Netherlands

Cancer

Registry

Lung cancer and mesothelioma in the Netherlands

1989–1997

Vereniging van
Integrale Kankercentra
Association of Comprehensive Cancer Centres

Contents

Foreword

As of 1989, the Netherlands Cancer Registry publishes annual reports regarding the incidence of cancer in the Netherlands. These reports contain basic statistical information, which forms an important source for epidemiological and public health research.

In addition to these statistical reports, special papers regarding the clinical epidemiology of specific types of cancer, e.g. urological or gynaecological cancer, are published on a regular basis. The WCLC post-Tokyo evaluation meeting was considered a suitable occasion to present a detailed overview of lung cancer and mesothelioma in the Netherlands. It intends to provide an overview of incidence, mortality, tumour stage, treatment and survival to clinicians, involved in diagnosis and treatment of patients with lung cancer or mesothelioma. It also demonstrates the potential of a population-based registry, containing both epidemiological and clinical information.

Co-operation between the Dutch Lung Cancer Study Group and the Association of Comprehensive Cancer Centres is considered essential for the development and implementation of treatment guidelines.

Although both lung cancer and mesothelioma are amenable to preventive measures, more attention for the improvement of treatment options is indispensable. We hope that this special paper and the post-Tokyo meeting will contribute to the improvement of survival for these diseases, which kill more than 7000 men and 1900 women each year.

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Chairman Dutch Lung Cancer Study Group

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Association of Comprehensive Cancer Centres, responsible for the Netherlands Cancer Registry

Introduction and methods

This report is the seventh in a series of reports, specifically meant for clinicians. The current report contains a number of papers regarding the (clinical) epidemiology of lung cancer and mesothelioma in the Netherlands. Statistical information in these papers is mainly derived from the Netherlands Cancer Registry. A general chapter at page 26 provides additional information regarding the structure of the Netherlands Cancer Registry, the sources of information used and the quality of the data. That chapter also contains information regarding the calculation of rates and risks.

In this report also information from other sources is presented. Mortality data were made available by Statistics Netherlands. Incidence statistics for other European countries were obtained from the EUROCIM database <http://www-dep.iarc.fr/encr.htm>. Survival rates were compared with those of other countries using information from the EUROCARE study <http://www.iarc.fr/>.

Since follow-up information is not readily available in the Netherlands, survival analyses were restricted to patients from the IKA-Amsterdam Cancer Registry and the IKZ-Eindhoven Cancer Registry, excluding patients diagnosed at autopsy. In clinical studies, disease-specific survival is the most common outcome measure to control for death due to causes other than the underlying cancer. Since cause of death records are not available to the cancer registry, relative survival is used instead. Relative survival is calculated as the ratio of the observed and the expected actuarial rates, using a program of the Finnish Cancer Registry <http://www.cancerregistry.fi/surv2/index.html>.

Expected survival rates were calculated from age-, sex- and period-specific life tables (supplied by Statistics Netherlands).

Coding definitions

In the Netherlands Cancer Registry tumour types are defined by the topography and morphology of the tumour. The topography codes are derived from the ICD-O-1 (International Classification of Diseases for Oncology), the morphology codes from the ICD-O-2. For tabulation purposes, topography and morphology information is combined in specific groups [tables 0.1, 0.2].

Staging

For chapter 4 stage was based on the pre-treatment clinical TNM-classification; for chapter 5 on the combined pre- and postsurgical histopathological TNM-classification. Categories were condensed according to UICC stage grouping [ref 10].

Table 0.1
Subgroup definitions for lung cancer (T162)

GROUP NAME	MORPHOLOGY
small cell carcinoma	8041-8049, 8246
squamous cell carcinoma	8032, 8052, 8070-8089
adenocarcinoma	8140-8149, 8250-8269, 8310, 8323, 8480-8490, 8550, 8570-8579
large cell carcinoma	8012
other/not specified	other

Table 0.2
Subgroup definitions for mesothelioma

GROUP NAME	TOPOGRAPHY	MORPHOLOGY
pleural mesothelioma	T163	9050-9053
other mesothelioma	other	9050-9053
pleura other/not specified	T163	other

1 Trends in incidence of and mortality from lung cancer

J.A.A.M. van Dijck

Incidence and mortality

In the period 1989-1997, lung cancer has been a large problem in the Netherlands. In males, it was the most frequent cancer. In females, it was the fourth most common cancer in 1989, but it ranked third in 1997.

In males, the number of newly diagnosed lung cancers decreased from 7246 in 1989 to 6688 in 1997 [table 1.1]. The corresponding incidence rates (ESR, European standardized rate per 100.000 persons) decreased from 108.9 to 88.3. The Estimated Annual Percentage Change (EAPC) in the ESR was -2.6% ($p<0.001$). Mortality rates also decreased considerably from 109.8 to 88.9.

In females, the trends were opposite to those in males. The numbers of newly diagnosed cancers increased from 1298 to 2093 in the period 1989-1997. The ESR rose from 16.9 to 24.3 (EAPC 4.8%, $p<0.001$). The trend in the mortality rate was comparable; the ESR rose from 14.9 to 20.9.

In both males and females, incidence and mortality rates steeply increase with age [figure 1.1]. In males, the peak incidence rate (754 per 100.000 person-years) was observed in the age group 75-79. In females however, the peak incidence rate (86 per 100.00 person-years) occurred in the age group 65-69.

Morphological type

In the most recent years (1995-1997), squamous cell carcinoma was the most frequently diagnosed morphological type in males (ESR 34.8), followed by adenocarcinoma (ESR 18.6), small cell carcinoma (ESR 15.3) and large cell carcinoma (ESR 12.1) [table 1.2a]. The incidence rates of the various morphological types showed different trends. For adenocarcinoma, no apparent trend was visible (EAPC 1.3%, $p=0.07$), whereas for large cell carcinoma an increase was observed (EAPC 4.0%). The incidence of squamous cell carcinoma, small cell carcinoma and other morphologies decreased (EAPC -4.9%, -4.1% and -3.6%, respectively). As already mentioned, the overall EAPC was -2.6%.

In females, adenocarcinoma was the most frequently diagnosed morphological type in the most recent 3-year period (ESR 7.3), followed by small cell carcinoma (ESR 5.4), squamous cell carcinoma (ESR 4.4), large cell carcinoma (ESR 3.1) and other morphological types (ESR 3.1) [table 1.2b]. All morphological types increased in incidence. The increase was largest for large cell carcinoma (EAPC 9.9%) and smallest for squamous cell and small cell carcinoma (EAPC 2.8% and 3.2%, respectively).

Discussion

Changes in lung cancer incidence and mortality are caused by changes in the prevalence of risk factors 20 to 30 years earlier. The strongest risk factor for lung cancer is smoking. The risk for heavy smokers relative to non-smokers is 15 or more. The relative risk increases with the duration of smoking. In the past decades, the prevalence of smoking among Dutch males has decreased, whereas that among Dutch females has increased. This may be the most important explanation for the trends in incidence and mortality.

For males, the decrease in incidence is seen in the subtypes for which epidemiological studies have shown the strongest relative risks (squamous cell carcinoma and small cell carcinoma with relative risk

in relation to smoking of 15 or more versus a relative risk of 3-5 for adenocarcinoma). This observation is in accordance with the decreasing prevalence of smoking. For females, the strongest increase in incidence is visible in large cell and adenocarcinoma. Explanations may be differences in smoking habits between males and females such as the type of cigarettes smoked (filter yes/no, concentration of smoke compounds), the depth of inhalation, age at which smoking is begun, etc. Further, a difference between males and females may exist in the exposure to other risk factors (e.g. passive smoking and occupation-related exposures).

