
	9832	Prolymphocytic leukaemia, NOS
	9596	Composite Hodgkin and non-Hodgkin lymphoma
	9970	Lymphoproliferative disorder
	9971	Polymorphic post transplant lymphoproliferative disorder
Myeloid malignancies		
Acute myeloid leukaemia (AML)		
AML other and nos	9840	Acute erythroid leukaemia
	9861	AML, NOS
	9867	Acute myelomonocytic leukaemia
	9870	Acute basophilic leukaemia
	9872	AML, minimal differentiation
	9873	AML without maturation
	9874	AML with maturation
	9891	Acute monocytic leukaemia
	9898	Myeloid leukaemia associated with Down Syndrome
	9910	Acute megakaryoblastic leukaemia
	9930	Myeloid sarcoma

AML with recurrent cytogenetic abnormalities	9865	Acute myeloid leukaemia with t(6;9)(p23;q34); DEK-NUP214
	9866	Acute promyelocytic leukaemia t(15; 17) (q22; q11-12)
	9869	Acute myeloid leukaemia with inv(3)(q21q26.2) or t(3;3)(q21;q26.2); RPN1-EVI1
	9871	AML with abnormal marrow eosinophils
	9896	AML, t(8,21) (q22,q22)
	9897	AML, 11q23 abnormalities
	9911	Acute myeloid leukaemia (megakaryoblastic) with t(1;22)(p13;q13); RBM15-MKL1
AML with multilineage dysplasia	9895	AML, with multilineage dysplasia
	9984	Refractory anemia with excess blasts in transformation (obsolete, use 9895/3)
Acute panmyelosis with myelofibrosis	9931	Acute panmyelosis with myelofibrosis
Therapy related AML	9920	Therapy related myeloid neoplasm
	9987	Therapy related myelodysplastic syndrome, NOS (obsolete, use 9920/3)
Myeloproliferative neoplasms (MPN)		
Chronic myeloid leukaemia (CML)	9863	CML, NOS
	9875	Chronic myelogenous leukaemia, BCR/ABL positive
Chronic myeloproliferative neoplasms	9950	Polycythemia vera
	9961	Myelosclerosis with myeloid metaplasia
	9962	Essential thrombocythemia
	9963	Chronic neutrophilic leukaemia
	9964	Hypereosinophilic syndrome
	9965	Myeloid and lymphoid neoplasms with PDGFRA rearrangement
	9966	Myeloid neoplasms with PDGFRB rearrangement
	9967	Myeloid and lymphoid neoplasms with FGFR1 abnormalities
	9960	Chronic myeloproliferative neoplasms, NOS
Mast cell diseases	9740	Mast cell sarcoma
	9741	Malignant mastocytosis
	9742	Mast cell leukaemia
Myelodysplastic syndrome (MDS)		
Myelodysplastic syndrome	9980	Refractory anemia
	9982	Refractory anemia with sideroblasts
	9983	Refractory anemia with excess blasts
	9985	Refractory cytopenia with multilineage dysplasia
	9986	Myelodysplastic syndrome 5q deletion
	9989	Myelodysplastic syndrome, NOS
	9991	Refractory neutropenia
	9992	Refractory thrombocytopenia

Myelodysplastic/myeloproliferative neoplasms (MDS/MPN)		
Myelodysplastic/myeloproliferative neoplasms	9876	Atypical CML, BCR/ABL-1 negative
	9945	Chronic myelomonocytic leukaemia
	9946	Juvenile myelomonocytic leukaemia
	9975	Myelodysplastic/myeloproliferative neoplasm, unclassifiable
Myeloid neoplasms, NOS		
Leukaemia, NOS	9800	Leukaemia, NOS
	9801	Acute leukaemia, NOS
	9805	Acute leukaemia, ambiguous lineage
	9806	Mixed phenotype acute leukaemia with t(9;22)(q34;q11.2); BCR-ABL1
	9807	Mixed phenotype acute leukaemia with t(v;11q23); MLL rearranged
	9808	Mixed phenotype acute leukaemia, B/myeloid, NOS
	9809	Mixed phenotype acute leukaemia, T/myeloid, NOS
Myeloid leukaemia, NOS	9860	Myeloid leukaemia, NOS
Histiocytic and dendritic cell neoplasms		
Histiocytic and dendritic cell neoplasms	9750	Malignant histiocytosis
	9751	Langerhans cell histiocytosis
	9752	Langerhans cell histiocytosis, unifocal (obsolete, use 9751/3)
	9753	Langerhans cell histiocytosis, multifocal (obsolete, use 9751/3)
	9754	Langerhans cell histiocytosis, disseminated (obsolete, use 9751/3)
	9755	Histiocytic sarcoma
	9756	Langerhans cell sarcoma
	9757	Interdigitating dendritic cell sarcoma
	9758	Follicular dendritic cell sarcoma
	9759	Fibroblastic reticular cell tumour

APPENDIX 2: BELGIUM: NUMBER OF NEW DIAGNOSES (N), AGE-SPECIFIC AND AGE-STANDARDISED INCIDENCE (N/100,000) IN MALES IN 2012 FOR THE MAIN HAEMACARE GROUPS AND THEIR HISTOLOGICAL SUBTYPES.

HAEMACARE/WHO 2008 GROUPING	NUMBER OF NEW DIAGNOSES (N)							AGE SPECIFIC INCIDENCE (N/100.000)						CR	ESR	WSR	CRi
	Total	0-14y	15-29y	30-44y	45-59y	60-74y	75+	0-14y	15-29y	30-44y	45-59y	60-74y	75+				
Lymphoid malignancies	2.491	64	96	140	511	943	737	6.7	9.4	12.4	43.7	122.6	199.7	46.0	37.4	27.8	2.97
Hodgkin lymphoma	185	6	49	44	40	30	16	0.6	4.8	3.9	3.4	3.9	4.3	3.4	3.3	3.0	0.25
Hodgkin lymphoma. nodular lymphocyte predominance	17	1	5	4	4	2	1	0.1	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.02
Classical Hodgkin Lymphoma	168	5	44	40	36	28	15	0.5	4.3	3.5	3.1	3.6	4.1	3.1	3.0	2.7	0.23
Hodgkin lymphoma. NOS	14	-	2	1	3	5	3	-	0.2	0.1	0.3	0.6	0.8	0.3	0.2	0.2	0.02
Hodgkin lymphoma. lymphocyte rich	10	-	-	2	3	3	2	-	-	0.2	0.3	0.4	0.5	0.2	0.2	0.1	0.01
Hodgkin lymphoma. nodular sclerosis	102	3	33	32	20	9	5	0.3	3.2	2.8	1.7	1.2	1.4	1.9	1.9	1.8	0.14
Hodgkin lymphoma. mixed cellularity	39	2	9	5	10	9	4	0.2	0.9	0.4	0.9	1.2	1.1	0.7	0.7	0.6	0.05
Hodgkin lymphoma. lymphocyte depletion	3	-	-	-	-	2	1	-	-	-	-	0.3	0.3	0.1	0.0	0.0	0.00
Mature B-cell neoplasms	1.949	10	23	78	400	810	628	1.0	2.3	6.9	34.2	105.3	170.1	36.0	28.3	19.7	2.30
Small lymphocytic lymphoma/chronic lymphocytic leukaemia (SLL/CLL)	506	-	2	15	93	222	174	-	0.2	1.3	7.9	28.9	47.1	9.3	7.2	4.9	0.59
Immunoproliferative diseases/ Waldenström macroglobulinaemia	87	-	1	-	10	34	42	-	0.1	-	0.9	4.4	11.4	1.6	1.2	0.8	0.08
Waldenström macroglobulinaemia	86	-	-	-	10	34	42	-	-	-	0.9	4.4	11.4	1.6	1.1	0.7	0.08
Other Immunoproliferative diseases	1	-	1	-	-	-	-	-	0.1	-	-	-	-	0.0	0.0	0.0	0.00
Mantle cell lymphoma	91	-	-	3	21	43	24	-	-	0.3	1.8	5.6	6.5	1.7	1.3	0.9	0.12
Follicular B-cell lymphoma	180	-	1	13	58	72	36	-	0.1	1.2	5.0	9.4	9.8	3.3	2.7	2.0	0.24
Primary cutaneous follicle centre lymphoma	6	-	-	-	3	3	-	-	-	-	0.3	0.4	-	0.1	0.1	0.1	0.01
Follicular lymphoma. NOS	25	-	-	4	8	6	7	-	-	0.4	0.7	0.8	1.9	0.5	0.4	0.3	0.03
Follicular lymphoma. grade 1	57	-	-	6	20	19	12	-	-	0.5	1.7	2.5	3.3	1.1	0.9	0.6	0.07
Follicular lymphoma. grade 2	51	-	-	2	14	27	8	-	-	0.2	1.2	3.5	2.2	0.9	0.8	0.6	0.08
Follicular lymphoma. grade 3	41	-	1	1	13	17	9	-	0.1	0.1	1.1	2.2	2.4	0.8	0.6	0.4	0.05
Diffuse large B-cell lymphoma	460	-	13	26	91	171	159	-	1.3	2.3	7.8	22.2	43.1	8.5	6.7	4.7	0.52
Malignant lymphoma. mixed small and large cell. diffuse (obsolete)	3	-	-	-	1	1	1	-	-	-	0.1	0.1	0.3	0.1	0.0	0.0	0.00
Primary effusion lymphoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mediastinal large B-cell lymphoma	6	-	2	4	-	-	-	-	0.2	0.4	-	-	-	0.1	0.1	0.1	0.01
Malignant lymphoma. large B-cell. diffuse. NOS	419	-	10	21	82	155	151	-	1.0	1.9	7.0	20.1	40.9	7.7	6.0	4.2	0.47
Malignant lymphoma. large B-cell. diffuse. immunoblastic. NOS	5	-	-	1	1	2	1	-	-	0.1	0.1	0.3	0.3	0.1	0.1	0.1	0.01
T-cell rich large B-cell lymphoma	20	-	-	-	5	9	6	-	-	-	0.4	1.2	1.6	0.4	0.3	0.2	0.03
Intravascular large B-cell lymphoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plasmablastic lymphoma	6	-	-	-	2	4	-	-	-	-	0.2	0.5	-	0.1	0.1	0.1	0.01
ALK positive large B-cell lymphoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

