NIVEL Primary Care Database - Sentinel Practices 2015

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ISBN/EAN 9789461223791

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Contents

Foreword

The year 2015 was characterized by progress in digital data collection for the Dutch Sentinel Practices of NIVEL Primary Care Database. The digital module is used in all sentinel practices and in addition all questionnaires are offered exclusively in the digital mode since the first of January 2015. This means more efficient recording of questionnaires by participating general practitioners (GPs) of data processing at NIVEL and by research professionals. The registration of most topics of previous years were continued, with the exception of the surveillance of 'Oak Processionary Larvae' and 'Policy for symptoms of mamma', for which the data collection had been completed in 2014. The topic 'Urinary tract infection' was continued in 2015 for men, children and pregnant women. Sufficient data were collected in 2014 for non-pregnant women.

The influenza season 2015-2016 lasted 11 weeks and started in the first week of 2016. Of all influenza viruses identified in samples from sentinel practices 59% contained influenzavirus type A(H1N1)pdm09, 2% influenza A(H3N2), 37% influenza B (Victoria-lineage) and 2% influenza B (Yamagata-lineage). The relative proportion of influenzavirus type B (Victorialineage), not inclueded in the trivalent influenza vaccine, increased during the second half of the epidemic.

The whooping cough epidemic which was observed in 2014 continued in 2015 as shown in this annual report. The Dutch National Health Council advised the minister of Health in 2015 to include whooping cough immunisation for pregnant women in the National Vaccination Programme to protect young, not yet (completely) vaccinated babies. The minister supposedly decides on this issue in the course of 2016.

The unexpected threefold increase in applied palliative sedation, observed in the previous year, continued to increase in 2015. The facilitation by specialised home care teams installing the IV drips and pumps may enhance

the application. Only in one of eight cases of palliative sedation a euthanasia request was recorded as well. The reason to apply palliative sedation in these patients was well documented. The study does not indicate indistinctness of the border between euthanasia and palliative sedation. The study results were presented at several international scientific conferences in 2015.
Together with the National Institute for Public Health and the Environment (RIVM) and the Municipality Health Service of Rotterdam a study in patient initiated partner notification and treatment of chlamydia was designed in 2015. The study was granted by ZonMW, the national research programme, and started in 2015, also in the sentinel practices.

The end of life study, the more than 35 years existing surveillance of suicide, influenza, sexually transmitted diseases and HIV, and the previously recorded topic of unwanted pregnancy resulted in interesting international publications and presentations at national and international conferences in 2015, of which the results are presented in this annual report. In addition, a guideline for unwanted pregnancy was developed to support GPs and other professionals. This guideline is presented at the websites of the Netherlands Association of GPs (NHG) and FIOM.

The data in this annual report are this year again taken form the sentinel GP network in which GPs, often year after year, are willing to systematically collect information about these diverse subjects. We are very grateful for their cooperation.

Prof. dr. D. de Bakker
Chairman of the Counseling Committee
Dutch Sentinel Practices and Surveillance

1 Introduction

NIVEL Primary Care Database, Sentinel Practices, is an information system based on records kept by general practitioners (GPs). A national network of general practices, covers with the patients registered in these practices about 0.7% of the Dutch population. The network design takes account of the geographical distribution of the population and its distribution over areas with different degrees of population density (see pp 13-19). The GPs participating in the sentinel network, weekly assess and deliver data with regard to certain illnesses, events and procedures in general practice. Since the first of January 2014 the Sentinel Practices are integrated in NIVEL Primary Care Database. However, the for the Sentinel Practices characteristic type of data collection, which is not collected during routine EMD registration, is to be continued in the sentinel practices besides the routine data collection for NIVEL Primary Care Database.

Since 2009, the data on the topics are exclusively electronically registered and delivered. Most GP-information systems now contain an application, the so-called sentinel module, that facilitates the registration of these data. For participating practices, not having the integrated module at their disposal yet, a web application has been made available. Supplementary data gathered via questionnaires are collected exclusively electronically since the first of January 2015. This annual report is based on data assembled electronically via the sentinel module from all in 2015 participating 38 practices. Additional materials from questionnaires and specimens are published in separate articles and reports.

Each year an update is made of the composition of populations of the sentinel practices by gender and age. Consequently it is known to what population the gathered data are related (the epidemiological denominator). Usually, data are presented as frequencies per 10,000 men or women (see page 30). Each year the Counselling Committee selects the topics for which data will be registered. The Committee also considers requests and

suggestions for new topics by other parties. If a decision is made for the inclusion of a new topic a supervisor working at NIVEL or from outside who is responsible for analyses is assigned.
At least five conditions must be met for a disease or occurrence to be registered:

1 The importance of the topic must be described.
2 Strict and unambiguous criteria should be defined for the disease or occurrence to be registered.
3 Application of these criteria must not take too much time and must fit in with the GP's routine practice work.
4 A need should exist for representative information at the national level.
5 The Sentinel Practices must be the best source of information.

The recording of data for a topic is discontinued if the topic ‘owner’ feels that data has been collected for a sufficiently long period of time, if a different registration system is collecting more or less the same information, when financial resources are lacking or if insurmountable problems have arisen in the recording of data.

This report provides background information on each topic included in the registration for the first time. Refer to previous reports for information about "old" topics. See pages 171-175 for an overview of the years when topics were first included in the registration.

1.1 International cooperation

The Sentinel Practices have been participating in international projects since 1985.
At present the oldest international project is the European Influenza Surveillance Scheme (EISS). From August 2008 this international collaborative program of, among others, all EU-countries is executed by the European Center of Disease Control (ECDC) in Stockholm. In ECDC sentinel networks of GPs and national influenza centers of participating countries collaborate. Apart from all EU countries also Norway, Ukraine, Switzerland, Serbia and Turkey are involved. At the same time, flu data

delivered to the ECDC are also delivered to the World Health Organization (WHO).

In end-of-life research also from the beginning (2005) work has been done in international cooperation, initially only with Belgium, but over the past years also with Spain and Italy.

This also applies to the in 2011 started study in early diagnosis of abdominal tumors. The data collection in the sentinel practices for this study has been completed, but international cooperation in analyses and data interpretation is ongoing and intensive, coordinated by the University of Tromsö. Besides Dutch sentinel practices also GPs from Canada, Scotland, Belgium, Australia, Sweden, Denmark and Norway participate in this study. The study aims to identify prognostic symptoms preceding abdominal tumors.

2 Counselling Committee

The sentinel practices and surveillance clusters are supported by a Counselling Committee, usually meeting twice a year.

The committee members in 2015 were:

Counselling Committee:	Mrs. Dr. Ir. B.H.B. van Benthem, staff member (RIVM)
	Drs. M.J.J.C. Poos, senior researcher (RIVM)
	Drs. S.M. Handgraaf, Sentinel GP
	Dr. M. Hooiveld, epidemiologist NIVEL
	Dr. ir. J.Korevaar, epidemiologist NIVEL
	Mrs. Dr. E.E. Stobberingh, MD PhD, microbiologist (RIVM)
	Mrs. E. de Leeuw-Stravers, (NIVEL)
	Prof. Dr. F.G. Schellevis, PhD, NIVEL (Chairman)
Project leader:	Mrs. Dr. G.A. Donker, (GP and Epidemiologist)
Secretary:	Mrs. M. Heshusius-van Valen

The counselling committee met twice in 2015.
In close collaboration with NIVEL Primary Care Database, and other partners outside NIVEL, the Sentinel Practices project team consists of the following persons:

Project leader	Mrs. Dr. G.A. Donker, GP and Epidemiologist
Secretary	Mrs. M. Heshusius-van Valen (NIVEL)
ICT support	Mr. J. Gravestein, Mr. G. Opperhuizen, Mr. N. Daems and Mr. R. van der Burgh (NIVEL)
Contact	Mrs. E. Wentink (NIVEL)