Table 1.1
Incidence of and mortality from lung cancer by gender, 1989-1997

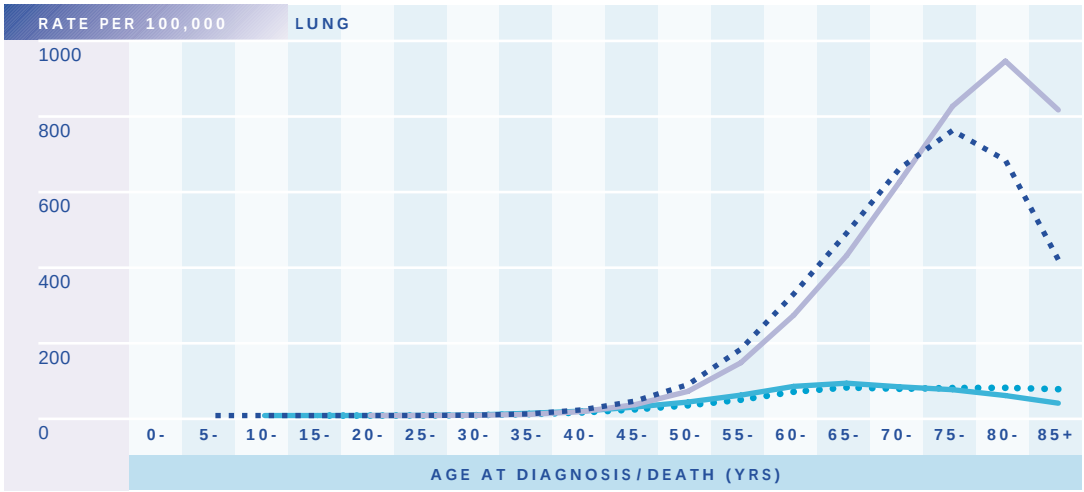
YEAR	INCIDENCE				MORTALITY			
	MALES		FEMALES		MALES		FEMALES	
	N	ESR	N	ESR	N	ESR	N	ESR
1989	7246	108.9	1298	16.9	7318	109.8	1232	14.9
1990	7377	108.8	1358	17.1	7011	103.6	1230	14.7
1991	7521	109.5	1483	18.8	7148	104.0	1272	15.2
1992	7486	107.1	1560	19.2	7097	101.4	1415	16.6
1993	7201	101.7	1737	21.2	7071	100.0	1545	17.8
1994	7186	100.0	1784	21.5	6934	96.5	1632	18.9
1995	7110	97.1	1897	22.4	6920	94.3	1731	19.5
1996	7025	94.4	1980	23.2	6766	91.0	1800	19.7
1997	6688	88.3	2093	24.3	6724	88.9	1884	20.9

N = number • ESR = European standardized rate per 100.000 persons
Source: Netherlands Cancer Registry/Statistics Netherlands

Figure 1.1
Age specific incidence of and mortality from lung cancer, 1989-1997

incidence males
mortality males

incidence females
mortality females



Source: Netherlands Cancer Registry/Statistics Netherlands

Table 1.2a
Incidence of lung cancer by morphological type, males 1989-1997

MORPHOLOGICAL TYPE	PERIOD						EAPC	P
	1989-1991		1992-1994		1995-1997			
	N	ESR	N	ESR	N	ESR		
squamous cell carcinoma	9567	47.0	8820	41.3	7784	34.8	-4.9	0.0000
adenocarcinoma	3448	17.2	3884	18.4	4153	18.6	1.3	0.0655
small cell carcinoma	4044	20.0	3882	18.4	3402	15.3	-4.1	0.0001
large cell carcinoma	1944	9.5	2235	10.5	2698	12.1	4.0	0.0004
other	3141	15.3	3052	14.4	2786	12.4	-3.6	0.0011
Total	**22144**	**109.0**	**21873**	**102.9**	**20823**	**93.2**	**-2.6**	**0.0000**

N = number • ESR = European standardized rate per 100.000 persons • EAPC = Estimated Annual Percentage Change •
Source: Netherlands Cancer Registry

Table 1.2b
Incidence of lung cancer by morphological type, females 1989-1997

MORPHOLOGICAL TYPE	PERIOD						EAPC	P
	1989-1991		1992-1994		1995-1997			
	N	ESR	N	ESR	N	ESR		
squamous cell carcinoma	879	3.8	1020	4.1	1149	4.4	2.8	0.0171
adenocarcinoma	1218	5.1	1523	6.3	1834	7.3	6.1	0.0000
small cell carcinoma	1013	4.4	1184	5.0	1337	5.4	3.2	0.0001
large cell carcinoma	409	1.8	574	2.3	806	3.1	9.9	0.0000
other	620	2.5	780	2.9	844	3.1	4.1	0.0010
Total	**4139**	**17.6**	**5081**	**20.6**	**5970**	**23.3**	**4.8**	**0.0000**

N = number • ESR = European standardized rate per 100.000 persons • EAPC = Estimated Annual Percentage Change •
Source: Netherlands Cancer Registry

2 Trends in incidence of and mortality from mesothelioma

R.A.M. Damhuis

In 1958 a Dutch pathologist reported 3 patients with pleural mesothelioma who had been occupationally exposed to asbestos [ref 1]. At that time, malignant mesothelioma was a rare disease and its existence was even challenged. Evaluation of trends in mesothelioma incidence is still hampered by variation in definitions and diagnostic expertise. A few decades ago, pleural metastases from lung cancer could easily be misdiagnosed as arising from the pleura. Pathologists having little experience in diagnosing mesothelioma were then requested to send samples to the National Mesothelioma Panel for review. Although this service still exists, many pathologists are now capable of diagnosing mesothelioma, even when occurring in other sites covered with mesothelium such as the peritoneal cavity, pericardium or tunica vaginalis testis.

In the period until 1996, mortality statistics were available for cancer of the pleura (T 163), so including other morphologies. As of 1996, a new version of the International Classification of Diseases (ICD 10) is used by Statistics Netherlands in which mesothelioma of all sites are combined (C 45), but non-mesothelioma pleural cancer is excluded. In table 2.1, the incidence is calculated for pleural mesothelioma, mesothelioma of other sites and for cancers of the pleura, morphology not specified or different from mesothelioma. The latter group, however, may still include mesothelioma in case the diagnosis was not verified by microscopical evaluation (>60%). The incidence rates appear to be reliable because more than 90% of the total incidence comprises pathology certified mesothelioma. Also, incidence rates match the mortality rates which is to be expected given the poor prognosis.

In contrast with a number of alarming reports [ref 2, 3, 4], the incidence of mesothelioma remained stable over the time period 1989-1997. The predictions that the mesothelioma incidence would rise to epidemic levels have not (yet?) come true. Accurate predictions are, however, difficult to make given the absence of information on the number of people exposed to the different types of asbestos. The use of crocidolite (blue asbestos) was banned in 1977 and, concurrently, employment in shipping industry decreased strongly. The malignant potential of chrysotile (white asbestos), which was widely used in construction and banned only recently, seems to be more certain for lung cancer than for mesothelioma. Peak incidence rates are therefore still seen in regions with shipping industry (chapter 3). In females, no trend in mesothelioma incidence could be observed (44 new patients a year, ESR 0.5).
As a result of the long latency period between exposure to asbestos and the development of mesothelioma, 20 to 50 years, mesothelioma are mainly diagnosed in men who have already retired from work. Peak incidence rates for males are seen in the age-group 75-79 and for females in the age-group 70-74 [figure 2.1].