HAEMACARE/WHO 2008 GROUPING	NUMBER OF NEW DIAGNOSES (N)							AGE SPECIFIC INCIDENCE (N/100.000)						CR	ESR	WSR	CRi
	Total	0-14y	15-29y	30-44y	45-59y	60-74y	75+	0-14y	15-29y	30-44y	45-59y	60-74y	75+				
Large B-cell lymphoma arising in HHV8-associated multicentric Castleman disease	1	-	1	-	-	-	-	-	0.1	-	-	-	-	0.0	0.0	0.0	0.00
Burkitt lymphoma/leukaemia	28	10	4	5	4	2	3	1.0	0.4	0.4	0.3	0.3	0.8	0.5	0.5	0.6	0.04
Marginal zone lymphoma	132	-	2	6	22	59	43	-	0.2	0.5	1.9	7.7	11.6	2.4	1.9	1.3	0.16
Mature B-cell leukaemia	36	-	-	1	16	11	8	-	-	0.1	1.4	1.4	2.2	0.7	0.6	0.4	0.04
Prolymphocytic leukaemia. B-cell type	3	-	-	-	-	1	2	-	-	-	-	0.1	0.5	0.1	0.0	0.0	0.00
Hairy cell leukaemia	33	-	-	1	16	10	6	-	-	0.1	1.4	1.3	1.6	0.6	0.5	0.4	0.04
Plasma cell neoplasms	429	-	-	9	85	196	139	-	-	0.8	7.3	25.5	37.7	7.9	6.2	4.2	0.52
Mature T-cell and NK-cell neoplasms	170	2	10	9	44	61	44	0.2	1.0	0.8	3.8	7.9	11.9	3.1	2.6	1.9	0.21
Cutaneous T-cell lymphoma	66	-	3	3	19	22	19	-	0.3	0.3	1.6	2.9	5.1	1.2	1.0	0.7	0.08
Mycosis fungoides	47	-	2	3	13	16	13	-	0.2	0.3	1.1	2.1	3.5	0.9	0.7	0.5	0.05
Sézary syndrome	3	-	-	-	-	1	2	-	-	-	-	0.1	0.5	0.1	0.0	0.0	0.00
Subcutaneous T panniculitis-like T-cell lymphoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cutaneous T-cell lymphoma. NOS	9	-	1	-	1	5	2	-	0.1	-	0.1	0.6	0.5	0.2	0.1	0.1	0.01
Primary cutaneous CD30+ T-cell lymphoproliferative disorder	7	-	-	-	5	-	2	-	-	-	0.4	-	0.5	0.1	0.1	0.1	0.01
Other T-/NK-cell lymphomas	104	2	7	6	25	39	25	0.2	0.7	0.5	2.1	5.1	6.8	1.9	1.6	1.2	0.13
Mature T-cell lymphoma. NOS	31	2	2	1	8	8	10	0.2	0.2	0.1	0.7	1.0	2.7	0.6	0.5	0.4	0.04
Angioimmunoblastic T-cell lymphoma	24	-	-	1	7	11	5	-	-	0.1	0.6	1.4	1.4	0.4	0.4	0.3	0.03
Anaplastic large cell lymphoma. T-cell and null cell type	19	-	2	1	4	9	3	-	0.2	0.1	0.3	1.2	0.8	0.4	0.3	0.2	0.03
Hepatosplenic γδ cell lymphoma	3	-	1	-	-	1	1	-	0.1	-	-	0.1	0.3	0.1	0.0	0.0	0.00
Intestinal T-cell lymphoma	2	-	-	-	-	2	-	-	-	-	-	0.3	-	0.0	0.0	0.0	0.00
NK/T-cell lymphoma. nasal and nasal-type	6	-	-	1	3	-	2	-	-	0.1	0.3	-	0.5	0.1	0.1	0.1	0.01
Adult T-cell leukaemia/ lymphoma (HTLV-1 positive)	3	-	-	-	-	1	2	-	-	-	-	0.1	0.5	0.1	0.0	0.0	0.00
T-cell large granular lymphocytic leukaemia	15	-	2	2	3	6	2	-	0.2	0.2	0.3	0.8	0.5	0.3	0.2	0.2	0.02
Prolymphocytic leukaemia. T-cell type	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aggressive NK-cell leukaemia	1	-	-	-	-	1	-	-	-	-	-	0.1	-	0.0	0.0	0.0	0.00
Lymphoblastic lymphoma/ acute (precursor cell) lymphoblastic leukaemia (ALL)	95	46	14	7	7	18	3	4.8	1.4	0.6	0.6	2.3	0.8	1.8	1.9	2.3	0.15
B-ALL	55	31	6	1	5	9	3	3.2	0.6	0.1	0.4	1.2	0.8	1.0	1.1	1.4	0.08
T-ALL	28	10	8	4	2	4	-	1.0	0.8	0.4	0.2	0.5	-	0.5	0.6	0.7	0.04
ALL. NOS	12	5	-	2	-	5	-	0.5	-	0.2	-	0.6	-	0.2	0.2	0.3	0.02
Lymphoid neoplasms. NOS	92	-	-	2	20	24	46	-	-	0.2	1.7	3.1	12.5	1.7	1.3	0.8	0.08
Myeloid malignancies	1.136	11	27	61	179	387	471	1.1	2.7	5.4	15.3	50.3	127.6	21.0	16.1	11.2	1.17
Acute myeloid leukaemia (AML)	281	6	15	13	55	78	114	0.6	1.5	1.2	4.7	10.1	30.9	5.2	4.1	3.0	0.29
AML other and nos	189	3	11	10	39	48	78	0.3	1.1	0.9	3.3	6.2	21.1	3.5	2.7	2.0	0.19
Acute erythroid leukaemia	9	-	1	-	2	4	2	-	0.1	-	0.2	0.5	0.5	0.2	0.1	0.1	0.01