3 Sentinel Practices staff seminar in 2015

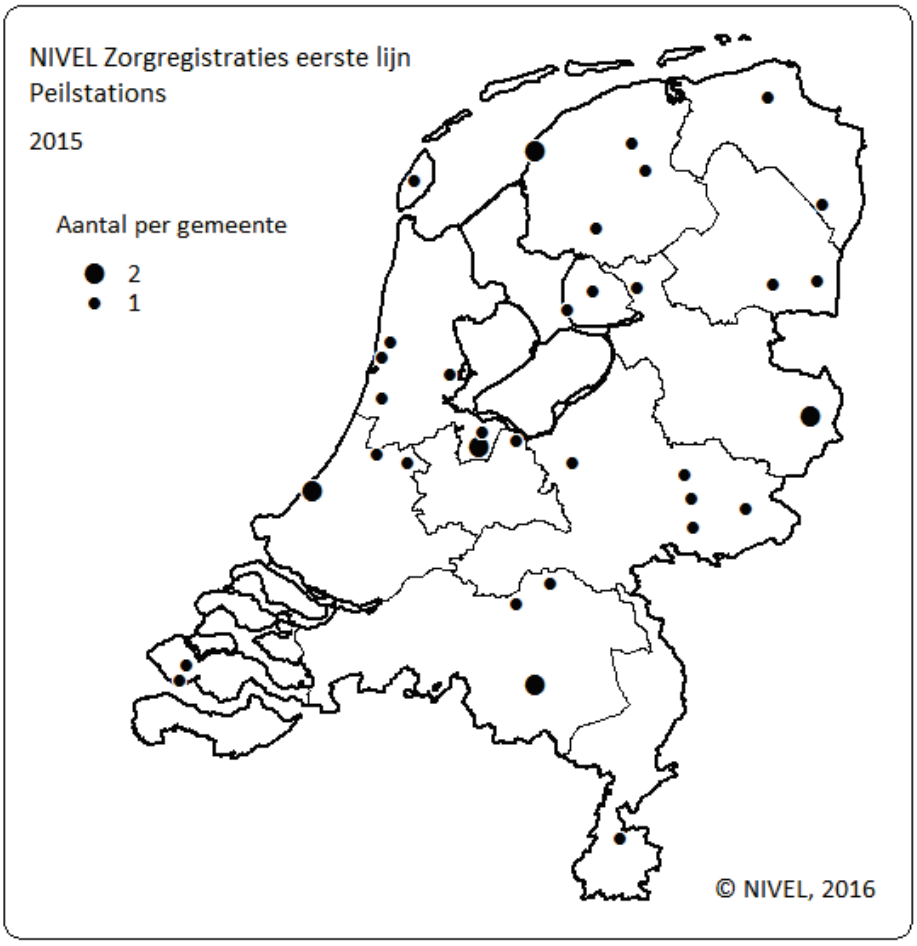
For the appropriate functioning of the Sentinel Practices it is of utmost importance that Sentinel GPs and their co-workers, the Counselling Committee, the topic managers and project leaders meet regularly. Every year, at the start of a new registration period, which runs from the first of January to December 31, an annual meeting is held. From 2009, this annual meeting is combined with other participants and GPs of NIVEL Primary Care database. The programme of the annual meeting 2015 included presentations on the following subjects:

How does NIVEL use your data?	Robert Verheij, programme leader NIVEL Primary Care Database
From transition to transparency – the need of monitoring	Johan Polder – Chief Health Science Officer Health Economics at RIVM
Variation in prescription of Diane-35 oral anticonceptive	Liset van Dijk, programme leader farmaceutic care NIVEL
Multimorbidity and polyfarmacy, a complex combination	Judith Sinnige, researcher NIVEL
Follow-up of cancer patients in general practice	Marianne Heins, researcher NIVEL
Patients with MUPS in general practice: what is their problem?	Inge Spronk, researcher NIVEL
Pneumonia in general practice	Rianne van Gageldonk, epidemiologist RIVM
High risk groups tested for HIV in STD related consultations	Ivo Joore, MD, researcher University of Amsterdam
Bad weather: predicting the course of eating disorders	Frederique Smink, psychiatrist-researcher Parnassia Foundation

4 Methodological explanation of NIVEL Primary Cara Database – Sentinel Practices

The distribution over The Netherlands of the in 2015 participating sentinel general practices is shown in Figure 4.1 and Table 4.1. In some communities two practices are participating, in most cases for practical reasons such as common holiday practice arrangements.

Figure 4.1



For location level practice see p. 169-170

4.1 Practices

There were 38 sentinel practices in the Netherlands in 2015. The number of participating GPs working in the sentinel practices was 60.

In this annual report the following breakdown and codes are used in processing and discussing the data:

N stands for the Groningen, Friesland and Drenthe province group (northern provinces);
O stands for the Overijssel, Gelderland and Flevoland province group (eastern provinces);
W stands for the Utrecht, Noord Holland and Zuid Holland province group (western provinces);
Z stands for the Zeeland, Noord Brabant and Limburg province group (southern provinces);
1 stands for address density category 5 (rural municipalities);[1]
2 stands for address density category 4-3-2 (urbanised rural municipalities and municipalities with urban features);
3 stands for address density category 1 (municipalities with 100,000 or more inhabitants).

Appendix 1 (pp 169-170) contains a list of the GPs who participated in the sentinel practices in 2015. Two or more GPs cooperate at tthorteen (33.2%) of the sentinel practices (two GPs cooperate in 6 practices, three in 5 practices, and four in two practices). The percentage of GPs working in a group practice nationwide in January 2015 was 78.5%; but 55.0% for the sentinel practices. In the sentinel practices a relative overrepresentation of single practices exists. There were ten dispensing sentinel doctors, nine in rural areas and one in an urbanised rural municipality, which is 25.7% of the total number of sentinel practices, 25.8% of the sentinel GPs. The figure for the Netherlands as a whole is 6.6%.[2]

Tables 4.1 and 4.2 show the distribution of the number of sentinel doctors and sentinel practices in each province group and address density group in the 2006-2015 period.

Table 4.1 Distribution of sentinel GPs and sentinel practices per province group in the 2006-2015 period[3]

	N; Groningen, Friesland and Drenthe		E; Overijssel, Gelderland and Flevoland		W; Utrecht, Noord- and Zuid- Holland		S; Zeeland, Noord-Brabant and Limburg	
province-group	GPs	sentinel practices	GPs	sentinel practices	GPs	sentinel practices	GPs	sentinel practices
2006	10	4	9	9	25	22	9	7
2007	14	8	12	10	25	20	10	7
2008	14	8	12	10	24	19	11	8
2009	13	8	12	10	23	16	11	8
2010	12	8	13	10	23	14	15	9
2011	7	7	14	9	18	15	15	9
2012	7	7	10	8	21	14	17	10
2013	8	8	10	8	23	14	15	9
2014	9	9	12	9	24	14	13	8
2015	9	9	19	10	19	12	13	7

Table 4.2 Distribution of sentinel GPs and sentinel practices per address density in the 2006-2015 period

	1; rural municipalities ≤500/km^2		2; urbanised rural municipalities together with municipalities with urban characteristics 500-2500/km^2		3; municipalities with 100,000 or more inhabitants ≥2500/km^2		total	
address density	GPs	sentinel practices	GPs	sentinel practices	GPs	sentinel practices	GPs	sentinel practices
2006	11	9	28	21	18	14	53	42
2007	12	10	36	26	13	9	61	45
2008	14	11	33	25	14	9	61	45
2009	10	9	32	24	17	9	59	42
2010	14	11	36	23	13	7	63	41
2011	14	11	28	20	12	9	54	40
2012	14	11	30	21	11	7	55	39
2013	15	12	28	20	13	7	56	39
2014	16	12	30	22	12	6	58	40
2015	14	11	35	22	11	5	60	38

4.2 Practice populations

A census of most practice populations was held in 2015. The results of the census have been used in processing the Sentinel Practices data from 1 January 2015. The Sentinel Practices was designed with the aim of achieving a sample of approximately 1% of the population of the Netherlands.

However in recent years the sample is smaller due to budget constrictions. The design of the project aims to be representative by geographical distribution (the 'province groups' referred to above) and distribution over areas with different population density). A check was done to see whether these criteria were still met. The tables show that he northern part of the country is overrepresented, whereas the eastern and western regions are underrepresented. In the last few years, the Sentinel Practices represent 0.7% of the Dutch population. This is accounted for in the recruitment of new practices.

Table 4.3 Comparison of the population of the sentinel practices with the total population of the Netherlands, 2015

	population of the Netherlands**		population of sentinel practices* (with percentages)	
province group:				
N	1,718,775		21,093	(1.2)
E	3,569,021		37,199	(0.7)
W	7,625,512		39,082	(0.5)
S	3,987,418		26,710	(0.7)
gender:				
men	8,372,858		61,757	(0.7)
women	8,527,868		62,327	(0.7)
total (1-1-2015)	16,900,726	,	124,084	(0.7)

* Practices census 2015

** 1-1-2014 Netherlands Statistics *(Centraal Bureau voor de Statistiek)*.

The total practice population of all Sentinel Practices at the beginning of 2015 was 124,084 persons, 0.7% of the Dutch population consisting of almost 17 million inhabitants. The table below shows the percentages of men and women in the Dutch population who are registered with the sentinel practices in 2015, with a breakdown by age group and province group in table 4.4.

Table 4.4 Percentage of men and women in the Dutch population registered with sentinel practices, by age group, province group and for the Netherlands as a whole in 2015

	province group								Netherlands	
	N		E		W		S			
	m	f	m	f	M	f	m	f	m	f
0-4	1.3	1.2	1.3	1.3	0.5	0.5	0.7	0.7	0.8	0.8
5-9	1.3	1.2	1.2	1.2	0.5	0.6	0.6	0.6	0.8	0.8
10-14	1.2	1.3	1.2	1.2	0.5	0.5	0.7	0.6	0.8	0.8
15-19	1.3	1.2	1.1	1.2	0.6	0.5	0.7	0.6	0.8	0.8
20-24	1.1	1.0	1.0	1.1	0.5	0.5	0.7	0.7	0.7	0.7
25-29	1.1	1.2	1.1	1.1	0.4	0.4	0.9	0.9	0.7	0.7
30-34	1.2	1.2	1.0	1.0	0.4	0.5	0.9	0.8	0.7	0.7
35-39	1.1	1.1	1.0	1.0	0.5	0.5	0.8	0.7	0.7	0.7
40-44	1.2	1.3	1.0	1.0	0.5	0.5	0.8	0.7	0.7	0.7
45-49	1.3	1.2	1.0	0.9	0.5	0.5	0.7	0.7	0.7	0.7
50-54	1.3	1.2	1.0	0.9	0.5	0.5	0.7	0.6	0.7	0.7
55-59	1.3	1.2	0.9	1.0	0.6	0.6	0.6	0.5	0.7	0.7
60-64	1.2	1.3	1.0	1.0	0.6	0.6	0.5	0.5	0.7	0.8
65-69	1.5	1.4	1.0	1.0	0.6	0.6	0.6	0.6	0.8	0.8
70-74	1.4	1.4	1.0	1.0	0.6	0.6	0.6	0.7	0.8	0.8
75-79	1.4	1.1	1.0	1.0	0.5	0.5	0.7	0.7	0.8	0.7
80-84	1.2	1.1	0.9	0.9	0.5	0.5	0.7	0.7	0.7	0.7
≥85	1.1	1.0	1.2	1.0	0.5	0.5	0.8	0.7	0.8	0.7
total	1.3	1.2	1.0	1.0	0.5	0.5	0.7	0.7	0.7	0.7