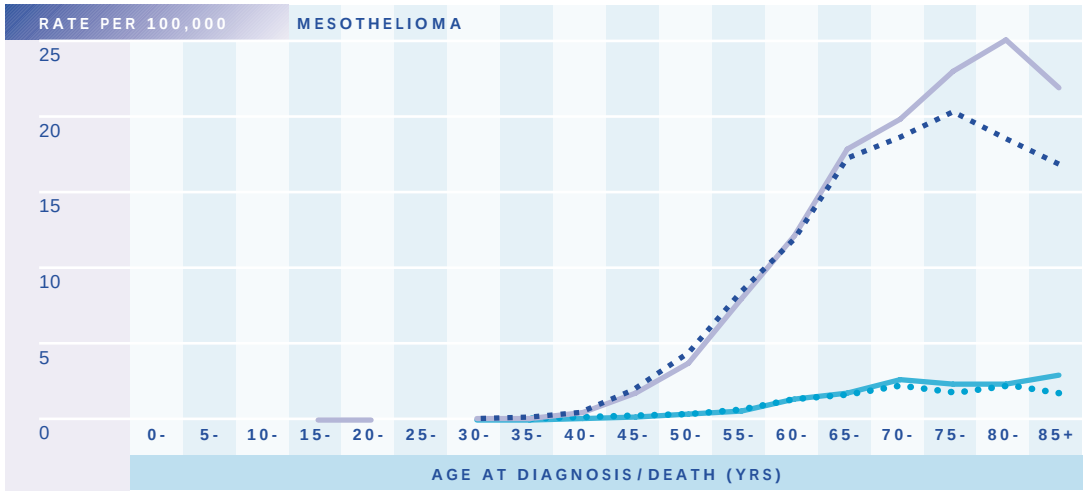
Table 2.1a
Incidence of and mortality from mesothelioma in males, 1989-1997

YEAR	INCIDENCE						MORTALITY	
	MESOTHELIOMA (T163)		PLEURA NS/OTHER		MESOTHELIOMA OTHER		T163[1]/C45[2]	
	N	ESR	N	ESR	N	ESR	N	ESR
1989	221	3.4	21	0.3	16	0.3	208	3.1
1990	213	3.2	17	0.3	20	0.3	236	3.6
1991	226	3.3	19	0.3	14	0.2	218	3.2
1992	299	4.3	26	0.4	24	0.4	259	3.8
1993	237	3.4	25	0.4	16	0.2	296	4.2
1994	257	3.6	22	0.3	21	0.3	301	4.2
1995	273	3.8	29	0.4	19	0.3	278	3.8
1996	313	4.3	23	0.3	18	0.2	282	3.8
1997	285	3.8	13	0.2	12	0.2	328	4.4

1) = 1989-1995 • 2) = 1996-1997 • N = number • ESR = European standardized rate per 100.000 persons •
Source: Netherlands Cancer Registry/Statistics Netherlands

Figure 2.1
Age-specific incidence of and mortality from mesothelioma, 1989-1997

incidence males
mortality males
incidence females
mortality females



Source: Netherlands Cancer Registry, Statistics Netherlands

3 Geographical variation in the incidence of lung cancer and mesothelioma

S. Siesling

National comparisons

For the period 1989 to 1997, incidence rates for lung cancer and mesothelioma (ESR, European standardized rate per 100.000 persons) were calculated by province. For lung cancer in males, incidence rates were lowest in the provinces Zeeland (80.6) and Zuid-Holland (96.3) and highest in Limburg (111.7) and Noord-Brabant (108.5) [figure 3.1].
For females, the incidence rates were lowest in the provinces Zeeland (12.6) and Friesland (14.3) and highest in Flevoland (30.4) and Noord-Holland (24.8) [figure 3.2]. Since smoking is the decisive risk factor for lung cancer, differences in incidence of lung cancer can be explained mainly by the differences in smoking habits by province. High incidence rates of lung cancer in females were particularly seen in the western urban provinces of the Netherlands, where women started smoking earlier compared to the other provinces.

The incidence of mesothelioma in males was lowest in Drenthe (1.3) and Friesland (2.1) and highest in Zeeland (7.6) and Zuid-Holland (5.5) [figure 3.3].
For females, no striking differences in the incidence of mesothelioma could be determined. The ESR was lowest in Drenthe (0.2) and highest in Flevoland (0.9) and Overijssel (0.8) [figure 3.4].
Since contact with asbestos is the main cause of mesothelioma, differences in incidence between provinces are mainly related to differences in occupational exposure, particularly men working in ship building industries [ref 5, 6]. In the Netherlands, this kind of industry was concentrated in the western part of the country (Vlissingen, Rotterdam, Amsterdam, Den Helder).

International comparisons

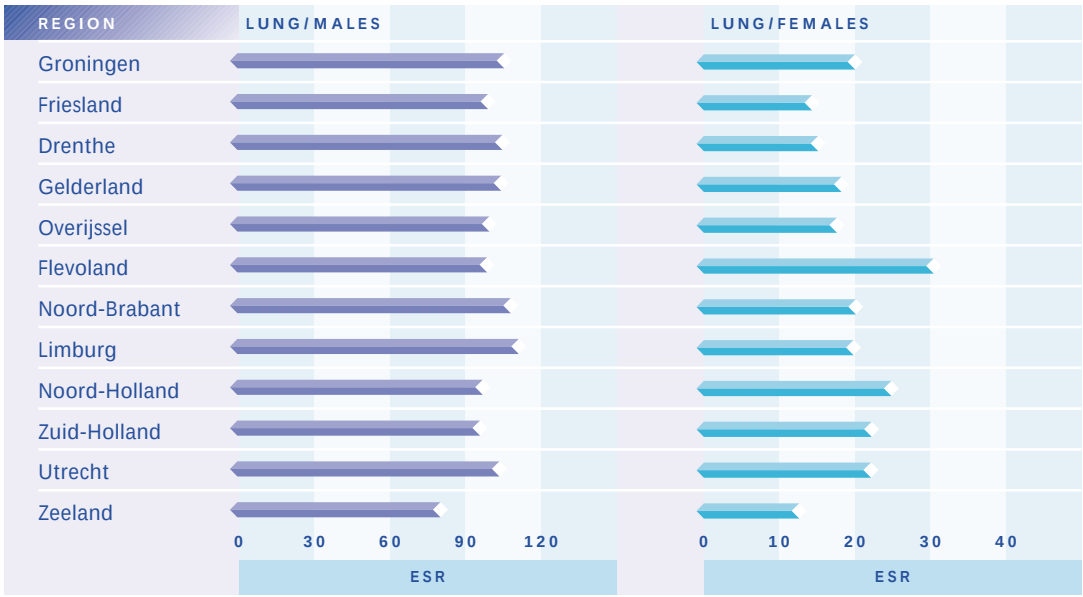
For comparison of lung and pleural cancer incidence in the Netherlands with other regions within Europe the EUROCIM database was used (see introduction and methods). We compared the incidence of lung and pleural cancer in the Netherlands (all Dutch registries included) with that in Denmark, Italy (Varese), Finland, France (Calvados, Somme and Doubs), Iceland, Poland (Cracow), Slovenia, Sweden, Switzerland (Geneva and Basel), Spain (Basque, Navarra and Tarragona) and the UK (Yorkshire). All registries, except for the UK, had a proportion of microscopically verified diagnosis higher than 90%. Incidence rates (ESR) were calculated for the period 1990-1994, except for Italy, for which only data was available for the period 1990-1992. Instead of mesothelioma, the disease entity pleural cancer was studied to accommodate for international differences in the availability of specific morphology information (see chapter 2).