HAEMACARE/WHO 2008 GROUPING	NUMBER OF NEW DIAGNOSES (N)							AGE SPECIFIC INCIDENCE (N/100.000)						CR	ESR	WSR	CRi
	Total	0-14y	15-29y	30-44y	45-59y	60-74y	75+	0-14y	15-29y	30-44y	45-59y	60-74y	75+				
AML. NOS	96	1	2	4	15	25	49	0.1	0.2	0.4	1.3	3.2	13.3	1.8	1.3	0.9	0.08
Acute myelomonocytic leukaemia	16	1	2	1	5	3	4	0.1	0.2	0.1	0.4	0.4	1.1	0.3	0.3	0.2	0.02
Acute basophilic leukaemia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AML. minimal differentiation	12	-	-	-	4	1	7	-	-	-	0.3	0.1	1.9	0.2	0.2	0.1	0.01
AML without maturation	14	-	-	1	5	6	2	-	-	0.1	0.4	0.8	0.5	0.3	0.2	0.2	0.02
AML with maturation	14	-	1	1	3	5	4	-	0.1	0.1	0.3	0.6	1.1	0.3	0.2	0.2	0.02
Acute monocytic leukaemia	23	1	4	3	3	3	9	0.1	0.4	0.3	0.3	0.4	2.4	0.4	0.4	0.3	0.02
Myeloid leukaemia associated with Down Syndrome	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acute megakaryoblastic leukaemia	1	-	-	-	1	-	-	-	-	-	0.1	-	-	0.0	0.0	0.0	0.00
Myeloid sarcoma	4	-	1	-	1	1	1	-	0.1	-	0.1	0.1	0.3	0.1	0.1	0.1	0.00
AML with recurrent cytogenetic abnormalities	23	2	4	1	6	4	6	0.2	0.4	0.1	0.5	0.5	1.6	0.4	0.4	0.3	0.03
Acute myeloid leukaemia with t(6;9)(p23;q34); DEK-NUP214	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acute promyelocytic leukaemia t(15; 17) (q22; q11-12)	10	-	3	1	2	2	2	-	0.3	0.1	0.2	0.3	0.5	0.2	0.2	0.1	0.01
Acute myeloid leukaemia with inv(3)(q21q26.2) or t(3;3)(q21;q26.2); RPN1-EVI1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AML with abnormal marrow eosinophils	1	-	-	-	1	-	-	-	-	-	0.1	-	-	0.0	0.0	0.0	0.00
AML. t(8.21) (q22.q22)	6	1	1	-	1	1	2	0.1	0.1	-	0.1	0.1	0.5	0.1	0.1	0.1	0.01
AML. 11q23 abnormalities	6	1	-	-	2	1	2	0.1	-	-	0.2	0.1	0.5	0.1	0.1	0.1	0.01
Acute myeloid leukaemia (megakaryoblastic) with t(1;22)(p13;q13); RBM15-MKL1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AML with multilineage dysplasia	44	1	-	1	6	16	20	0.1	-	0.1	0.5	2.1	5.4	0.8	0.6	0.4	0.05
Acute panmyelosis with myelofibrosis	12	-	-	-	1	5	6	-	-	-	0.1	0.6	1.6	0.2	0.2	0.1	0.01
Therapy related AML	13	-	-	1	3	5	4	-	-	0.1	0.3	0.6	1.1	0.2	0.2	0.1	0.02
Myeloproliferative neoplasms (MPN)	374	4	10	39	82	131	108	0.4	1.0	3.5	7.0	17.0	29.3	6.9	5.6	4.1	0.44
Chronic myeloid leukaemia (CML)	67	1	5	14	8	24	15	0.1	0.5	1.2	0.7	3.1	4.1	1.2	1.1	0.8	0.08
CML. NOS	41	-	3	8	6	14	10	-	0.3	0.7	0.5	1.8	2.7	0.8	0.6	0.5	0.05
CML. BCR/ABL positive	26	1	2	6	2	10	5	0.1	0.2	0.5	0.2	1.3	1.4	0.5	0.4	0.3	0.03
Chronic myeloproliferative neoplasms	297	3	5	23	69	104	93	0.3	0.5	2.0	5.9	13.5	25.2	5.5	4.4	3.1	0.34
Polycythemia vera	89	1	2	9	25	32	20	0.1	0.2	0.8	2.1	4.2	5.4	1.6	1.4	1.0	0.11
Myelosclerosis with myeloid metaplasia	74	-	-	4	14	21	35	-	-	0.4	1.2	2.7	9.5	1.4	1.0	0.7	0.07
Essential thrombocythemia	105	1	2	9	21	39	33	0.1	0.2	0.8	1.8	5.1	8.9	1.9	1.6	1.1	0.12
Chronic neutrophilic leukaemia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hypereosinophilic syndrome	8	1	1	-	1	5	-	0.1	0.1	-	0.1	0.6	-	0.1	0.1	0.1	0.01
Myeloid and lymphoid neoplasms with PDGFRA rearrangement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myeloid neoplasms with PDGFRB rearrangement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

HAEMACARE/WHO 2008 GROUPING	NUMBER OF NEW DIAGNOSES (N)							AGE SPECIFIC INCIDENCE (N/100.000)						CR	ESR	WSR	CRi
	Total	0-14y	15-29y	30-44y	45-59y	60-74y	75+	0-14y	15-29y	30-44y	45-59y	60-74y	75+				
Myeloid and lymphoid neoplasms with FGFR1 abnormalities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chronic myeloproliferative neoplasms. NOS	21	-	-	1	8	7	5	-	-	0.1	0.7	0.9	1.4	0.4	0.3	0.2	0.03
Mast cell diseases	10	-	-	2	5	3	-	-	-	0.2	0.4	0.4	-	0.2	0.2	0.1	0.01
Mast cell sarcoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malignant mastocytosis	10	-	-	2	5	3	-	-	-	0.2	0.4	0.4	-	0.2	0.2	0.1	0.01
Mast cell leukaemia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myelodysplastic syndrome (MDS)	386	-	2	9	38	137	200	-	0.2	0.8	3.2	17.8	54.2	7.1	5.1	3.3	0.35
Refractory anemia	42	-	-	1	3	14	24	-	-	0.1	0.3	1.8	6.5	0.8	0.5	0.3	0.03
Refractory anemia with sideroblasts	25	-	-	-	3	10	12	-	-	-	0.3	1.3	3.3	0.5	0.3	0.2	0.03
Refractory anemia with excess blasts	57	-	-	1	8	23	25	-	-	0.1	0.7	3.0	6.8	1.1	0.8	0.5	0.06
Refractory cytopenia with multilineage dysplasia	41	-	1	-	6	13	21	-	0.1	-	0.5	1.7	5.7	0.8	0.5	0.4	0.04
Myelodysplastic syndrome 5q deletion	2	-	-	-	-	-	2	-	-	-	-	-	0.5	0.0	0.0	0.0	-
Myelodysplastic syndrome. NOS	219	-	1	7	18	77	116	-	0.1	0.6	1.5	10.0	31.4	4.0	2.9	1.8	0.19
Refractory neutropenia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refractory thrombocytopenia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myelodysplastic/myeloproliferative neoplasms (MDS/MPN)	88	1	-	-	2	38	47	0.1	-	-	0.2	4.9	12.7	1.6	1.1	0.7	0.08
Atypical CML. BCR/ABL-1 negative	6	-	-	-	-	2	4	-	-	-	-	0.3	1.1	0.1	0.1	0.0	0.01
Chronic myelomonocytic leukaemia	61	-	-	-	1	26	34	-	-	-	0.1	3.4	9.2	1.1	0.8	0.5	0.06
Juvenile myelomonocytic leukaemia	1	1	-	-	-	-	-	0.1	-	-	-	-	-	0.0	0.0	0.0	0.00
Myelodysplastic/myeloproliferative neoplasm. NOS	20	-	-	-	1	10	9	-	-	-	0.1	1.3	2.4	0.4	0.3	0.2	0.02
Myeloid neoplasms. NOS	7	-	-	-	2	3	2	-	-	-	0.2	0.4	0.5	0.1	0.1	0.1	0.01
Histiocytic and dendritic cell neoplasms	18	5	4	3	2	3	1	0.5	0.4	0.3	0.2	0.4	0.3	0.3	0.3	0.4	0.03
All haematological malignancies	3.645	80	127	204	692	1.333	1.209	8.4	12.5	18.1	59.1	173.3	327.5	67.3	53.8	39.3	4.12