4.3 Scale and continuity of reporting

The number of days per year that each sentinel practice reports and the combined number of reporting days per week of all sentinel practices have been checked and processed since 1975. This check is made to monitor the completeness and continuity of reporting. The sentinel doctors are requested to let it be known when they are unable to report due to holidays or personal circumstances.
The maximum number of days on which reporting is possible depends on the number of weeks in the year and on the number of sentinel practices. The number in 2015 was 9,390: 53 weeks x 5 days x 34 sentinel practices; 1 sentinel practice registered for 26 weeks, one for 22 weeks and two sentinel practices for 14 weeks only.
In table 4.5 the absolute numbers and percentages are presented.

Table 4.5 Maximum number and actual number of reporting days per year (2006-2015)

Year	maximum number of reporting days	actual number (absolute)	reporting day percentage
2006	10,465	7,905	75.5%
2007	10,860	9,205	84.8%
2008	10,450	9,087	87.0%
2009	10,755	9,381	87.0%
2010	10,480	9,965	95.0%
2011	10,140	9,432	93.0%
2012	9,605	8,831	91.9%
2013	9,265	8,545	92.2%
2014	10,325	8,329	80.7%
2015	9,390	7,305	77.8%

The percentage of reporting days in 2015 is slightly lower than in 2014, possibly due to the fact that the P-module did not function from week 23-28 in five practices with the 'Mira' electronic GP information system leading to no registration during these weeks. The calculation method of registration days has been changed in 2014 in order to approach the real registration days as much as possible. The method is based on triggers built in the 'P-module'. When the 'P-module' is in use and an ICPC code is recorded ('trigger ICPC'), the GP reads a pop-up question whether this is an intended recording of a case related to the topic. All days with trigger records are counted as registration days. When a GP records 'yes' to the pop-up question this will be counted as a valid registration in the topic. When a working day does not produce a 'trigger ICPC', the registration day counts when morbidity data are recorded in NIVEL Primary Care Database.

The table below contains a breakdown by province group and address density.

Table 4.6 Reporting by province group and address density in 2015

province group		address density	
N	79,3%	1	75,8%
E	74,2%	2	77,2%
W	80,1%	3	84.6%
S	75,9%		

Figure 4.2 shows the weekly reporting of all sentinel practices. The influence of public holidays is clearly visible. The average number of non-reporting days of all sentinel practices together per week is 39 (the maximum number of registration days per week is 265).

Figure 4.2 Number of days in 2015 that data were recorded

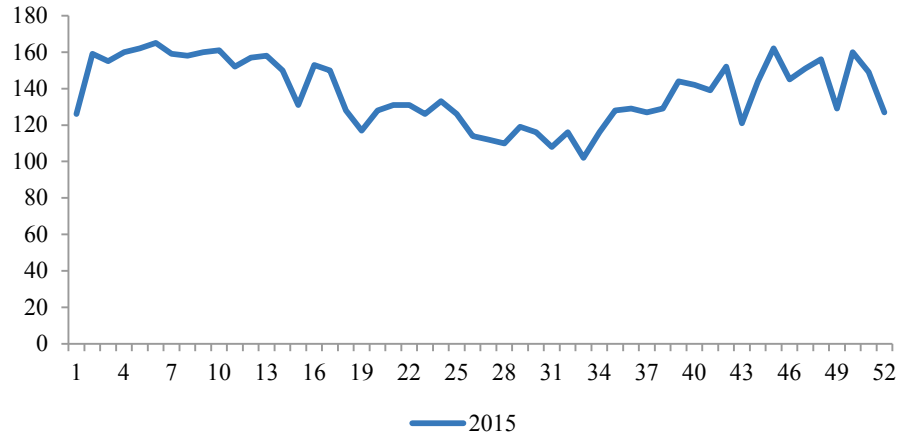


Table 4.7 shows the frequency distribution of the number of non-reporting days at each sentinel practice. The average number of non-reporting days per sentinel practice in 2015 was 55, which is more than in 2014 (46).
A breakdown into single and group practices reveals a significant difference, i.e. 68 and 28 days, respectively. This is in agreement with the hypothesis that in collaborative practices the continuity of reporting is better guaranteed.

Table 4.7 Frequency distribution of the number of non-reporting days per sentinel practice (2006-2015)

number of non reporting days	Number of sentinel stations									
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
0	2	3	8	-	5	7	4	7	1	-
1-9	1	8	3	7	18	12	18	16	5	1
10-19	1	6	15	8	8	10	6	5	7	7
20-29	3	5	4	10	4	5	3	3	7	7
30-39	4	5	2	9	5	1	2	2	3	3
40-49	8	6	4	4	1	2	1	-	-	3
50-59	8	5	1	1	-	-	1	2	6	2
60-69	7	2	2	1	-	1	1	-	3	2
70-79	-	1	2	-	-	1	1	1	-	2
80-89	1	-	1	-	-	-	1	1	2	1
90-99	1	2	1	-	-	-	-	1	2	5
≥99	6	2	2	2	-	1	1	1	4	5
total number of sentinel practices	42	45	45	42	41	40	39	39	40	38
average	61	37	31	33	13	19	20	18	46	55
median	66	31	17	23	7	11	8	8	31	43

Closer examination of the table reveals an increase in non reporting days over the years until 2006, after which it decreased but increased again in 2011 and 2012. A major failure to report i.e. no reporting by a sentinel

practice on more than 50 days per year does occur in 2015 in 16 practices (42.1%) compared to 42.5% in 2014. The five practices that did not report in 2015 for more than 99 days did so for reasons of problems with the electronic registration.

4.4 Surveillance topics

In 2015 data were registered from the following topics. Between brackets the year is recorded in which the topic was entered for the first time.

1 Influenza (and influenza-like illnesses) (1970);
2 Pneumonia (2012);
3 Whooping cough (1998);
4 Acute gastro-enteritis (1996);
5 STD (2008);
6 Urinary tract infection(2014);
7 End-of-Life study (2005);
8 Suicide (and attempted suicide) (1979);
9 Request for euthanasia (1976);
10 Palliative sedation (2005);
11 Eating disorders (1985).

In principle, a weekly report is the base. This means that also patients that are seen by a locum doctor outside office hours, are reported, except influenza(like illness). Diagnosis by telephone or advices given by telephone are not reported; influenza is also here an exception.

An alphabetical list of all topics since 1970 is provided in appendix 2 (pp 171-174), together with the years during which the data were registered.

4.5 Analyses

This report contains the results of registration of topics in 2015. The data were processed at NIVEL.

Three tables are presented routinely for each subject:
1 absolute number of patients by gender and age group;
2 absolute number of patients by gender and province group;
3 absolute number of patients by gender and address density.

Tables 1, 2 and 3 are produced each week for surveillance purposes and each quarter and year for annual reporting purposes. For the participating doctors a feedback report is produced for each sentinel practice, presenting the average score per topic per 10,000 patients of the practice and this is compared to the averages of all sentinel practices.

With the exception of the information provided per sentinel practice, the data is also presented per 10,000 of the total practice population (relative frequencies). Frequencies have been rounded off. A frequency below 0.5 per 10,000 inhabitants is rounded off to '0'. '_' denotes that no cases were reported.
A frequency based on fewer than five reported cases is presented in brackets.
A frequency of new cases of a disease in a certain period of time is referred to as 'incidence' or 'incidence rate' in epidemiology. The term 'prevalence' refers to all cases of the disease that exist in a certain period of time or at a certain moment in time. There are also absolute and relative incidences and prevalences.
The cumulative incidence of periodic prevalence (per year) in general practice is calculated in this report in all instances per 10,000 inhabitants, men or women. Appendix 4 (p 176) shows the age structure of the Dutch population on 1 January 2015, which can be used to calculate absolute numbers for the Netherlands.

Data from practices reporting only 0, 1 or 2 days of the week are not processed i.e. the practice population is not included in the "denominator". In order to minimize underreporting reported cases during these days were included in the numerator. The practice populations of practices reporting

more than 2 days per week were processed normally.
A correction factor used to be applied because enquiries among sentinel doctors revealed that an absence of 1 or 2 days merely meant that the work was shifted to a different time. The practice populations are calculated based on practice registries of patients. The GPs are instructed to report for the Sentinel Practices topics exclusively on patients on their practice registry. This procedure was also applied in 2015, was introduced in 2013 and differs a little from the years before, reason why retrospectively in 2013 annual report figures have been recalculated over the years 2009 to 2013 to make comparison with previous years meaningful in this annual report.

The tables were produced using the weekly records, with frequencies being calculated on the basis of the average population present in the period concerned.