Incidence rates of lung cancer in Dutch males (>80 per 100,000 person-years) were high and similar to those for males in Italy, Poland and Slovenia [figure 3.5]. The incidence was moderate (50-80) for males in France, Spain, Denmark, Finland, Switzerland, UK and Iceland. In Sweden the incidence for males was low (<50).
For females the lung cancer incidence rates were highest (>20 per 100,000 person-years) in the UK, Iceland, Denmark, Poland and Switzerland [figure 3.6]. The incidence for Dutch females was moderate (10-20), and was similar to those for Sweden, Slovenia, Finland and Italy. The incidence was low (<10) for females in France and Spain.

Since smoking is the major risk factor for lung cancer, differences in the incidence of lung cancer can be explained mainly by the differences in smoking habits by country. For instance, the percentage of male smokers has been very high in the Netherlands (95% in 1960), which has resulted in a very high lung cancer incidence rate among males in the 1980s [ref 7]. In contrast, in Sweden and Iceland the percentages of smokers have been low, which has resulted in a low lung cancer incidence [ref 8].
For females, the percentage of smokers always has been lower than that of males. The incidence rate of lung cancer in females was relatively high in Iceland, Denmark and the UK. The percentage of female smokers has also been high in these countries [ref 8].

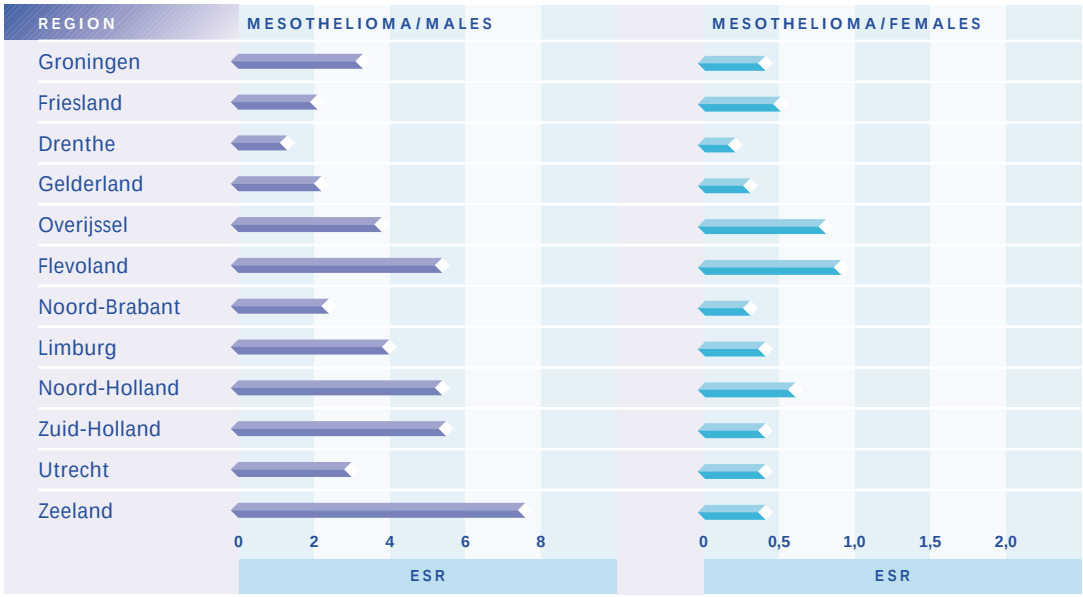
The incidence of pleural cancer in Dutch males was high compared to other European countries [figure 3.7]. The incidence rates for pleural cancer in the UK, Denmark and Italy were also high (>2 per 100,000 person-years). Moderate incidence rates for pleural cancer among males (1-2) were found in Switzerland, Sweden, Finland and France. In Slovenia, Spain, Poland and Iceland the incidence of pleural cancer was low (<1). For females, the incidence of pleural cancer was very low in all registries [figure 3.8].
The differences in occupation between males and females can explain a large part of the differences in incidence between males and females. A large proportion of the pleural cancers (mainly mesothelioma) is caused by contact with asbestos. Especially high rates of pleural cancer in males are found in regions with former ship building industry, such as Germany-Hamburg (ESR 5.0) and UK-Scotland (ESR 4.7).

Figure 3.1/3.2
Age standardized incidence rates (ESR) of lung cancer by province, 1989-1997



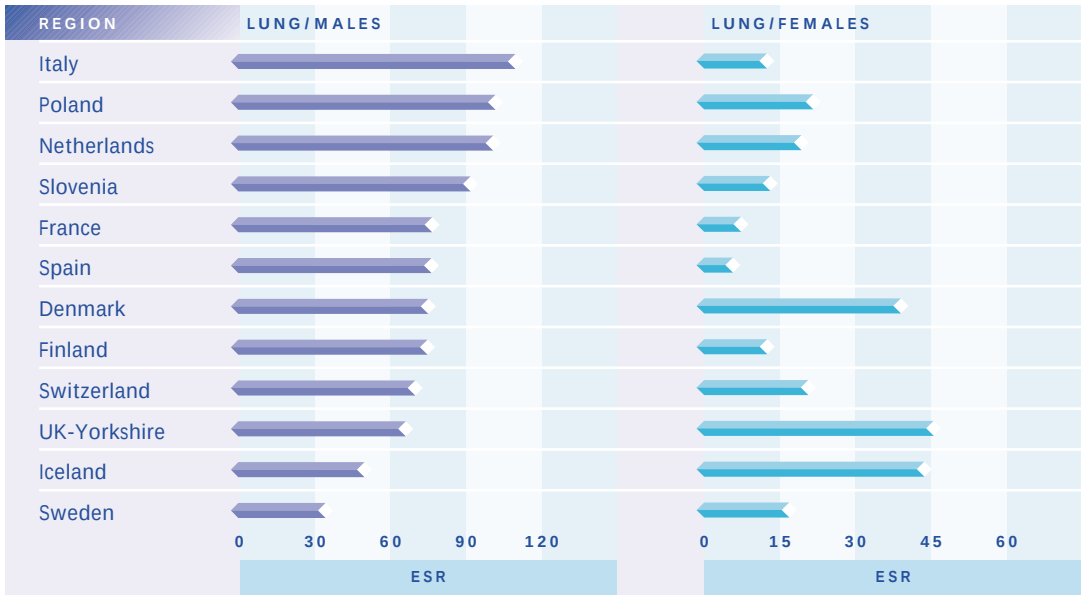
ESR = European standardized rate per 100.000 persons • Source: Netherlands Cancer Registry

Figure 3.3/3.4
Age standardized incidence rates (ESR) of mesothelioma by province, 1989-1997