CR: crude (all ages) incidence rate (N/100,000 person years)

ESR and WSR: age-standardised incidence using the European or World Standard Population (N/100,000 person years)

CRi: Cumulative risk 0-74 years (%)

APPENDIX 3: BELGIUM: NUMBER OF NEW DIAGNOSES (N), AGE-SPECIFIC AND AGE-STANDARDISED INCIDENCE (N/100,000) IN FEMALES IN 2012 FOR THE MAIN HAEMACARE GROUPS AND THEIR HISTOLOGICAL SUBTYPES.

HAEMACARE/WHO 2008 GROUPING	NUMBER OF NEW DIAGNOSES (N)							AGE SPECIFIC INCIDENCE (N/100.000)						CR	ESR	WSR	CRi
	Total	0-14y	15-29y	30-44y	45-59y	60-74y	75+	0-14y	15-29y	30-44y	45-59y	60-74y	75+				
Lymphoid malignancies	1.866	45	79	109	325	629	679	4.9	7.9	9.8	28.0	75.4	113.2	33.2	23.8	18.1	1.92
Hodgkin lymphoma	140	3	49	28	18	25	17	0.3	4.9	2.5	1.5	3.0	2.8	2.5	2.4	2.3	0.19
Hodgkin lymphoma. nodular lymphocyte predominance	6	1	1	2	2	-	-	0.1	0.1	0.2	0.2	-	-	0.1	0.1	0.1	0.01
Classical Hodgkin Lymphoma	134	2	48	26	16	25	17	0.2	4.8	2.3	1.4	3.0	2.8	2.4	2.3	2.2	0.18
Hodgkin lymphoma. NOS	8	-	-	1	1	3	3	-	-	0.1	0.1	0.4	0.5	0.1	0.1	0.1	0.01
Hodgkin lymphoma. lymphocyte rich	5	-	-	1	-	3	1	-	-	0.1	-	0.4	0.2	0.1	0.1	0.0	0.01
Hodgkin lymphoma. nodular sclerosis	102	1	45	21	14	13	8	0.1	4.5	1.9	1.2	1.6	1.3	1.8	1.8	1.8	0.14
Hodgkin lymphoma. mixed cellularity	17	1	3	3	1	4	5	0.1	0.3	0.3	0.1	0.5	0.8	0.3	0.3	0.2	0.02
Hodgkin lymphoma. lymphocyte depletion	2	-	-	-	-	2	-	-	-	-	-	0.2	-	0.0	0.0	0.0	0.00
Mature B-cell neoplasms	1.468	2	14	61	261	543	587	0.2	1.4	5.5	22.5	65.1	97.8	26.1	17.5	12.2	1.46
Small lymphocytic lymphoma/chronic lymphocytic leukaemia (SLL/CLL)	302	-	-	4	63	116	119	-	-	0.4	5.4	13.9	19.8	5.4	3.6	2.5	0.30
Immunoproliferative diseases/Waldenström macroglobulinaemia	48	-	-	1	9	23	15	-	-	0.1	0.8	2.8	2.5	0.9	0.6	0.4	0.06
Waldenström macroglobulinaemia	46	-	-	1	9	21	15	-	-	0.1	0.8	2.5	2.5	0.8	0.6	0.4	0.05
Other Immunoproliferative diseases	2	-	-	-	-	2	-	-	-	-	-	0.2	-	0.0	0.0	0.0	0.00
Mantle cell lymphoma	31	-	-	2	8	10	11	-	-	0.2	0.7	1.2	1.8	0.6	0.4	0.3	0.03
Follicular B-cell lymphoma	222	-	1	15	54	94	58	-	0.1	1.4	4.6	11.3	9.7	3.9	3.0	2.1	0.26
Primary cutaneous follicle centre lymphoma	8	-	1	2	1	2	2	-	0.1	0.2	0.1	0.2	0.3	0.1	0.1	0.1	0.01
Follicular lymphoma. NOS	34	-	-	2	3	16	13	-	-	0.2	0.3	1.9	2.2	0.6	0.4	0.3	0.04
Follicular lymphoma. grade 1	73	-	-	4	21	34	14	-	-	0.4	1.8	4.1	2.3	1.3	1.0	0.7	0.10
Follicular lymphoma. grade 2	63	-	-	6	20	25	12	-	-	0.5	1.7	3.0	2.0	1.1	0.9	0.7	0.08
Follicular lymphoma. grade 3	44	-	-	1	9	17	17	-	-	0.1	0.8	2.0	2.8	0.8	0.5	0.4	0.04
Diffuse large B-cell lymphoma	369	1	11	19	42	127	169	0.1	1.1	1.7	3.6	15.2	28.2	6.6	4.2	3.0	0.34
Malignant lymphoma. mixed small and large cell. diffuse (obsolete)	1	-	-	-	-	1	-	-	-	-	-	0.1	-	0.0	0.0	0.0	0.00
Primary effusion lymphoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mediastinal large B-cell lymphoma	7	-	2	3	1	1	-	-	0.2	0.3	0.1	0.1	-	0.1	0.1	0.1	0.01
Malignant lymphoma. large B-cell. diffuse. NOS	352	1	9	15	40	124	163	0.1	0.9	1.4	3.4	14.9	27.2	6.3	4.0	2.8	0.32
Malignant lymphoma. large B-cell. diffuse. immunoblastic. NOS	1	-	-	-	1	-	-	-	-	-	0.1	-	-	0.0	0.0	0.0	0.00
T-cell rich large B-cell lymphoma	4	-	-	1	-	1	2	-	-	0.1	-	0.1	0.3	0.1	0.0	0.0	0.00
Intravascular large B-cell lymphoma	2	-	-	-	-	-	2	-	-	-	-	-	0.3	0.0	0.0	0.0	-
Plasmablastic lymphoma	2	-	-	-	-	-	2	-	-	-	-	-	0.3	0.0	0.0	0.0	-
ALK positive large B-cell lymphoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