As mentioned in the introduction, the purpose of this report is to present data, not to provide a complete analysis of that data.

The following annual tables are included (pp 178-183).
1 Cumulative, i.e. all sentinel practices in a standardised format, year 2015, weeks 01-53, pp 1-3.[4]
2 Province group standardised according to illness, year 2015, weeks 01-53 pp 1-3.[4]
3 Address density, standardised according to illness, year 2015, weeks 01-53, pp 1-3.[4]

4.6 Extrapolation of observed frequencies to the Dutch population as a whole

For each topic a general impression is extrapolated of the numbers of patients, consultations, actions and events in the Netherlands. The figures presented are based on frequencies calculated using data recorded by sentinel practices. As pointed out in previous reports, readers should bear in mind when examining the tables that while the populations of the sentinel practices represent the Dutch population as a whole with reasonable accuracy (see also pages 17-19), the sentinel doctors are a select group.

Consequently it is impossible to determine conclusively to what extent the results vary from the situation that exists in reality. Variations may differ depending on the nature of the topic. Caution should be exercised when examining topics that include intervention by a GP. Similarly, the 'suicide and attempted suicide'[5] topic appears to differ from data recorded elsewhere, probably because these occurrences are not always reported to a GP. With regard to the topics: end-of-life, pneumonia and sexually transmitted diseases only practices reporting these items in 2015 and previous years were included in the analysis in order to decrease underreporting. Nevertheless, readers should examine **not only** the extrapolated numbers, but should also refer to the chapters concerned. To allow correct interpretation of the extrapolated figures, the details of the total Dutch population per year are presented in table 4.8, in thousands.

Table 4.8 Dutch population by gender, in thousands, 2006-2015 (CBS)*

year	men	women	Total
2006	8,077	8,257	16,334
2007	8,089	8,269	16,358
2008	8,112	8,293	16,405
2009	8,156	8,329	16,486
2010	8,203	8,372	16,575
2011	8,244	8,412	16,656
2012	8,283	8,447	16,730
2013	8,307	8,472	16,779
2014	8,334	8,495	16,829
2015	8,373	8,528	16,901

* Numbers as on 1 January of each year.

4.7 Confidence intervals

Reliability margins have to be applied when examining the incidence rates and prevalence rates estimated for the entire Dutch population. The table below provides an impression of the incidence rates and prevalence rates, for relative and absolute numbers.

The table should be read in the following way. If a frequency of 1 per 10,000 patients is observed in the sentinel practices' total population of approximately 124,084 patients (1st column), the 95% confidence interval is 0.44 – 1.56 per 10,000 (2nd column). It then follows that the estimated absolute number in the Dutch population is 1690 (3rd column), and that the 95% confidence interval is between 750 and 2,630. The table shows how these estimates relate to a frequency at the sentinel practices of 1 to 1,000 per 10,000 patients with some intermediate 'steps'. The confidence intervals are particularly high at the lower frequencies.

Table 4.9 Confidence intervals of estimates of incidence and prevalence and sentinel station practices per 10,000 and the absolute numbers

frequency per 10,000		Netherlands (absolute numbers)	
frequency	95%CI	absolute number	95%CI
1	0.44-1.56	1690	750-2.630
10	8.24-11.76	16901	13.928-19.873
100	94.46-105.54	169007	159.651-178.364
1,000	983.31-1016.69	1690072	1.661.861-1.771.284

For the total groups of men and women separately, each comprising about half of the total population, the confidence intervals are only a little wider than shown in the table. For separate 5 or 10-year age groups, the intervals obviously are much wider, because these groups are smaller in size.

5 Influenza(-like illness)

Topic owner: National Influenza Centre *(National Influenza Centre)* (1970-2015)

Introduction

Influenza is an important health care and public health problem. Influenza has been linked to an increase in the number of consultations and visits by GPs, as well as to an increased workload in health care and nursing institutions, an extra load on hospitals as a result of more referrals and admissions and an increase in the mortality rate. In addition, absenteeism due to influenza means loss of production from the workforce and pupils not attending school.

Cases of influenza occur every year in the Netherlands and throughout the rest of the world. The usual 'influenza season' runs from week 40 to week 20 of the following year. In the so-called inter pandemic situation an influenza epidemic actually only occurs in the winter in the northern hemisphere. A pandemic also may occur outside this season and this phenomenon did happen in 2009. Since registration of influenza-like illness (ILI) began, the influenza epidemics have always started between mid-November and the beginning of March, except for the pandemic in 2009, that lead to an epidemic from the beginning of October (week 41) in the Netherlands, earlier than ever before over the 43 years of registration of ILI in the sentinel practices.

The history of well-described outbreaks of respiratory infections dates from 1173-1174. The incidence of airway infection described in that winter is considered to be a good description of an influenza epidemic. Since the end of the 12th century a number of descriptions of (sometimes worldwide) outbreaks of what appeared to be influenza do exist.
In the 20th and 21st century the world was hit by four pandemics (the Spanish flu (1918-1919), the Asian flu (1957-1958), the Hong Kong flu (1968-1970) and the Mexican flu (2009-2010) of which the flu outbreak in 1918-1919 made the most impression and left frightened people in its wake:

approximately 40 million dead throughout the entire world.
In 1933 various pieces of the influenza puzzle started to fall into place and the influenza virus was identified and held responsible for small or larger outbreaks of acute respiratory infections where it was not unusual for the infected person to die. It was also proven that influenza could be transmitted from animal to animal, from animal to human and from human to human.

After the 2nd World War the newly set up World Health Organisation decided in 1949 to monitor influenza. National Influenza Centres were established to track the occurrence of influenza and report to the WHO. However, it was only at the start of the 1960s that sentinel doctors began to register the occurrence of influenza among the population (in England and Wales). Other European countries followed. For example, the Netherlands set up the Sentinel Practices in 1970 as a representative national network that succeeded the local networks in a number of large cities.
At the start of the 1990s the quality of the influenza surveillance system was further improved. From 1992/1993, sentinel GPs in an increasing number of European countries took a nose and/or throat swab from patients with an influenza-like illness (ILI) or an acute respiratory infection. These swabs were then sent for further tests at the laboratory of the National Influenza Centre for virological determination. This procedure is also applied in the Netherlands where swabs are sent to the National Institute for Public Health and the Environment (RIVM).

Method

The GPs register patients who consult them for an acute influenza-like illness known as ILI, that meets the Pel criteria.[6] These are defined as follows: (Pel.1965)*)

1 An acute start, so a maximum prodromal stage of three to four days (included pre-existing infection of the respiratory system at not-ill-making level).
2 The infection should also involve rise in temperature of at least 38^0, Celsius, rectal.
3 At least one of the following symptoms should occur: cough, nasal catarrh, sore throat, frontal headache, retrosternal pain, myalgia.

*) Pel, J.Z.S., 1965 Proefonderzoek naar de frequentie en de aetiologie van griepachtige ziekten in de winter 1963-1964. Huisarts en Wetenschap 1965:86:321.

The age of the patient is also recorded.
The doctor is asked to take a nose and throat swab from 2 patients with ILI per week which are then sent for further testing to the National Institute for Public Health and the Environment (RIVM) (Infectious Diseases Diagnostics and Screening Laboratory). The sampling instruction has been adapted to the guidelines of the European study I-MOVE at the start of the season 2015/2016 (week 40 2015) as the sentinel practices participate in this study. These instructions are as follows:

- On Monday to and including Wednesday at least the two first patients with influenza like illness (ILI). This is a random sampling necessary for valid calculation of the influenza vaccine effectiveness.
- When on Monday to and including Wednesday no ILI patients less than 65 years of age are sampled, on Thursday and/or Friday at least the first two patients ≤65 years of age with ILI or another acute respiratory illness (ARI).
- All patients ≥65 years of age with ILI or ARI consulting the GP.

A detailed instruction for swabbing from throat and nose and sending the swabs to RIVM for analysis is available at the web page: www.rivm.nl/afnameinstructie-NIVELgriep.
The registration form accompanying the swabs contains since 2015 besides the diagnosis (ILI or ARI), information about symptoms, influenza vaccination (yes or no), use of antiviarals and recent travel history also underlying disease, functional status, pregnancy, frequency of GP consultation in the preceeding year and hospital admission. In the RIVM-IDS laboratory the swabs are additionally assessed for respiratory syncytial virus (RSV), rhinovirus and enterovirus since 2008. The number of pathogens for which tests are performed may be adapted when necessary. The results are analysed and reported throughout the year but they are presented in this report from week 40 to week 20 of the following year.

Results

In the 2015/2016 season the baseline above which an excess level of flu activity can be observed, was maintained at 51 per 100,000. This line is based on statistical analysis of the incidence of ILI during the last 10 seasons outside the epidemic period. The baseline is recalculated annually, but only adapted when the recalculation deviates substantially. Increased influenza activity is defined as the incidence of ILI exceeding the baseline of 51 per 100,000 for two consecutive weeks and if samples sent to RIVM are found to contain influenza viruses in a substantial percentage. The method for calculation of the baseline was developed by the previously functioning European Influenza Surveillance Scheme (EISS) in order to harmonize the baselines of the various European Countries, taking into account the variety in health systems.
The season 2015/2016 was characterized by a when considering intensity mild influenza epidemic from week 1 in 2016 to and including week 11 in 2016 (11 weeks). In week 7 of 2016 the peak of the mild epidemic was recorded with 14.7 per 10,000 population, slightly lower than in the previous season (16.2). After this peak the incidence remained during four weeks above the epidemic baseline and during these weeks in the nose and throat swabs of patients with ILI in over half of the specimen influenzavirus was found. The cumulative ILI incidence was slightly lower in 2015/2016 than in the previous season, mainly due to the shorter period of the epidemic (Figure 5.1). No striking regional differences in ILI incidence were observed. The highest ILI incidence was observed in the northern part of the country in week 7: 21.4 per 10,000 (Figure 5.2). As usual the ILI incidence was the highest in the rural areas (Figure 5.3) and in the age group 0-4 years (Figure 5.4).