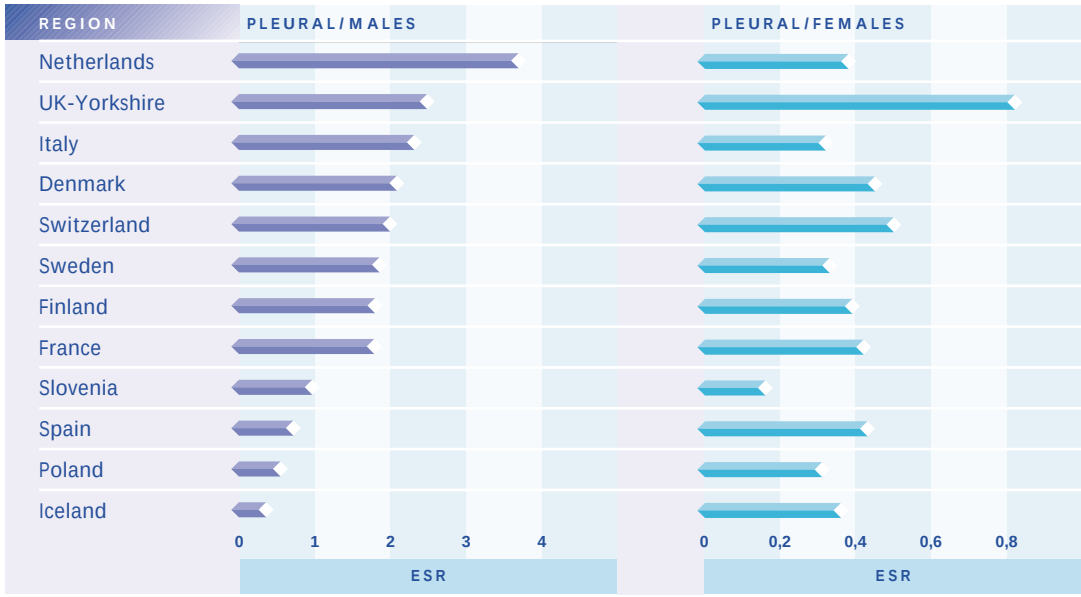
ESR = European standardized rate per 100.000 persons • Source: Netherlands Cancer Registry

Figure 3.5/3.6
Age standardized incidence rates (ESR) of lung cancer by country, 1990-1994 (Italy, 1990-1992)



ESR = European standardized rate per 100.000 persons • Source: EUROCIM, version 3.0

Figure 3.7/3.8
Age standardized incidence rates (ESR) of pleural cancer by country, 1990-1994 (Italy, 1990-1992)



ESR = European standardized rate per 100.000 persons • Source: EUROCIM, version 3.0

4 Treatment of lung cancer by age and stage of disease

R.A.M. Damhuis

Treatment information is gathered by all regional cancer registries but not included in the national database. As a special project, information on primary treatment for patients diagnosed with lung cancer in 1996 was combined [ref 9]. Primary treatment refers to the treatment given according to the initial treatment plan at diagnosis, so ignoring later treatment in case of progression or recurrence of disease.
Distinction was made between small cell and non-small cell tumours. Stage was based on the pre-treatment clinical TNM-classification and categories were condensed according to the UICC stage grouping [ref 10]. Stage X refers to cases in which the extent of disease was inconclusive or unknown or refers to certain morphologies for which the TNM-system does not apply. Patients who received radiotherapy in combination with surgery or chemotherapy were classified in the surgery or chemotherapy group. Non-resectional surgery was disregarded.

For early stage (I-II) non-small cell lung cancer, surgery was the preferred type of treatment for younger patients [table 4.1]. In patients 75 years or older, radiotherapy was preferred although 37% of patients underwent surgery, despite the inherent postoperative risk [ref 11]. For stage III, radiotherapy was given in 51% of patients and chemotherapy in 13%. In stage IV, palliative chemotherapy and radiotherapy were administered in 12% and 20% of patients, respectively. In all cases, additional treatment may have been given at a later time to avoid complications or achieve palliation.

In 1996, chemotherapy was mainly used in patients younger than 60 years. Thereafter, it became more popular due to the development of more effective regimens. Indications for radiotherapy were standardised at a national level as a result of a consensus conference. For small cell lung cancer, chemotherapy is the treatment of choice [table 4.2]. In the elderly it is sometimes withheld in case of a poor performance status.

Table 4.1
Treatment of non-small cell lung cancer according to stage (UICC (1992) stage grouping) and age

STAGE / PRIMARY TREATMENT		AGE CATEGORY (YRS)					
		0-59		60-74		75+	
		N	%	N	%	N	%
I/II	surgery	300	89	760	75,6	174	36,6
	chemotherapy	12	3,6	14	1,4	1	0,2
	radiotherapy	13	3,9	157	15,6	173	36,4
	other/no therapy	12	3,6	74	7,4	127	26,7
	all	337	100	1005	100	475	100
III	surgery	89	14,1	120	9,3	20	3,6
	chemotherapy	156	24,8	127	9,9	9	1,6
	radiotherapy	282	44,8	717	55,8	251	44,7
	other/no therapy	102	16,2	322	25	281	50,1
	all	629	100	1286	100	561	100
IV	surgery	18	4	12	1,3	3	0,9
	chemotherapy	112	24,9	91	10	10	2,9
	radiotherapy	77	17,1	198	21,7	67	19,3
	other/no therapy	242	53,9	610	67	267	76,9
	all	449	100	911	100	347	100
X/NOS	surgery	85	51,2	197	33	46	8,3
	chemotherapy	8	4,8	14	2,3	2	0,4
	radiotherapy	9	5,4	90	15,1	89	16
	other/no therapy	64	38,6	296	49,6	420	75,4
	all	166	100	597	100	557	100
all	surgery	492	31,1	1089	28,7	243	12,5
	chemotherapy	288	18,2	246	6,5	22	1,1
	radiotherapy	381	24,1	1162	30,6	580	29,9
	other/no therapy	420	26,6	1302	34,3	1095	56,4
	All	**1581**	**100**	**3799**	**100**	**1940**	**100**

X/NOS = Stage unknown or not specified • Source: Netherlands Cancer Registry

Table 4.2
Treatment of small cell lung cancer by age

PRIMARY TREATMENT	AGE CATEGORY (YRS)					
	0-59		60-74		75+	
	N	%	N	%	N	%
chemotherapy	327	89,6	653	79,7	201	56,9
other/no therapy	38	10,4	166	20,3	152	43,1
All	**365**	**100**	**819**	**100**	**353**	**100**

Source: Netherlands Cancer Registry

5 Survival of lung cancer and mesothelioma

M.L.G. Janssen-Heijnen

The survival rates in this chapter were calculated after pooling data on patients diagnosed in the regions of the IKA-Amsterdam Cancer Registry (1988-1997) and the IKZ-Eindhoven Cancer Registry (1988-1992) (see introduction and methods).

Of all patients with small cell lung cancer diagnosed between 1988 and 1997, 20% died within one month of diagnosis. The overall 1-year survival rate slightly increased from 28% in 1988-1992 to 31% in 1993-1997. The 5-year relative survival rate remained only 4%. Survival was better for patients younger than 75 years and patients with limited disease [figures 5.1 and 5.2]. In the Netherlands, chemotherapy has been first-choice therapy for patients with small cell lung cancer since the beginning of the 1980s. Nonetheless, despite initial chemosensitivity, the majority of patients relapse or develop a second tumour and die; results of chemotherapy seem to have reached a plateau and ascending from here seems impossible with the current available tools [ref 12, 13].