HAEMACARE/WHO 2008 GROUPING	NUMBER OF NEW DIAGNOSES (N)							AGE SPECIFIC INCIDENCE (N/100.000)						CR	ESR	WSR	CRi
	Total	0-14y	15-29y	30-44y	45-59y	60-74y	75+	0-14y	15-29y	30-44y	45-59y	60-74y	75+				
Large B-cell lymphoma arising in HHV8-associated multicentric Castleman disease	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Burkitt lymphoma/leukaemia	9	1	-	1	1	2	4	0.1	-	0.1	0.1	0.2	0.7	0.2	0.1	0.1	0.01
Marginal zone lymphoma	150	-	1	6	28	49	66	-	0.1	0.5	2.4	5.9	11.0	2.7	1.7	1.2	0.14
Mature B-cell leukaemia	9	-	-	-	3	5	1	-	-	-	0.3	0.6	0.2	0.2	0.1	0.1	0.01
Prolymphocytic leukaemia. B-cell type	3	-	-	-	-	3	-	-	-	-	-	0.4	-	0.1	0.0	0.0	0.01
Hairy cell leukaemia	6	-	-	-	3	2	1	-	-	-	0.3	0.2	0.2	0.1	0.1	0.1	0.01
Plasma cell neoplasms	328	-	1	13	53	117	144	-	0.1	1.2	4.6	14.0	24.0	5.8	3.8	2.6	0.31
Mature T-cell and NK-cell neoplasms	112	4	7	7	27	36	31	0.4	0.7	0.6	2.3	4.3	5.2	2.0	1.6	1.2	0.13
Cutaneous T-cell lymphoma	48	2	4	3	15	13	11	0.2	0.4	0.3	1.3	1.6	1.8	0.9	0.7	0.6	0.06
Mycosis fungoides	24	-	2	2	8	7	5	-	0.2	0.2	0.7	0.8	0.8	0.4	0.3	0.3	0.03
Sézary syndrome	1	-	-	-	1	-	-	-	-	-	0.1	-	-	0.0	0.0	0.0	0.00
Subcutaneous T panniculitis-like T-cell lymphoma	3	-	1	-	-	-	2	-	0.1	-	-	-	0.3	0.1	0.0	0.0	0.00
Cutaneous T-cell lymphoma. NOS	12	-	-	-	4	4	4	-	-	-	0.3	0.5	0.7	0.2	0.2	0.1	0.01
Primary cutaneous CD30+ T-cell lymphoproliferative disorder	8	2	1	1	2	2	-	0.2	0.1	0.1	0.2	0.2	-	0.1	0.2	0.2	0.01
Other T-/NK-cell lymphomas	64	2	3	4	12	23	20	0.2	0.3	0.4	1.0	2.8	3.3	1.1	0.9	0.7	0.07
Mature T-cell lymphoma. NOS	19	-	1	-	4	8	6	-	0.1	-	0.3	1.0	1.0	0.3	0.2	0.2	0.02
Angioimmunoblastic T-cell lymphoma	14	-	-	-	2	5	7	-	-	-	0.2	0.6	1.2	0.2	0.2	0.1	0.01
Anaplastic large cell lymphoma. T-cell and null cell type	13	2	1	3	1	3	3	0.2	0.1	0.3	0.1	0.4	0.5	0.2	0.2	0.2	0.02
Hepatosplenic γδ cell lymphoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Intestinal T-cell lymphoma	5	-	-	-	1	3	1	-	-	-	0.1	0.4	0.2	0.1	0.1	0.0	0.01
NK/T-cell lymphoma. nasal and nasal-type	3	-	-	1	1	1	-	-	-	0.1	0.1	0.1	-	0.1	0.0	0.0	0.00
Adult T-cell leukaemia/ lymphoma (HTLV-1 positive)	1	-	-	-	-	-	1	-	-	-	-	-	0.2	0.0	0.0	0.0	-
T-cell large granular lymphocytic leukaemia	8	-	1	-	3	2	2	-	0.1	-	0.3	0.2	0.3	0.1	0.1	0.1	0.01
Prolymphocytic leukaemia. T-cell type	1	-	-	-	-	1	-	-	-	-	-	0.1	-	0.0	0.0	0.0	0.00
Aggressive NK-cell leukaemia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lymphoblastic lymphoma/ acute (precursor cell) lymphoblastic leukaemia (ALL)	86	36	6	13	9	14	8	3.9	0.6	1.2	0.8	1.7	1.3	1.5	1.7	1.9	0.12
B-ALL	57	30	3	7	5	7	5	3.3	0.3	0.6	0.4	0.8	0.8	1.0	1.2	1.4	0.08
T-ALL	14	4	3	5	1	1	-	0.4	0.3	0.5	0.1	0.1	-	0.2	0.3	0.3	0.02
ALL. NOS	15	2	-	1	3	6	3	0.2	-	0.1	0.3	0.7	0.5	0.3	0.2	0.2	0.02
Lymphoid neoplasms. NOS	60	-	3	-	10	11	36	-	0.3	-	0.9	1.3	6.0	1.1	0.6	0.4	0.04
Myeloid malignancies	994	20	18	47	186	266	457	2.2	1.8	4.2	16.0	31.9	76.2	17.7	11.6	8.4	0.86
Acute myeloid leukaemia (AML)	221	9	8	12	52	60	80	1.0	0.8	1.1	4.5	7.2	13.3	3.9	2.9	2.2	0.23
AML other and nos	154	9	6	9	37	39	54	1.0	0.6	0.8	3.2	4.7	9.0	2.7	2.0	1.6	0.16
Acute erythroid leukaemia	8	-	-	-	1	3	4	-	-	-	0.1	0.4	0.7	0.1	0.1	0.1	0.01
AML. NOS	74	6	2	3	16	12	35	0.7	0.2	0.3	1.4	1.4	5.8	1.3	0.9	0.7	0.06

HAEMACARE/WHO 2008 GROUPING	NUMBER OF NEW DIAGNOSES (N)							AGE SPECIFIC INCIDENCE (N/100.000)						CR	ESR	WSR	CRi
	Total	0-14y	15-29y	30-44y	45-59y	60-74y	75+	0-14y	15-29y	30-44y	45-59y	60-74y	75+				
Acute myelomonocytic leukaemia	7	-	-	1	3	2	1	-	-	0.1	0.3	0.2	0.2	0.1	0.1	0.1	0.01
Acute basophilic leukaemia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AML. minimal differentiation	16	-	-	1	2	5	8	-	-	0.1	0.2	0.6	1.3	0.3	0.2	0.1	0.01
AML without maturation	15	-	2	2	7	2	2	-	0.2	0.2	0.6	0.2	0.3	0.3	0.2	0.2	0.02
AML with maturation	11	-	1	1	4	5	-	-	0.1	0.1	0.3	0.6	-	0.2	0.2	0.1	0.02
Acute monocytic leukaemia	19	2	1	1	4	7	4	0.2	0.1	0.1	0.3	0.8	0.7	0.3	0.3	0.3	0.02
Myeloid leukaemia associated with Down Syndrome	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acute megakaryoblastic leukaemia	2	1	-	-	-	1	-	0.1	-	-	-	0.1	-	0.0	0.0	0.0	0.00
Myeloid sarcoma	2	-	-	-	-	2	-	-	-	-	-	0.2	-	0.0	0.0	0.0	0.00
AML with recurrent cytogenetic abnormalities	23	-	2	2	7	5	7	-	0.2	0.2	0.6	0.6	1.2	0.4	0.3	0.2	0.02
Acute myeloid leukaemia with t(6;9)(p23;q34); DEK-NUP214	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acute promyelocytic leukaemia t(15; 17) (q22; q11-12)	9	-	2	-	4	1	2	-	0.2	-	0.3	0.1	0.3	0.2	0.1	0.1	0.01
Acute myeloid leukaemia with inv(3)(q21q26.2) or t(3;3)(q21;q26.2); RPN1-EVI1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AML with abnormal marrow eosinophils	3	-	-	1	-	1	1	-	-	0.1	-	0.1	0.2	0.1	0.0	0.0	0.00
AML. t(8.21) (q22.q22)	10	-	-	1	3	2	4	-	-	0.1	0.3	0.2	0.7	0.2	0.1	0.1	0.01
AML. 11q23 abnormalities	1	-	-	-	-	1	-	-	-	-	-	0.1	-	0.0	0.0	0.0	0.00
Acute myeloid leukaemia (megakaryoblastic) with t(1;22)(p13;q13); RBM15-MKL1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AML with multilineage dysplasia	26	-	-	-	4	9	13	-	-	-	0.3	1.1	2.2	0.5	0.3	0.2	0.02
Acute panmyelosis with myelofibrosis	6	-	-	-	1	2	3	-	-	-	0.1	0.2	0.5	0.1	0.1	0.0	0.01
Therapy related AML	12	-	-	1	3	5	3	-	-	0.1	0.3	0.6	0.5	0.2	0.2	0.1	0.01
Myeloproliferative neoplasms (MPN)	387	4	8	27	90	116	142	0.4	0.8	2.4	7.7	13.9	23.7	6.9	4.9	3.6	0.39
Chronic myeloid leukaemia (CML)	99	3	-	9	32	25	30	0.3	-	0.8	2.8	3.0	5.0	1.8	1.3	1.0	0.11
CML. NOS	57	1	-	4	19	13	20	0.1	-	0.4	1.6	1.6	3.3	1.0	0.7	0.5	0.06
CML. BCR/ABL positive	42	2	-	5	13	12	10	0.2	-	0.5	1.1	1.4	1.7	0.7	0.6	0.5	0.05
Chronic myeloproliferative neoplasms	283	-	8	17	57	90	111	-	0.8	1.5	4.9	10.8	18.5	5.0	3.5	2.5	0.27
Polycythemia vera	61	-	-	1	12	22	26	-	-	0.1	1.0	2.6	4.3	1.1	0.7	0.5	0.06
Myelosclerosis with myeloid metaplasia	36	-	1	1	3	14	17	-	0.1	0.1	0.3	1.7	2.8	0.6	0.4	0.3	0.03
Essential thrombocythemia	149	-	6	12	32	45	54	-	0.6	1.1	2.8	5.4	9.0	2.7	1.9	1.4	0.15
Chronic neutrophilic leukaemia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hypereosinophilic syndrome	5	-	1	1	-	2	1	-	0.1	0.1	-	0.2	0.2	0.1	0.1	0.1	0.01
Myeloid and lymphoid neoplasms with PDGFRA rearrangement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myeloid neoplasms with PDGFRB rearrangement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myeloid and lymphoid neoplasms with FGFR1 abnormalities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