Between week 40 of 2015 through week 20 2016 729 ILI and 509 ARI swabs were sent to the RIVM by the sentinel GPs. In total influenzavirus was found in 428 ILI and ARI swabs of which 59% influenzavirus type A(H1N1)pdm09, 2% A(H3N2), 37% type B (Victoria-lineage) and 2% type B (Yamagata-lineage). The relative proportion of influenzavirus type B (Victorialineage), not included in the influenza vaccine this season, has increased in the second part of the epidemic.

In A(H1N1)pdm09- and influenza B-viruses of the fylogenetic lineage B/Yamagata/16/88 no significant antigenic drift was observed when compared to the previous season 2014/2015. In A(H3N2)-viruses since the season 2011/2012 antigenic drift has occurred.
The viruses in this season's flu vaccine matched well to the circulating A(H1N1)pdm09-virus isolates, but like in the previous season not optimally with the sporadic A(H3N2)- and the B/Yamagata/16/88-lineage virus isolates. The in swabs frequently observed influenzavirus B (Victoria-lineage) was not included in the trivalent influenza vaccine this season.
For the season 2016/2017 of the northern hemisphere the WHO recommended the following contents for the influenza vaccine:

- for A(H1N1)pdm09**:** again a A/California/7/2009-like virus
- for A(H3N2): anA/Hong Kong/4801/2014 like virus
- for B: a B/Brisbane 60/2008 like virus of the B/Victoria/lineage

In none of the 428 tested influenza viruses a decreased sensitivity to antiviral neuraminidase inhibitors was found.

Figure 5.1 Number of incidental patients with influenza-like illness per week per 10,000 inhabitants, for the Netherlands in, 2013/2014, 2014/2015 and 2015/2016

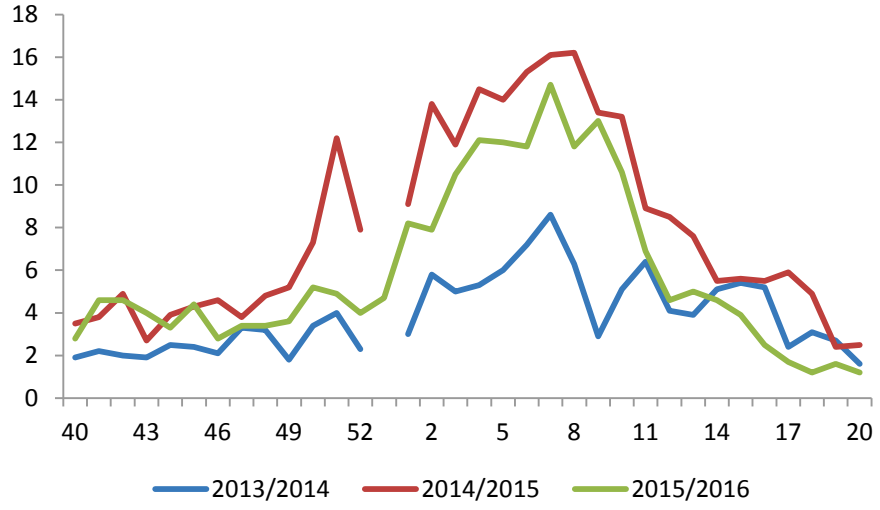


Figure 5.2 Number of incidental patients with influenza-like illness per week per 10,000 inhabitants, according to population density in 2015/2016

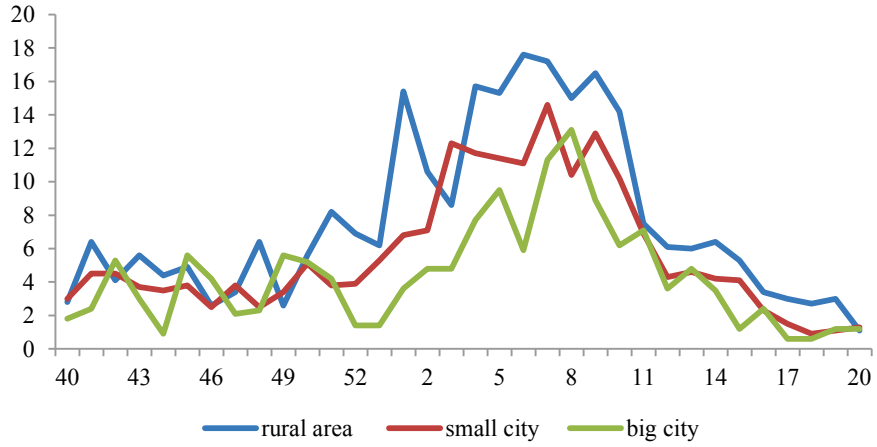


Figure 5.3 Number of incidental patients with influenza-like illness per week per 10,000 inhabitants, per province group in 2015/2016

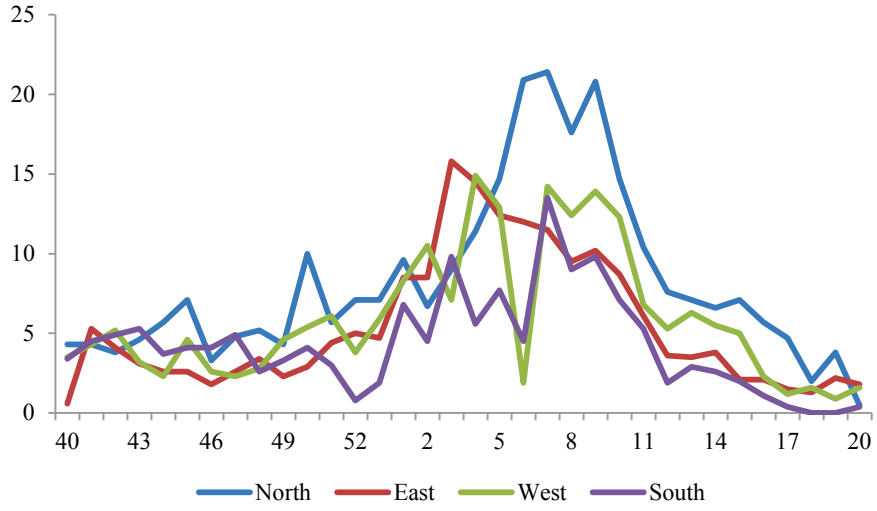


Figure 5.4 Number of incidental patients with influenza-like –illness, per 10,000 per age group, season 2015-2016

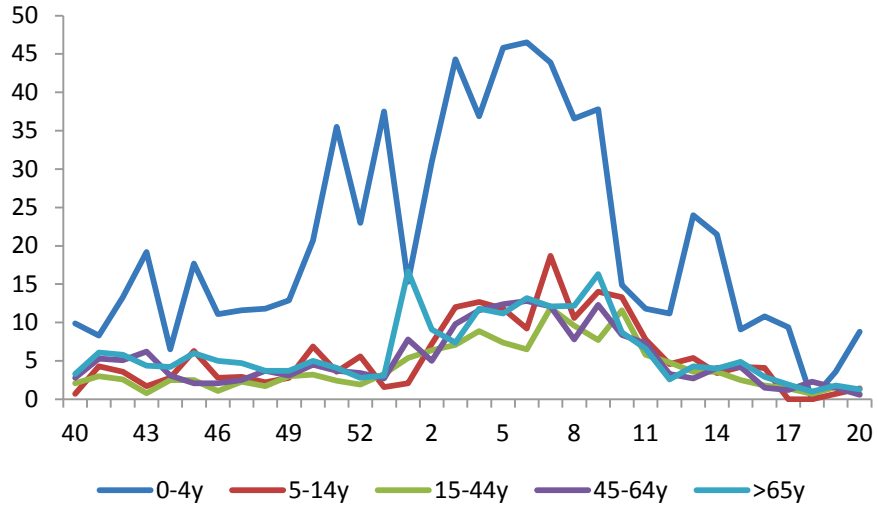


Table 5.1 Number of incidental patients with influenza(-like illness), per 10,000 inhabitants, 2006-2016

year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
total calendar year	190	141	168	309	130	171	170	256	230	302	
highest weekly incidence per 'season'		8	7	15	19	11	8	15	9	16	15

Extrapolation

Table 5.2 Extrapolation of incidence rates influenza like illness to the Dutch population

	frequency incidence rate (per 10,000)*	Netherlands** (absolute numbers)
topic year	total (m+f)	total (m+f)
influenza like illness		
2006	190	310,000
2007	141	231,000
2008	168	276,000
2009	309	453,000
2010	130	212,000
2011	171	285,000
2012	170	284,000
2013	256	430,000
2014	230	387,000
2015	302	510,000

* number influenza like complaints per 10,000 men and/or women (data from sentinel practices)

** extrapolation of the incidence rates to the Dutch population as a whole (for the year in question), rounded off to the nearest thousand

Discussion

The season 2015/2016 was characterized by a when considering intensity mild influenza epidemic of 11 weeks dominated by influenzavirus type A(H1N1pdm09). The epidemic started in the first week of 2016 and reached

its peak in week 7 of 2016: 14.7 per 10,000 were reported that week by the GPs. Thereafter the incidence decreased very slowly. This season the percentage of influenzavirus found in the nose and throat swabs was high, in most weeks >50%. As usual the highest incidence did occur in the age group 0-4 years. Analyses of viruses isolated in the Netherlands showed that the viruses of this season's influenza vaccine matched well with the circulating A(H1N1)pdm09-virus isolates, but suboptimal with theA(H3N2)- and B/Yamagata/16/88-lineage virus isolates. The especially in the second half of the season frequently occurring influenza B (Victoria lineage) was not included in the trivalent influenza vaccine. Vaccinated persons were therefore suboptimally protected.