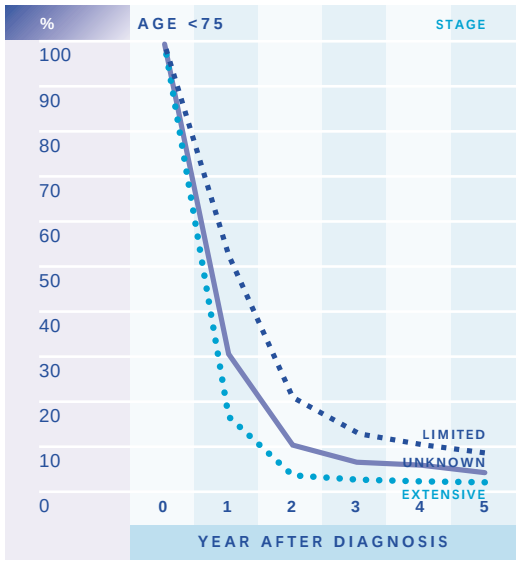
Overall, relative 1- and 5-year survival rates for patients with non-small cell lung cancer diagnosed between 1988 and 1997 (41% and 15%, respectively) were similar for men and women. Ten percent died within one month of diagnosis. There was no significant improvement of survival over time (1988-1992 versus 1993-1997); in the southeastern part of the Netherlands also no improvement in relative survival of non-small cell lung cancer was found between 1975 and 1994 [ref 14]. Figures 5.3 and 5.4 show that relative survival rates were highest for patients younger than 75 years of age and for those with a localized tumour (stage I and II). In addition to being dependent on age and stage, survival clearly varied according to histological subtype. Survival rates were higher for patients with squamous cell carcinoma or adenocarcinoma than for those with large cell undifferentiated carcinoma [figure 5.5].

Survival rates for patients with pleural mesothelioma were poor. Between 1988 and 1997 the overall relative 1- and 5-year survival rates were 34% and 3%, respectively. There was no significant difference between men and women [figure 5.6]. Seven percent of patients died within one month of diagnosis. The prognosis for patients with mesothelioma in the Netherlands was similar to that in the United States and Canada [ref 15,16,17].

For patients with other uncommon respiratory tumours, relative 1-year survival rates for those with carcinoid tumours, carcinosarcoma and sarcoma were 94%, 38% and 28%, respectively [figure 5.7]. Although these tumours very rarely occur in the lung, they should be distinguished from small cell lung cancer, non-small cell lung cancer or mesothelioma, because different treatment is required and there are differences in prognosis.

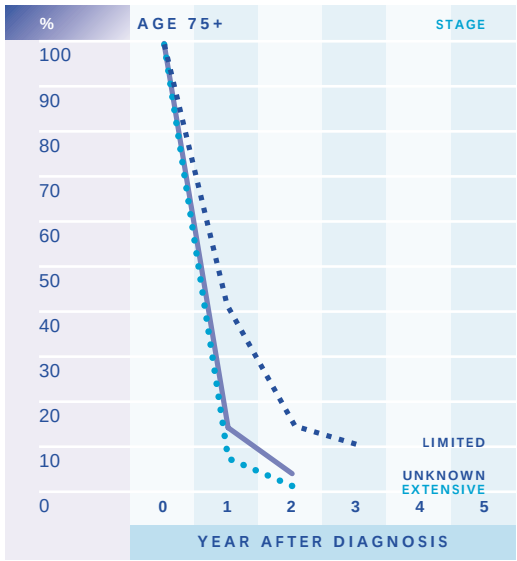
Between 1985 and 1989, age-standardized relative 5-year survival rates for lung cancer varied strongly within Europe. Age-standardized relative 5-year survival rates were highest for France, Iceland, the Netherlands and Spain (12%), and lowest for Denmark, England, Poland and Slovenia (6-7%) [figure 5.8]. The most likely explanation for the differences is the variation in early access to specialized care [ref 18].

Figure 5.1 (left)
Relative survival of small cell lung cancer by stage, age <75



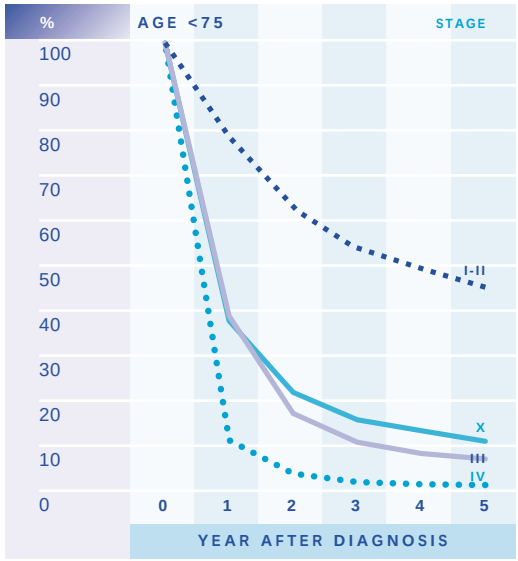
Source: Eindhoven Cancer Registry 1988-1992, Amsterdam Cancer Registry 1988-1997

Figure 5.2 (right)
Relative survival of small cell lung cancer by stage, age 75+



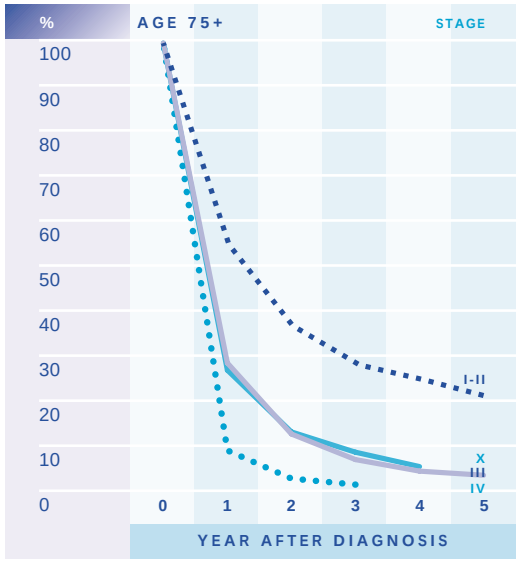
Source: Eindhoven Cancer Registry 1988-1992, Amsterdam Cancer Registry 1988-1997

Figure 5.3 (left)
Relative survival of non-small cell lung cancer by stage, age <75



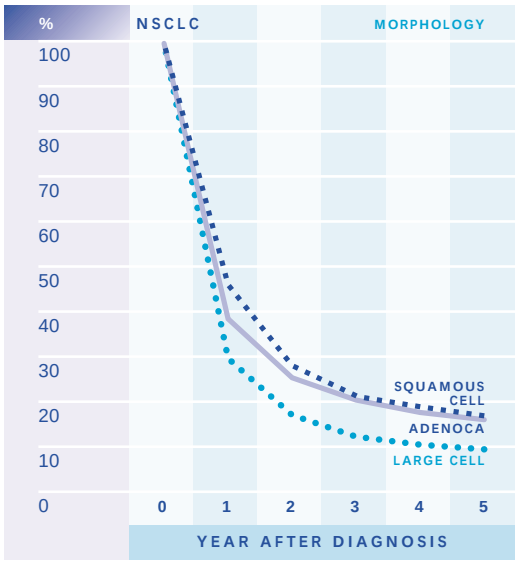
Source: Eindhoven Cancer Registry 1988-1992, Amsterdam Cancer Registry 1988-1997