HAEMACARE/WHO 2008 GROUPING	NUMBER OF NEW DIAGNOSES (N)							AGE SPECIFIC INCIDENCE (N/100.000)						CR	ESR	WSR	CRi
	Total	0-14y	15-29y	30-44y	45-59y	60-74y	75+	0-14y	15-29y	30-44y	45-59y	60-74y	75+				
Chronic myeloproliferative neoplasms. NOS	32	-	-	2	10	7	13	-	-	0.2	0.9	0.8	2.2	0.6	0.4	0.3	0.03
Mast cell diseases	5	1	-	1	1	1	1	0.1	-	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.01
Mast cell sarcoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malignant mastocytosis	5	1	-	1	1	1	1	0.1	-	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.01
Mast cell leukaemia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myelodysplastic syndrome (MDS)	314	5	2	7	35	78	187	0.5	0.2	0.6	3.0	9.3	31.2	5.6	3.1	2.1	0.22
Refractory anemia	34	-	-	2	5	9	18	-	-	0.2	0.4	1.1	3.0	0.6	0.3	0.2	0.03
Refractory anemia with sideroblasts	18	-	-	-	-	4	14	-	-	-	-	0.5	2.3	0.3	0.1	0.1	0.01
Refractory anemia with excess blasts	64	1	-	2	9	16	36	0.1	-	0.2	0.8	1.9	6.0	1.1	0.7	0.5	0.05
Refractory cytopenia with multilineage dysplasia	25	-	-	-	2	5	18	-	-	-	0.2	0.6	3.0	0.4	0.2	0.1	0.01
Myelodysplastic syndrome 5q deletion	5	-	-	-	1	3	1	-	-	-	0.1	0.4	0.2	0.1	0.1	0.0	0.01
Myelodysplastic syndrome. NOS	163	4	2	3	17	41	96	0.4	0.2	0.3	1.5	4.9	16.0	2.9	1.7	1.2	0.11
Refractory neutropenia	1	-	-	-	-	-	1	-	-	-	-	-	0.2	0.0	0.0	0.0	-
Refractory thrombocytopenia	4	-	-	-	1	-	3	-	-	-	0.1	-	0.5	0.1	0.0	0.0	0.00
Myelodysplastic/myeloprolif-erative neoplasms (MDS/MPN)	62	1	-	1	9	11	40	0.1	-	0.1	0.8	1.3	6.7	1.1	0.6	0.4	0.04
Atypical CML. BCR/ABL-1 negative	6	-	-	-	4	-	2	-	-	-	0.3	-	0.3	0.1	0.1	0.1	0.01
Chronic myelomonocytic leukaemia	35	-	-	-	2	7	26	-	-	-	0.2	0.8	4.3	0.6	0.3	0.2	0.02
Juvenile myelomonocytic leukaemia	1	1	-	-	-	-	-	0.1	-	-	-	-	-	0.0	0.0	0.0	0.00
Myelodysplastic/myelo-proliferative neoplasm. unclassifiable	20	-	-	1	3	4	12	-	-	0.1	0.3	0.5	2.0	0.4	0.2	0.1	0.01
Myeloid neoplasms. NOS	10	1	-	-	-	1	8	0.1	-	-	-	0.1	1.3	0.2	0.1	0.1	0.00
Histiocytic and dendritic cell neoplasms	19	7	2	5	3	2	-	0.8	0.2	0.5	0.3	0.2	-	0.3	0.4	0.4	0.03
All haematological malignancies	2.879	72	99	161	514	897	1.136	7.9	9.9	14.5	44.3	107.5	189.3	51.2	35.7	26.9	2.80

CR: crude (all ages) incidence rate (N/100,000 person years)

ESR and WSR: age-standardised incidence using the European or World Standard Population (N/100,000 person years)

CRi: Cumulative risk 0-74 years (%)

APPENDIX 4: BELGIUM: INCIDENCE, 5 YEAR PREVALENCE AND 5 YEAR RELATIVE SURVIVAL BY SEX FOR THE MAIN HAEMACARE GROUPS AND THEIR MOST FREQUENTLY DIAGNOSED HISTOLOGICAL SUBTYPES.