This topic will be continued.

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6 Pneumonia

Topic owner: Mw. Dr. R. van Gageldonk, RIVM (2007-2010, 2012-2015)

Introduction

Thanks to the Sentinel Practices since years a good overview is available of the incidence of influenza like illness (ILI) and influenza virus in the Dutch population.[7]
Pneumonia is a potentially life threatening disease. Most information concerning incidence, risk factors, ethiology at the moment is generated from secondary care, reason why population incidence and trends are unknown. This is the reason that important information is lacking for adequate disease management.[8]

The pneumonia surveillance was initiated in 2007 to support 'pandemic preparedness'. As pneumonia is one of the most important complications of influenza, a combination of influenza and surveillance strengthens the knowledge of epidemiology of both diseases. Pandemic preparedness remains important after the 2009 pandemic, especially due to the circulation of highly pathogenic avian influenza viruses. To enhance successful interpretation of fluctuations during a pandemic knowledge of historical patterns is essential, reason why continuous surveillance of influenza and pneumonia is necessary.

The goal of the pneumonia surveillance is a nationally representative overview of geographic and seasonal trends in the incidence of pneumonia in primary care, stratified by age and gender, compared to incidence of ILI incidence and trends.

Method

The general practitioners are asked to register new patients with the clinical diagnosis of pneumonia with ICPC-code R81. It is not essential that the diagnosis has been confirmed by X- ray. Nevertheless, it is asked whether a thorax X-ray has been made and whether sputum sample has been analyzed. The following questions are asked:
- Is this a patient with ILI?
- Has a sputum sample been taken for culturing (in ILI-cases only)?
- Has the diagnosis been confirmed by x-ray?
- Is the CRP level increased?
- Is the patient referred to secondary care?

When pneumonia is caused by ILI this will be recorded in the patient record and usual virological examination for ILI will take place by sending nose and throat swabs to RIVM. Results of the virological examination are reported after about one week.

Data from sentinel practices reporting about pneumonia not at all or only once were excluded from the annual analysis because it is unlikely that pneumonia does not or hardly occur in a whole year in a given practice. Including the data of these practices would lead to an underestimation of the incidence in general practice.

Results

In 2015 the results are based on 37 reporting sentinel practices. One practice was excluded from analyses due to presumed underreporting. The incidence is 104 per 10,000 registered patients, higher than in 2014 and considerably higher than in preceedeing years. The he higher incidence co-insides with the implementation of the sentinel practices electronic data collection application in all but one practices during 2014 and all practices in 2015 reducing underreporting.

Table 6.1 Number of patients with pneumonia per 10,000 inhabitants, per province group, address density and for the Netherlands, 2007-2010, 2012-2015

	province group				address density			Netherlands
	N	E	W	S	1*	2*	3*	
2007	39	47	62	61	73	45	68	54
2008	48	47	76	64	94	48	69	59
2009	62	72	66	35	93	48	73	62
2010	65	48	76	22	75	49	46	55
2012	16	30	60	38	15	66	30	46
2013	23	33	65	44	18	73	29	49
2014	85	77	93	103	76	93	103	91
2015	95	86	93	148	96	102	118	104

* 1: ≤500/km^2 2: 500-2500/km^2 3: ≥2500/km^2

Seasonal influence

Comparison of the incidence per season during previous seasons shows that pneumonia occurs mostly in winter (first trimester). This was also the case in 2015 with a peak in the first trimester co-inciding with the long lasting influenza epidemic in the same trimester (table 6.2).

Table 6.2 Number of patients with pneumonia per 10,000 inhabitants per quarter, 2007-2010, 2012-2015

	weeks 1-13	weeks 14-26	weeks 27-39	weeks 40-52
2007	18	11	9	15
2008	19	13	9	17
2009	20	10	12	21
2010	21	13	9	13
2012	18	9	7	11
2013	22	11	4	11
2014	19	23	17	31
2015	42	20	17	25

Age distribution

The incidence of pneumonia is the highest in the age group 1-4 years and the elderly (≥55 years). The highest incidence occurs in persons of ≥85 years: 545 per 10,000. In elderly persons ≥75 years of age the incidence is higher in men than in women. In the younger age groups the differences between men and women are inconsistent (table 6.3).

Table 6.3 Number of male and female patients with pneumonia per 10,000; per age group and for the Netherlands, 2012-2015

	2012			2013			2014		
age group	m	f	t	m	f	t	m	f	t
≤1	185	(31)	109	-	(24)	(13)	(79)	(40)	59
1-4	79	69	74	(25)	38	31	135	113	124
5-9	28	(6)	17	23	24	23	57	84	70
10-14	(16)	(17)	16	21	(4)	13	36	16	26
15-19	(22)	(17)	20	(4)	26	15	30	(3)	17
20-24	-	(5)	(3)	(13)	21	17	22	32	27
25-29	(16)	35	26	(17)	25	21	38	19	28
30-34	(20)	(26)	23	(8)	22	15	32	36	34
35-39	(19)	14	17	(8)	41	24	54	44	49
40-44	43	26	35	44	30	37	55	64	59
45-49	35	44	39	44	45	45	52	49	51
50-54	(19)	34	27	44	35	40	70	74	72
55-59	59	71	65	39	91	66	58	110	84
60-64	59	75	67	58	93	75	114	139	126
65-69	76	105	91	74	112	93	158	123	141
70-74	94	106	100	94	74	86	198	175	186
75-79	98	67	81	142	81	109	259	184	219
80-84	206	60	116	186	109	141	558	258	382
≥ 85	(110)	249	209	270	265	266	579	484	513
total	43	48	46	43	54	49	91	90	91

The numbers between brackets are based on N<5

to be continued

Table 6.3 Number of male and female patients with pneumonia per 10,000; per age group and for the Netherlands, 2012-2015

	2015		
age group	m	f	t
≤1	(81)	(43)	63
1-4	162	154	158
5-9	95	98	97
10-14	26	17	21
15-19	(13)	28	20
20-24	23	28	26
25-29	20	20	20
30-34	31	58	44
35-39	63	82	73
40-44	57	57	57
45-49	75	55	65
50-54	60	86	73
55-59	120	113	116
60-64	141	165	153
65-69	161	171	166
70-74	176	231	204
75-79	311	208	257
80-84	445	316	371
≥ 85	774	431	545
total	101	106	104

In table 6.4 the percentage of pneumonia patients with a nose/throat swab by age group and the percentage of pneumonia patients with ILI by year is shown. Swabbing is more or less equally spread about all age groups, but occurs in only 1 of 12 patients presenting with pneumonia. A relatively high percentage of pneumonia patients (40%) presents ILI symptoms in 2015 (Table 6.4).

Table 6.4 Percentage of pneumonia patients by age group per year swabbed for ILI and percentage presenting ILI symptoms

age group	0-4	5-14	15-44	45-64	≥65	total	% IAZ	N
2009	8.0	15.1	19.1	8.4	11.5	12.4	16.5	654
2010	6.6	12.7	12.0	13.3	2.3	8.2	11.5	609
2012	11.1	8.3	22.0	13.6	11.1	13.7	50.9	278
2013	9.1	12.5	19.4	14.5	8.3	12.4	44.7	387
2014	6.7	5.2	13.1	9.3	6.9	8.3	36.7	973
2015	8.2	6.0	6.9	8.6	8.2	8.0	40.6	1017

Table 6.5 presents the percentage of x-ray of thorax requests by the GP by age group per year. In adults x-rays are more frequently requested than in children to confirm the diagnosis pneumonia. In 2015 an x-ray of the thorax was requested in one out of six pneumonia patients, comparable to previous years (Table 6.5).

Table 6.5 Percentage of patients per year per age group with x-ray of thorax 2009-2010, 2012-2015.

age group	0-4	5-14	15-44	45-64	≥65	total	N
2009	16.0	13.2	17.0	22.8	15.2	17.4	654
2010	3.3	1.8	21.3	16.8	17.8	15.3	609
2012	14.8	8.3	16.0	18.5	25.0	19.8	278
2013	36.4	6.3	19.4	13.7	19.5	17.6	387
2014	11.7	5.2	17.2	22.0	16.4	17.0	973
2015	6.8	11.9	16.7	24.2	16.6	17.6	1017

Table 6.6 presents the percentage of pneumonia patients by age group per year with a practice based CRP test to support the diagnosis. This question was not included in the questionnaire in 2009 and 2010. CRP tests are more frequently used in adults than in children. In 2015 this test was used in over a quarter of pneumonia patients.