Figure 5.4 (right)
Relative survival of non-small cell lung cancer by stage, age 75+



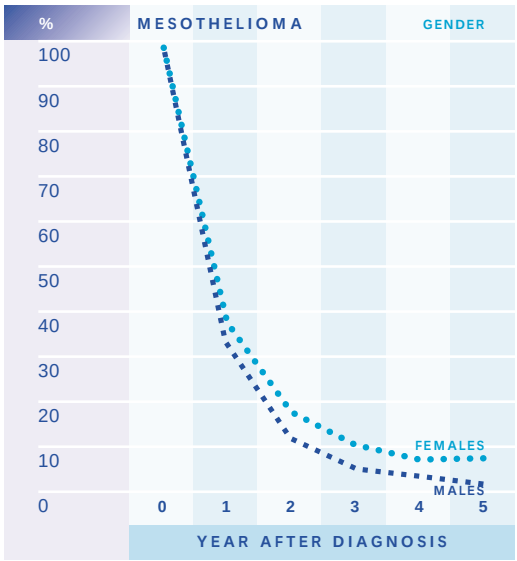
Source: Eindhoven Cancer Registry 1988-1992, Amsterdam Cancer Registry 1988-1997

Figure 5.5 (left)
Relative survival of non-small cell lung cancer by morphology



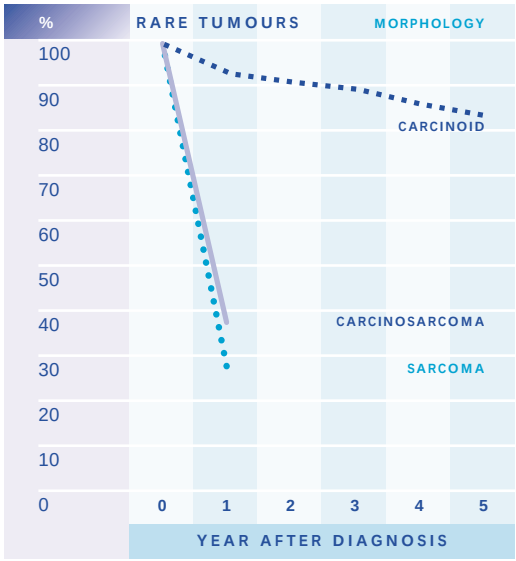
Source: Eindhoven Cancer Registry 1988-1992, Amsterdam Cancer Registry 1988-1997

Figure 5.6 (right)
Relative survival of mesothelioma by gender



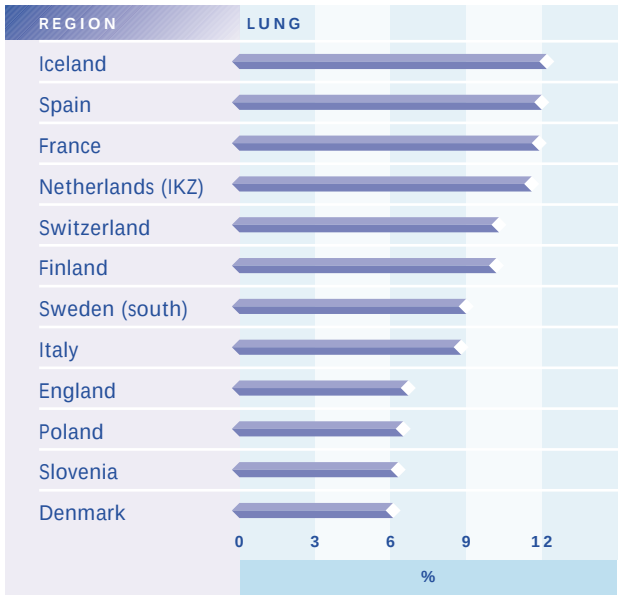
Source: Eindhoven Cancer Registry 1988-1992, Amsterdam Cancer Registry 1988-1997

Figure 5.7
Relative survival of rare tumours



Source: Eindhoven Cancer Registry 1988-1992, Amsterdam Cancer Registry 1988-1997

Figure 5.8
Variation in relative 5-year survival for lung cancer within Europe



Source: Eurocare

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The Netherlands Cancer Registry

Introduction

The number of people with cancer in the Netherlands increased until 1996. This can be explained to a large extent by ageing of the population. Cancer is the second most common cause of death after cardiovascular diseases. Mortality figures alone give an incomplete picture of this disease because a substantial proportion of patients are cured or die from other causes. The Netherlands Cancer Registry was set up in the eighties to study the incidence and prognosis of cancer and to investigate its determinants.

The Netherlands Cancer Registry contains data on all patients hospitalised for a cancer which has been confirmed morphologically. This means that over 95% of all cases of cancer in the Netherlands are registered. More than 60,000 new tumours and about 55,000 new patients are registered annually.

Structure and contents of the registry

The Netherlands Cancer Registry is made up of the nine regional registries of the Comprehensive Cancer Centres (CCC). Most of the regional registries contain data from 1986 onwards. One exception is the Eindhoven registry (the SOOZ area), which dates back to the fifties. Prevalence data are therefore derived from this registry. The national registry contains data from 1989 onwards.

The Comprehensive Cancer Centres provide the data for the national database. A basic set of data for each tumour, based on the 'minimal data set' of the World Health Organisation, is included in the national registry.

The national database contains the following data:

Diagnosis and tumour data

- sequential number • *If more than one tumour has been found in a patient, the number of the primary tumour in sequential order*
- topography and lateralisation • *the location of the tumour*
- morphology • *tissue typing and cytology*
- incidence date • *date of diagnosis, in most cases the date of tissue typing*
- basis for diagnosis • *the most valid diagnostic procedure*
- staging • *size and extent of spread of the malignancy*

Follow-up data

- patient status • *indicates whether the patient is alive*
- date of death/date of last contact

Administrative and demographic data

- patient identification code
- date of birth
- sex
- digits in postal code.

The Netherlands Cancer Registry is a tumour registry. This means that more than one tumour may appear in the registry for one patient. The data are recorded in accordance with international rules. A national Coding Committee advises the CCC on the uniformity of the definition of the items. Basal cell carcinomas of the skin and carcinomas in situ of the cervix are not included in the national registry. These tumours are, however, registered in some CCC regions. Supplementary data are also included in the regional registries, such as the treating hospital and data on primary therapy given.

Sources of information

The Comprehensive Cancer Centres receive information on possible new cases of cancer from various sources. The most important are:

- pathological and haematological laboratories
- hospital medical records offices.

The pathological laboratories are connected to the Pathology Information System (IPA, formerly PALGA). The IPA publishes weekly overviews of possible new primary malignancies for the cancer registry. Use is also made of data from the National Registry (LMR), a registry of discharge diagnoses established by the Information in Health Care Foundation (PRISMANT).

If a tumour has not yet been included in the registry, the patient's data are queried. Specially trained CCC staff in the hospitals record the required data on the basis of the medical file. In the event of problems relating to coding, the pathologist or clinician concerned and/or the National Coding Committee is consulted.

Potential uses

The Netherlands Cancer Registry offers support for research in various potential areas. The most important are:

- epidemiological research
- clinical studies and 'pattern of care' research
- evaluation of preventive measures, such as screening programmes
- determination of health care policies.