Haemacare/WHO 2008 grouping	Males									Females								
	Incidence (2012)			Prevalence (5 years)			5-year Relative survival			Incidence (2012)			Prevalence (5 years)			5-year Relative survival		
	N	CR	WSR	N	CR	WSR	N at risk	%	95%CI	N	CR	WSR	N	CR	WSR	N at risk	%	95%CI
Lymphoid malignancies	2,491	46.0	27.8	8,336	154.0	95.7	18,628	69.7	[68.8:70.6]	1,866	33.2	18.1	6,692	119.0	66.2	15,028	70.1	[69.1:71.1]
Hodgkin lymphoma	185	3.4	3.0	775	14.3	12.8	1,455	84.7	[82.4:86.9]	140	2.5	2.3	577	10.3	10.1	1,072	86.1	[83.6:88.4]
Hodgkin lymphoma, nodular lymphocyte predominance	17	0.3	0.3	82	1.5	1.4	151	92.4	[85.8:96.6]	6	0.1	0.1	25	0.4	0.4	45	93.4	[79.2:99.4]
Classical Hodgkin Lymphoma	168	3.1	2.7	693	12.8	11.4	1,304	83.8	[81.3:86.1]	134	2.4	2.2	552	9.8	9.7	1,027	85.8	[83.2:88.1]
Hodgkin lymphoma, NOS	14	0.3	0.2	54	1.0	0.7	132	75.3	[65.8:83.0]	8	0.1	0.1	31	0.6	0.5	93	70.6	[59.2:79.8]
Hodgkin lymphoma, lymphocyte rich	10	0.2	0.1	44	0.8	0.6	75	83.6	[70.1:92.8]	5	0.1	0.0	23	0.4	0.3	38	83.7	[64.2:94.8]
Hodgkin lymphoma, nodular sclerosis	102	1.9	1.8	449	8.3	7.8	822	87.4	[84.4:89.9]	102	1.8	1.8	417	7.4	7.6	756	90.4	[87.7:92.6]
Hodgkin lymphoma, mixed cellularity	39	0.7	0.6	140	2.6	2.1	259	79.5	[72.6:85.3]	17	0.3	0.2	79	1.4	1.3	130	73.7	[63.7:81.8]
Mature B-cell neoplasms	1,949	36.0	19.7	6,491	119.9	66.6	14,763	69.7	[68.7:70.7]	1,468	26.1	12.2	5,320	94.6	45.1	12,072	69.9	[68.8:71.0]
Small lymphocytic lymphoma/ chronic lymphocytic leukaemia (SLL/CLL)	506	9.3	4.9	1,845	34.1	17.9	3,683	84.2	[82.1:86.1]	302	5.4	2.5	1,328	23.6	10.3	2,601	85.1	[82.9:87.3]
Immunoproliferative diseases/ Waldenström macroglobu-linaemia	87	1.6	0.8	305	5.6	2.8	665	72.3	[67.1:77.2]	48	0.9	0.4	183	3.3	1.5	405	77.1	[70.7:82.8]
Waldenström macroglobulinaemia	86	1.6	0.7	298	5.5	2.7	655	72.0	[66.7:77.0]	46	0.8	0.4	179	3.2	1.4	401	77.3	[70.9:83.1]
Mantle cell lymphoma	91	1.7	0.9	287	5.3	2.8	722	56.5	[51.6:61.2]	31	0.6	0.3	133	2.4	1.1	311	64.5	[57.2:71.2]
Follicular B-cell lymphoma	180	3.3	2.0	741	13.7	8.1	1,530	86.1	[83.3:88.7]	222	3.9	2.1	876	15.6	8.1	1,690	88.0	[85.5:90.2]
Follicular lymphoma, NOS	25	0.5	0.3	129	2.4	1.4	389	80.3	[74.3:85.7]	34	0.6	0.3	163	2.9	1.4	428	85.0	[79.9:89.4]
Follicular lymphoma, grade 1	57	1.1	0.6	294	5.4	3.3	556	92.4	[88.2:96.0]	73	1.3	0.7	325	5.8	3.1	584	92.0	[87.9:95.4]
Follicular lymphoma, grade 2	51	0.9	0.6	183	3.4	2.0	347	87.7	[82.0:92.6]	63	1.1	0.7	236	4.2	2.2	405	89.6	[84.5:93.9]
Follicular lymphoma, grade 3	41	0.8	0.4	123	2.3	1.4	224	77.8	[69.0:85.3]	44	0.8	0.4	138	2.5	1.2	258	80.6	[73.3:86.9]
Diffuse large B-cell lymphoma	460	8.5	4.7	1,270	23.5	13.7	3,302	59.4	[57.3:61.6]	369	6.6	3.0	1,114	19.8	9.9	3,006	59.5	[57.3:61.7]
Burkitt lymphoma/leukaemia	28	0.5	0.6	93	1.7	2.0	163	54.8	[46.2:62.8]	9	0.2	0.1	53	0.9	1.0	92	51.7	[40.4:62.0]
Marginal zone lymphoma	132	2.4	1.3	471	8.7	4.7	956	84.7	[80.8:88.3]	150	2.7	1.2	520	9.2	4.4	1,041	83.1	[79.5:86.4]
Mature B-cell leukaemia	36	0.7	0.4	160	3.0	1.8	326	94.8	[89.3:99.2]	9	0.2	0.1	39	0.7	0.4	86	82.4	[69.2:92.3]
Hairy cell leukaemia	33	0.6	0.4	157	2.9	1.7	316	94.8	[89.2:99.2]	6	0.1	0.1	36	0.6	0.3	75	86.8	[73.1:96.5]
Plasma cell neoplasms	429	7.9	4.2	1,319	24.4	12.8	3,416	52.8	[50.6:55.0]	328	5.8	2.6	1,077	19.2	8.5	2,840	51.3	[49.0:53.6]
Mature T-cell and NK-cell neoplasms	170	3.1	1.9	536	9.9	6.4	1,253	62.7	[59.2:66.1]	112	2.0	1.2	362	6.4	3.8	824	67.8	[63.7:71.6]
Cutaneous T-cell lymphoma	66	1.2	0.7	299	5.5	3.4	586	84.1	[79.0:88.8]	48	0.9	0.6	200	3.6	2.1	370	90.7	[85.2:95.3]
Mycosis fungoides	47	0.9	0.5	209	3.9	2.3	403	89.6	[83.4:94.9]	24	0.4	0.3	129	2.3	1.2	240	93.1	[86.2:98.4]
Cutaneous T-cell lymphoma, NOS	9	0.2	0.1	32	0.6	0.4	73	73.0	[56.9:86.3]	12	0.2	0.1	30	0.5	0.3	71	79.9	[65.0:91.1]
Primary cutaneous CD30+ T-cell lymphoproliferative disorder	7	0.1	0.1	43	0.8	0.6	79	72.9	[58.3:84.5]	8	0.1	0.2	25	0.4	0.4	37	92.3	[72.4:101.9]
Other T-/NK-cell lymphomas	104	1.9	1.2	237	4.4	3.0	667	43.9	[39.5:48.4]	64	1.1	0.7	162	2.9	1.8	454	49.2	[43.9:54.4]
Mature T-cell lymphoma, NOS	31	0.6	0.4	60	1.1	0.8	219	30.2	[23.4:37.3]	19	0.3	0.2	37	0.7	0.4	144	33.1	[24.3:42.4]
Angioimmunoblastic T-cell lymphoma	24	0.4	0.3	37	0.7	0.4	108	37.4	[26.6:48.5]	14	0.2	0.1	34	0.6	0.3	84	52.1	[39.3:64.1]
Anaplastic large cell lymphoma, T-cell and null cell type	19	0.4	0.2	70	1.3	1.0	179	61.0	[52.2:69.1]	13	0.2	0.2	40	0.7	0.6	104	65.1	[54.2:74.4]
T-cell large granular lymphocytic leukaemia	15	0.3	0.2	44	0.8	0.5	69	68.8	[49.9:84.1]	8	0.1	0.1	36	0.6	0.3	58	74.3	[56.7:87.3]
Lymphoblastic lymphoma/acute (precursor cell) lymphoblastic leukaemia (ALL)	95	1.8	2.3	312	5.8	7.9	396	42.5	[37.2:47.7]	86	1.5	1.9	230	4.1	5.7	327	42.5	[36.5:48.3]
B-ALL	55	1.0	1.4	194	3.6	5.1	209	40.2	[32.8:47.6]	57	1.0	1.4	158	2.8	4.2	173	37.6	[29.7:45.4]
T-ALL	28	0.5	0.7	83	1.5	2.1	106	52.7	[42.1:62.3]	14	0.2	0.3	37	0.7	0.8	60	59.5	[44.6:71.7]
ALL, NOS	12	0.2	0.3	35	0.6	0.8	81	34.5	[23.9:45.5]	15	0.3	0.2	35	0.6	0.6	94	40.5	[29.5:51.4]
Lymphoid neoplasms, NOS	92	1.7	0.8	244	4.5	2.3	761	66.3	[61.7:70.7]	60	1.1	0.4	209	3.7	1.6	733	63.7	[59.1:68.2]