Table 6.6 Percentage of pneumonia patients by age group per year with a practice based CRP test to support the diagnosis

age group	0-4	5-14	15-44	45-64	≥65	total	N
2012	11.1	-	16.0	25.9	28.7	22.6	278
2013	36.4	43.8	35.8	27.4	25.4	28.9	387
2014	5.0	12.1	30.3	24.8	21.1	21.9	973
2015	5.5	14.9	29.9	35.3	24.6	26.2	1017

Table 6.7presents the percentage of pneumonia patients by age group per year referred to secondary care. In the youngest and oldest age groups the referral percentages are relatively the highest, but all-over referral percentages are relatively low. In 2015 one in eight pneumonia patients was referred to secondary care.

Table 6.7 Percentage of pneumonia patients by age group per year referred to secondary care

age group	0-4	5-14	15-44	45-64	≥65	total	N
2009	14.0	9.4	3.5	9.0	12.3	9.5	654
2010	4.9	-	13.0	9.8	14.0	10.7	609
2012	11.1	-	6.0	11.1	20.4	13.3	278
2013	18.2	-	9.0	3.2	4.1	4.9	387
2014	33.3	5.2	5.5	8.1	16.8	13.3	973
2015	9.6	13.4	9.7	13.0	13.8	12.7	1017

Extrapolation

Table 6.8 Extrapolation of incidence rates to the Dutch population

	frequency incidence rate (per 10,000)*			Netherlands** (absolute numbers)		
topic year	m	f	total (m+f)	m	f	total (m+f)
pneumonia						
2007	55	54	54	44,000	45,000	89,000
2008	67	59	59	54,000	43,000	97,000
2009	62	61	62	51,000	51,000	102,000
2010	57	53	55	47,000	44,000	91,000
2012	43	48	46	36,000	41,000	77,000
2013	43	54	49	36,000	46,000	82,000
2014	91	90	91	76,000	76,000	153,000
2015	101	106	104	85,000	90,000	176,000

* number of patients with pneumonia per 10,000 men and/or women (data from sentinel practices)

** extrapolation of the incidence rates to the Dutch population as a whole (for the year in question), rounded off to the nearest thousand

Discussion

The pneumonia incidence in 2015 peaks in the first trimester co-inciding with the long lasting influenza epidemic in the same period. Pneumonia is relatively frequently diagnosed in the younger (1-4 years) and the older (≥55 years) age groups and in the age group ≥75 years the incidence in men is higher than in women, probably due to more co-morbidity in men related to smoking in these age categories (COPD and cardiovascular disease). The

incidence of pneumonia is in 2015 higher than in 2014 and remarkably higher than in preceeding years, probably as a result of successful implementation of electronic tools for data collection. During 2014 in all but one practices and in 2015 in all practices the electronic data collection application was implemented.

This topic will be continued in 2016.

Publications based fully or partly on NIVEL Primary Care Database, Sentinel Practices

Van Dijk CE, Garcia-Aymerich J, Carsin AE, Smit LAM, Borlée F, Heederik DJ, Donker GA, Yzermans CJ, Zock JP. *Risk of exacerbations in COPD and asthma patients living in the neighbourhood of livestock farms: Observational study using longitudinal data*. Int. J. Hyg. Environ. Health (2016), http://dx.doi.org/10.1016/j.ijheh.2016.01.002

Spuesens EBM, Meijer A, Bierschenk D, Hoogenboezem T, Donker GA, Hartwig NG, Koopmans MPG, Vink C, Van Rossum AMC. *Macrolide resistance determination and molecular typing of Mycoplasma pneumoniae in respiratory specimens collected between 1997 and 2008 in The Netherlands*. J Clin Microbiol 2012;50(6):1999-2004. DOI:10.1128/JCM.00400-12

7 Whooping cough

Topic owner: Dr. H. de Melker, (RIVM) (1998-2015)

Introduction

Whooping cough is an acute, very infectious disease of the upper airways that is caused by the bacteria *Bordetella pertussis* and in some cases by *Bordetella parapertussis*.
Notably in children younger than 3 months whooping cough may have very serious complications such as brain damage and convulsions**,** actelectasis of the lungs, pneumothorax, and pulmonary emphysema and even death.
Immunity is built up both after having had whooping cough and after having a vaccination, but in both cases the immunity decreases again with the passage of time.
Vaccination against *Bordetella pertussis* has been included in the Dutch government's vaccination programme since 1952. The percentage of people reached by this programme is high (≥ 96%).

The vaccine that was developed in the 1950s was effective in preventing the infection but did not wipe out the bacteria. The bacteria remained in circulation and in spite of the large numbers of people who have been vaccinated the incidence of whooping cough in the Netherlands has been increasing since 1996. Every few years it reaches epidemic levels. Analysis of the available data showed that the proportion of vaccinated people among the indicated disease cases of whooping cough had increased.[9] Therefore, since July 2001 children at four years of age received revaccination with acellular whooping cough vaccine. Since 2005 the whole cell whooping cough vaccine component in the first year of life has been replaced by a combination vaccine with an acellular whooping cough component.

Whooping cough is one of the diseases included in the national mandatory notification. However, the development of the illness and the criteria for registration lead to significant under-reporting and the number of notifications do not reflect the real picture. Underreporting may be caused by

3 reasons. Firstly, many people, notably adults who have been coughing for a few weeks, do not quickly decide to consult a doctor. Secondly, if a patient consults a doctor and the doctor suspects whooping cough, then a laboratory test will not always be requested. Thirdly, not all GPs report all proven cases of whooping cough to the health authorities.

Direct registration of whooping cough in general practice is one way of gaining insight into the extent of under-reporting. At the end of the 1990s information about the incidence of whooping cough was not available in general practice and was just as difficult to obtain from other sources. Further research into the changes in the epidemiology of whooping cough was considered desirable, especially after the introduction of an improved vaccine in 1998. In 1998, it was decided to explore prevention of whooping cough and the diagnostic method in the sentinel surveillance. Because of the recent changes in the strategy of vaccination the possible implementation of maternal vaccination against whooping cough it is desirable that monitoring will be continued. In 2010, further analysis into the shifts in epidemiology and age distribution took place, since the introduction of the acellular vaccine and in 2012 this was done as well and compared to the national mandatory notification register (Donker and van der Maas).[10,11]

Method

The sentinel doctor is asked to register every patient with whooping cough, including gender and age group. A case description is not easy because of the often atypical development of whooping cough in vaccinated people. The sentinel doctors use the following definition for whooping cough: Long-term cough (longer than 3 weeks) with more or less typical characteristics and/or proof of *Bordetella pertussis/parapertussis* infection (according to the protocol of the National Coordination Centre for Combating Infectious Diseases (*Landelijke Coördinatiestructuur Infectieziektebestrijding*).

Using an additional questionnaire, a difference is made between clinical whooping cough that is not laboratory-confirmed and a symptomatic infection (typically or not) with *Bordetella pertussis/Bordetella parapertussis* that is confirmed by a laboratory test. By making this

distinction, insight may be obtained into the frequency of whooping cough diagnosed by the GP on basis of clinical signs only.
The registration of a case of whooping cough is accompanied by an electronic questionnaire presented to the GP collecting additional information about the registration and about the results of the laboratory test if one was requested. The questionnaire also collects information on patient's vaccination status against whooping cough including the number of vaccinations administered.
The information, together with other sources of information about the occurrence of whooping cough, is used by the Centre for Infectious Diseases, Epidemiology and Surveillance of the RIVM at Bilthoven to interpret the progress of whooping cough in the Netherlands.

Results

The number of new cases of whooping cough per 10,000 patients per region and by population density is presented in table 7.1.

In 2014 60 patients were reported with whooping cough amounting to 6 per 10,000 patients, comparable to the previous year. This incidence indicates a small epidemic in 2014 and 2015 with less cases than in 2012 (see table 7.1). An epidemic occurs every three to four years. The present epidemic occurs earlier than expected. Since the introduction of the acellular vaccine - for four year olds in 2001 and for zero year olds in 2005 – the epidemics were supposed to be decreasing, but the contrary appeared to be true in 2012.[11] The incidence in 2012 was comparable to the incidence in 2004, after implementation of the revaccination at four years of age, but before introduction of the acellular vaccine. Over the years no consistent differences by region and population density were observed. However, in 2012, 2014 and 2015 the northern part of the country and rural areas showed a relatively high incidence.

Table 7.1 Number of patients with whooping cough by province group, address density and for the Netherlands as a whole, per 10,000 people, 2006-2015

	province group				address density			Netherlands
	N	E	W	S	1*	2*	3*	
2006	1	7	2	1	7	2	2	3
2007	4	6	4	8	7	5	3	5
2008	3	1	3	15	5	5	2	5
2009	2	6	5	0	2	4	2	3
2010	3	2	3	3	1	4	3	3
2011	-	3	2	4	2	2	3	2
2012	23	5	8	7	10	9	9	9
2013	3	1	2	5	2	3	2	3
2014	13	4	4	7	9	6	3	6
2015	13	5	5	4	13	4	6	6

* 1: ≤500/km^2 2: 500-2500/km^2 3: ≥2500/km^2

Distribution by age group

Table 7.2 shows the numbers of patients with whooping cough per 10,000 inhabitants and per age group.