Epidemiological research on factors and conditions in society which cause cancer is one of the fields of application of the Netherlands Cancer Registry. The registry is used for descriptive research, in the follow-up of cohort studies and the design of case-control studies. The cancer registry makes it possible, for example, to study the influence of lifestyle, working conditions or residential environment on the occurrence of cancer in groups of people.

A second field of application is clinical research. The registry is used to test the feasibility of a study by examining whether the required number of patients will be available within an acceptable period of time. Information on specific tumours is also supplied to tumour study groups, to help determine which treatment regimens should be set up or evaluated.

Additional data are required to answer specific questions. These may be registered either prospectively or retrospectively. Urologists in three CCC regions, for instance, have collected extra diagnostic and follow-up data on patients with carcinoma of the bladder for the purpose of evaluating the prognostic value of 'at random' biopsy during transurethral resection. Supplementary data are also registered in order to obtain a picture of the results of treatment of breast cancer and haematological malignancies. Pattern of care studies have been set up in various CCC regions using cancer registry data and additional items. The aim is to feed information on diagnostic examinations, staging and treatment of patients back to the hospitals and specialists for comparison with the regional results, in order to assess and improve the quality of care.

The CCC report annually to the participating hospitals and institutions. The cancer registry is also used to evaluate effectiveness of prevention programmes, such as the national screening programme for breast cancer. Finally, the cancer registry data are used to forecast the expected number of patients with cancer and therefore to plan the need for care.

Quality of the data

The coverage of the Netherlands Cancer Registry is over 95%. Only patients who have not been referred to the hospital with a malignancy not confirmed by a pathological laboratory are routinely missed.

The quality of the Netherlands Cancer Registry is also determined by the training of the registry staff and quality control. The registry staff attends special training courses at the CCC. Coding problems are discussed at monthly regional meetings. National meetings of registry staff are held twice each year to promote uniformity and expertise.

Computer programs which recognize errors in the data entered and programs which identify unlikely combinations of data have also been developed. Finally a study is periodically carried out which tests whether the registered data are reproducible and whether the coding rules are being interpreted uniformly.

Privacy

The regional registries contain data to identify patients in coded form. These data are necessary to prevent double registration and also to make follow-up and specific research possible. The national database does not contain any identifying data.

Every request for data is assessed by an independent Supervisory Committee with regard to privacy.

The Supervisory Committee assesses the request according to the following criteria:

- There must be sufficient certainty that the identifying data will be used only for scientific analysis and never to contact persons other than the treating physicians.
- The staff involved in the project must sign a written declaration of confidentiality.
- The data supplied must not be presented in such a way that a combination of data can lead to an indication of the registered patient, physician or hospital to which the data relate.
- If the requested data can be attributed to individuals, they must give their consent. The committee assesses whether this is the case and whether the information provided when asking for consent has been given in writing, correctly, in full and sufficiently clearly.

Request for data

If you wish to use data from the Netherlands Cancer Registry, contact the Association of Comprehensive Cancer Centres (ACCC) in Utrecht. The ACCC consults the Supervisory Committee on privacy aspects.

The following aspects are important if your request is to be dealt with efficiently:

- the purpose of your request
- a description of the data you wish to receive and how the data will be used
- if the request concerns identifying data: how you intend to protect privacy.

The Supervisory Committee advises on these matters beforehand. Data are generally supplied within two months of receipt of request, depending on the complexity. Costs are payable to the Netherlands Cancer Registry upon receipt of the request for data.

Assistance and advice

Experts from the Netherlands Cancer Registry can advise you on methodological design, the desired number of patients, study organisation and so on. They will also help you to submit your request and to take privacy aspects into account beforehand.

Reports

A report entitled 'Incidence of Cancer in the Netherlands' based on the Netherlands Cancer Registry is published annually. A minimum period of two years elapses between the incidence year and the time of publication of the report. The report contains incidence figures from the national registry and explanatory articles.
The first report, dealing with the incidence year 1989, appeared in 1992. In March 2000 the eighth report on 1996 incidence data was published. The reports are obtainable free of charge from the ACCC.

Calculation of rates and risks

Crude rates and age-specific incidence rates are calculated on the basis of the average annual population. The crude rate is the total number of new cases per 100,000 individuals of the total population. The age-specific incidence rate is the number of new cases in a 5-year age group per 100,000 individuals of that 5-year age group. The cumulative risk (cri) can be described as the risk that an individual will develop the disease in question during a certain age period (e.g. 0 to 75 years) if no other causes of death interfere.

Because cancer is most common among the elderly, the crude rate is strongly influenced by the percentage old people. A high percentage elderly people yields a high crude rate, while a high percentage young people yields a low crude rate. To compare rates between countries with different population structures, age-adjusted rates are calculated by using standard populations. For calculation of the European standardized rate (ESR) and the World standardized rate (WSR) the European and World Standard Populations are used. The Estimated Annual Percentage Change (EAPC) is used to evaluate incidence trends and reflects the annual change, assuming an exponential trend.

The Comprehensive Cancer Centres

The Comprehensive Cancer Centres (CCC's) were established as a result of an initiative of the Dutch government in 1978, the aim being to foster expertise among professional health care workers and to improve the quality of cancer treatment, care and research. The Dutch Association of Comprehensive Cancer Centres (ACCC) is a federation of the nine CCC's. Every month, the CCC's meet to coordinate policy and activities at the ACCC level. The ACCC also functions as both contact and spokesman nationally as well as internationally.

Each CCC serves an area with 1–3 million inhabitants. The CCC's are independent private organisations (NGO: non-governmental organisations). All general hospitals are obligated to link up with a CCC. Each CCC consists of a group of hospitals, universities, radiotherapy departments and community health care organisations. The CCC's receive an annual budget from the health insurance companies.

The activities of the Centres include:

- organisation of tumour study groups and consultancies,
- formulation and implementation of guidelines,
- cancer registration,
- data management for clinical trials and translational research,
- dissemination of information,
- improvement of the organization and quality of palliative care,
- support for patient organizations,
- organisation of national population-screening for breast cancer and cervical cancer.

In addition to these regular activities, the management of projects is considered very important. Depending on requests from institutions, professionals and patients in the region, projects aimed at improvement of the quality and/or the accessibility of cancer care are set up.
The following aspects are taken in consideration:

- content: the quality of the professional medical and nursing care,
- customer orientation: the quality of both the information provided and the palliative and supportive care, and
- the process: the quality of the organisation of oncological care.

Professionals and care institutions are ultimately themselves responsible for the quality of all these aspects of oncological care. But one of the CCC's tasks is to offer both structural and project-based support. Instruments developed for this purpose at ACCC level are national treatment guidelines (content), the 'Framework for quality of the organization of oncological care' (process) and the 'Patient information policy guideline' (customer orientation). Projects are carried out using these instruments in various regions.

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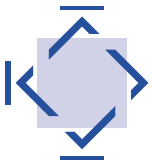
List of abbreviations

ACCC	Association of Comprehensive Cancer Centres
CCC	Comprehensive Cancer Centre
EAPC	Estimated Annual Percentage Change
ESR	European Standardized Rate
ICD	International Classification of Diseases
IK_	Integraal Kankercentrum _
NSCLC	Non-small cell lung cancer
TNM	Tumour Nodes Metastasis staging system
UK	United Kingdom
WCLC	World Conference on Lung Cancer



Vereniging van
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Netherlands

Cancer

Registry

Lung cancer and mesothelioma in the Netherlands

1989–1997