Haemacare/WHO 2008 grouping	Males									Females								
	Incidence (2012)			Prevalence (5 years)			5-year Relative survival			Incidence (2012)			Prevalence (5 years)			5-year Relative survival		
	N	CR	WSR	N	CR	WSR	N at risk	%	95%CI	N	CR	WSR	N	CR	WSR	N at risk	%	95%CI
Myeloid malignancies	1,136	21.0	11.2	3,120	57.6	32.2	8,190	49.5	[48.0:50.9]	994	17.7	8.4	2,831	50.4	25.2	6,827	57.4	[55.9:58.9]
Acute myeloid leukaemia (AML)	281	5.2	3.0	482	8.9	6.2	2,122	23.8	[21.8:25.9]	221	3.9	2.2	464	8.3	5.8	1,796	28.7	[26.4:31.0]
AML other and nos	189	3.5	2.0	308	5.7	4.1	1,451	22.6	[20.3:25.1]	154	2.7	1.6	280	5.0	3.8	1,277	24.4	[21.8:27.0]
Acute erythroid leukaemia	9	0.2	0.1	16	0.3	0.2	78	20.8	[11.2:32.6]	8	0.1	0.1	11	0.2	0.1	52	22.6	[12.1:35.4]
AML, NOS	96	1.8	0.9	108	2.0	1.3	635	15.7	[12.6:19.1]	74	1.3	0.7	98	1.7	1.2	569	16.7	[13.4:20.3]
Acute myelomonocytic leukaemia	16	0.3	0.2	27	0.5	0.4	99	31.6	[21.9:42.0]	7	0.1	0.1	23	0.4	0.3	83	39.8	[28.6:51.0]
AML, minimal differentiation	12	0.2	0.1	34	0.6	0.4	174	23.7	[17.1:31.0]	16	0.3	0.1	32	0.6	0.4	150	26.3	[19.2:34.1]
AML without maturation	14	0.3	0.2	24	0.4	0.3	99	29.1	[19.9:39.1]	15	0.3	0.2	28	0.5	0.4	115	33.2	[24.2:42.6]
AML with maturation	14	0.3	0.2	43	0.8	0.5	169	29.7	[22.3:37.6]	11	0.2	0.1	36	0.6	0.5	135	34.7	[26.0:43.6]
Acute monocytic leukaemia	23	0.4	0.3	40	0.7	0.6	156	29.2	[21.7:37.2]	19	0.3	0.3	44	0.8	0.7	140	25.1	[17.9:33.0]
AML with recurrent cytogenetic abnormalities	23	0.4	0.3	64	1.2	1.0	209	37.9	[30.5:45.3]	23	0.4	0.2	84	1.5	1.1	185	58.6	[50.8:65.8]
AML with multilineage dysplasia	44	0.8	0.4	62	1.1	0.6	333	18.6	[14.0:23.8]	26	0.5	0.2	49	0.9	0.4	216	20.9	[15.2:27.4]
Acute panmyelosis with myelofibrosis	12	0.2	0.1	30	0.6	0.3	73	36.8	[23.8:50.5]	6	0.1	0.0	26	0.5	0.2	44	64.6	[44.8:80.7]
Myeloproliferative neoplasms (MPN)	374	6.9	4.1	1,355	25.0	14.7	2,541	80.6	[78.2:83.0]	387	6.9	3.6	1,360	24.2	12.4	2,461	86.6	[84.4:88.7]
Chronic myeloid leukaemia (CML)	67	1.2	0.8	337	6.2	4.2	682	79.8	[75.4:83.7]	99	1.8	1.0	307	5.5	3.2	581	82.0	[77.4:86.1]
CML, NOS	41	0.8	0.5	202	3.7	2.4	436	75.2	[69.4:80.5]	57	1.0	0.5	177	3.1	1.7	353	77.8	[71.4:83.4]
CML, BCR/ABL positive	26	0.5	0.3	135	2.5	1.8	246	87.8	[81.4:93.0]	42	0.7	0.5	130	2.3	1.5	228	88.7	[82.0:93.9]
Chronic myeloproliferative neoplasms	297	5.5	3.1	993	18.3	10.1	1,818	81.1	[78.1:83.9]	283	5.0	2.5	1,020	18.1	8.7	1,826	87.9	[85.3:90.4]
Polycythemia vera	89	1.6	1.0	299	5.5	3.1	505	96.3	[91.3:100.6]	61	1.1	0.5	257	4.6	2.1	444	91.7	[86.4:96.2]
Myelosclerosis with myeloid metaplasia	74	1.4	0.7	179	3.3	1.7	338	49.3	[41.8:56.7]	36	0.6	0.3	86	1.5	0.7	210	49.9	[41.1:58.5]
Essential thrombocythemia	105	1.9	1.1	420	7.8	4.3	763	87.9	[83.5:92.0]	149	2.7	1.4	578	10.3	5.0	998	95.2	[91.9:98.2]
Chronic myeloproliferative neoplasms, NOS	21	0.4	0.2	67	1.2	0.7	158	65.6	[54.7:75.5]	32	0.6	0.3	81	1.4	0.7	142	81.3	[69.3:91.0]
Mast cell diseases	10	0.2	0.1	25	0.5	0.4	41	70.6	[51.8:83.9]	5	0.1	0.1	33	0.6	0.5	54	92.0	[77.8:99.2]
Myelodysplastic syndrome (MDS)	386	7.1	3.3	998	18.4	8.7	2,726	41.8	[39.2:44.4]	314	5.6	2.1	812	14.4	5.5	2,006	48.9	[45.9:51.9]
Refractory anemia	42	0.8	0.3	129	2.4	1.1	320	57.8	[49.6:65.9]	34	0.6	0.2	106	1.9	0.7	237	61.1	[51.9:69.7]
Refractory anemia with sideroblasts	25	0.5	0.2	83	1.5	0.6	217	57.2	[47.1:67.1]	18	0.3	0.1	77	1.4	0.4	149	67.2	[55.0:78.3]
Refractory anemia with excess blasts	57	1.1	0.5	120	2.2	1.1	438	18.9	[14.4:24.0]	64	1.1	0.5	97	1.7	0.7	291	23.8	[17.9:30.4]
Refractory cytopenia with multilineage dysplasia	41	0.8	0.4	108	2.0	1.0	219	40.3	[31.0:49.8]	25	0.4	0.1	66	1.2	0.4	115	49.9	[36.1:63.6]
Myelodysplastic syndrome 5q deletion	2	0.0	0.0	9	0.2	0.1	23	50.8	[25.2:74.5]	5	0.1	0.0	27	0.5	0.2	65	64.6	[48.1:78.6]
Myelodysplastic syndrome, NOS	219	4.0	1.8	549	10.1	4.9	1,509	42.9	[39.5:46.4]	163	2.9	1.2	433	7.7	3.0	1,143	49.2	[45.3:53.2]
Myelodysplastic/myeloproliferative neoplasms (MDS/MPN)	88	1.6	0.7	266	4.9	2.4	667	45.6	[40.6:50.6]	62	1.1	0.4	184	3.3	1.3	477	53.1	[47.2:58.9]
Atypical CML, BCR/ABL-1 negative	6	0.1	0.0	18	0.3	0.2	60	44.4	[29.7:59.0]	6	0.1	0.1	9	0.2	0.1	44	66.6	[48.0:81.2]
Chronic myelomonocytic leukaemia	61	1.1	0.5	134	2.5	1.1	363	30.5	[24.2:37.2]	35	0.6	0.2	81	1.4	0.5	215	31.3	[23.0:40.2]
Myelodysplastic/myeloproliferative neoplasm, unclassifiable	20	0.4	0.2	110	2.0	1.1	244	66.4	[57.9:74.3]	20	0.4	0.1	92	1.6	0.7	218	69.7	[60.9:77.6]
Myeloid neoplasms, NOS	7	0.1	0.1	19	0.4	0.2	134	28.0	[19.7:37.2]	10	0.2	0.1	11	0.2	0.1	87	30.2	[20.1:41.2]
Histiocytic and dendritic cell neoplasms	18	0.3	0.4	79	1.5	1.9	75	72.1	[59.1:82.2]	19	0.3	0.4	84	1.5	2.0	76	79.5	[66.6:88.3]
All haematological malignancies	3,645	67.3	39.3	11,486	212.2	129.3	26,875	63.7	[62.9:64.4]	2,879	51.2	26.9	9,580	170.4	93.2	21,907	66.2	[65.4:67.0]

CR: Crude (all ages) rate (N/100,000 person years)

WSR: age-standardised rate, using the world population (N/100,000 person years)

Relative survival calculated for adults (age 15+) diagnosed between 2004 and 2012

10 years
Belgian Cancer Registry

Cancer Incidence in Belgium

years

Cancer Incidence in Belgium 2012

Special Issue

Haematological malignancies