Table 7.2 Number of patients with whooping cough by age group per 10,000 inhabitants, 2006-2015

age group	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
≤1	(18)	(8)	9	(17)	(8)	(9)	(32)	(-)	(20)	(31)
1-4	17	17	8	18	(4)	11	12	17	18	21
5-9	(7)	10	9	7	(4)	(3)	15	(2)	19	(4)
10-14	10	17	24	7	12	(5)	30	(3)	18	12
15-19	(7)	14	6	7	(4)	(6)	16	(3)	(6)	15
20-24	-	(3)	(2)	(2)	(4)	(3)	13	(-)	(6)	(5)
25-29	-	0	(3)	-	(1)	-	(7)	(2)	(2)	10
30-34	(3)	(6)	(2)	(3)	(3)	(2)	(5)	(3)	7	(3)
35-39	(1)	(1)	(4)	-	-	(1)	(3)	(5)	(5)	(4)
40-44	-	(5)	6	(5)	(3)	(2)	10	(-)	(3)	(3)
45-49	-	6	(1)	(1)	(3)	(1)	9	(1)	(5)	7
50-54	-	0	(1)	(1)	(1)	(1)	(5)	(5)	(1)	(3)
55-59	-	(1)	(4)	(1)	(1)	-	(7)	(-)	(1)	(3)
60-64	-	(2)	(2)	-	(3)	(1)	(3)	(2)	(4)	(7)
65-69	-	0	-	-	(2)	(2)	(6)	(2)	(3)	(2)
≥70	-	-	-	(2)	(1)	-	4	(1)	(3)	(1)

The numbers between bracket are based on N<5

Whooping cough may occur at any age. Analysis of the period 1998-2009 in three groups of 4 years shows that since the introduction of the acellular vaccine – for four year olds in 2001 and for zero year olds in 2005 – the peak incidence gradually shifts from toddler to teenager.[10] However, in 2015 the incidence peaked in the whole age group 0-19 years.

Extrapolation

Table 7.3 Extrapolation of incidence rates whooping cough to the Dutch population

	frequency incidence rate (per 10,000)*	Netherlands** (absolute numbers)
topic year	total (m+f)	total (m+f)
whooping cough		
2006	3	4,900
2007	5	8,000
2008	5	8,000
2009	3	5,000
2010	3	5,000
2011	2	3,000
2012	9	15,000
2013	3	5,000
2014	6	10,000
2015	6	10,000

* number whooping cough per 10,000 inhabitants (data from sentinel practices)

** extrapolation of the incidence rates to the Dutch population as a whole (for the year in question), rounded off to the nearest thousand

Discussion

In spite of the large number of people being vaccinated against whooping cough it still does occur relatively often in the population and 2014 and 2015 showed an epidemic, although smaller than in 2012. This epidemic occurred earlier than expected. Whooping cough occurs in all age groups. Since the introduction in 2001 of vaccination with an acellular vaccine at the age of 4

years and the replacement of a cellular vaccine by an acellular vaccine in the first year after birth in 2005, the peak incidence gradually shifts towards teenage groups. However, during the epidemic in 2014 the peak incidence occurred in the whole age group 0-19 years. The mandatory notification showed a peak incidence in the same age group in 2014 and to a lesser degree in 2015 as well. In comparison to the epidemic in 2012 the peak incidence in the age group 6 months to 4 years was higher in 2014. During an epidemic the incidence of baby's with an incomplete vaccination status increases due to higher infection risk. A comparison between sentinel surveillance and mandatory notification during the epidemic in 2012 showed no marked differences between the two surveillance systems. In 2015 the comparison showed some regional differences between the two systems with a peak incidence in the northern part of the country in the sentinel surveillance and a peak incidence in the central and the eastern part of the Netherlands in the mandatory notification system. The Health Council is considering additional measures regarding whooping cough.[12] In order to protect young babies with incomplete vaccination status the Health Council advised the minister of Sports, Health and Wellfare in December 2015 to offer pregnant women additional vaccination against whooping cough via the National Immunization Programme. The minister will decide in 2016 about this issue.[12]

The topic will be continued in 2016.

Publications based fully or partly on NIVEL Primary Care Database, Sentinel Practices

Van der Maas NAT, Kemmeren JM, Lugner AK, Suijkerbuijk AWM, Donker GA, Buisman A, Berbers GAM, Van Els CACM, De Melker HE, Mooi FR. Pertussis. In: Schurink-van 't Klooster TM, De Melker HE, editors. *The National Immunisation Programme in the Netherlands* – developments in 2013. Bilthoven 2014, RIVM report 150202002/2013:36-43

Donker Gé, van der Maas Nicoline. *De kinkhoestepidemie van 2012.* Huisarts en Wetenschap 2012;55(12):571

Donker Gé, van der Gevel Joost. *Kinkhoest van kinder- naar tienerziekte.* Huisarts en Wetenschap 2011;54(2):53

Greeff de Sabine C. Lugnér Anna K. Heuvel van den Danielle M, Mooi Frits R, Melker de Hester E. *Economic analysis of pertussis illness in the Dutch population: Implications for current and future vaccination strategies.* Vaccine 2009;(27):1932-1937

8 Acute gastro-enteritis

Topic owner: Dr. W. van Pelt (RIVM-CIE) (1992-1993) (1996-2015)

Introduction

Gastro-enteritis is among the top ten illnesses in the Netherlands in terms of incidence. It is an illness that places a considerable burden on the primary health care system.[13]
Gastro-enteritis was added again to the surveillance of the Sentinel Practices in the Netherlands in 1996. Also in 1992 and 1993 the subject has been registered by the sentinel practices.
Initially (until 1999) the investigation mainly focused on the assessment of trends in the incidence of gastro-enteritis, campylobacteriosis and salmonellosis and the burden of health care involved, also with regard to specific pathogens. The results of this research have been published before.[14]

Since 2000 this topic has been maintained in accordance with the first of the above aims: the monitoring of trends in the incidence of acute gastro-enteritis in general practice. In 2001-2002 supplementary information was collected about laboratory diagnosis of patients sent in for consultation within the frame-work of regular health care. The results of this study are published elsewhere.[15]
In 2013 a study was published comparing gastro-enteritis in children 0-4 years consulting GPs in the sentinel practices versus children attending day care centers.[16] Resulting from this study in day care centers a question on attending a day care center was added in the age group concerned to the P-module topic acute gastro-enteritis in the sentinel practices.

Method

Sentinel GPs are asked to report patients with a new episode of gastro-enteritis. A new episode includes that the patient is seen for the first time

during the current episode and has not shown symptoms for at least 14 days following an earlier report. Patients who consult their GP solely by phone are not reported.
Since 2003 it was requested to only report the occurrence of acute gastro-enteritis and to indicate whether or not a faeces test was performed. No other questions with regard to the indication or result of the test are asked as was done before in 2001 and 2002. In 2015 for the first time a question was added in the age group 0-4 years whether the child presenting with gastro-enteritis is attending a day care center.

The sentinel doctors adhere to the following definition of acute gastro-enteritis:
- thin stools three or more times a day, differing from the normal situation for the person concerned, or
- thin stools and two of the following symptoms: fever, vomiting, nausea, stomach ache, stomach cramps, blood or mucus in the stools or
- vomiting and two of the following symptoms: fever, nausea, stomach ache, blood or mucus in the stools.

Results

Table 8.1 shows the number of reports of acute gastro-enteritis, by province group, address density and for the Netherlands as a whole.

Table 8.1 Numbers of cases of acute gastro-enteritis by province group, address density and for the Netherlands as a whole, per 10,000 men and per 10,000 women, 2006-2015

		province group				address density			Netherlands
		N	E	W	S	1*	2*	3*	
2006	male	85	135	112	167	121	119	126	121
2007		69	36	110	110	66	77	135	86
2008		92	53	89	130	105	71	150	90
2009		90	50	95	79	80	72	109	81
2010		101	67	86	104	89	84	110	90
2011		52	50	61	50	62	46	64	54
2012		63	91	70	102	83	83	79	82
2013		57	80	77	137	58	90	132	91
2014		96	56	92	119	78	81	140	92
2015		153	62	86	100	115	85	103	95
2006	female	71	124	122	143	107	122	112	117
2007		67	36	122	139	56	95	134	95
2008		83	57	91	152	88	79	158	93
2009		87	80	103	84	99	77	124	91
2010		129	67	97	124	111	100	110	104
2011		63	70	85	73	70	62	103	75
2012		77	91	88	132	106	90	111	99
2013		69	97	116	181	82	119	175	122
2014		133	60	87	158	87	100	142	105
2015		154	56	104	156	118	104	129	112

* 1: ≤500/km^2 2: 500-2500/km^2 3: ≥2500/km^2

to be continued

Table 8.1 Numbers of cases of acute gastro-enteritis, by province group, address density and for Netherlands as a whole, per 10,000 men and per 10,000 women 2006-2015

		province group				address density			Netherlands
		N	E	W	S	1*	2*	3*	
2006	total	78	129	117	155	114	120	119	119
2007		69	36	116	124	61	86	135	90
2008		88	55	90	141	92	75	154	91
2009		89	65	99	81	89	74	117	86
2010		115	67	92	114	100	92	110	97
2011		57	60	73	62	66	54	84	65
2012		70	91	79	117	94	87	95	91
2013		63	89	97	158	70	105	153	107
2014		114	58	89	138	83	91	141	99
2015		153	59	95	127	117	95	116	104

* 1: ≤500/km^2 2: 500-2500/km^2 3: ≥2500/km^2

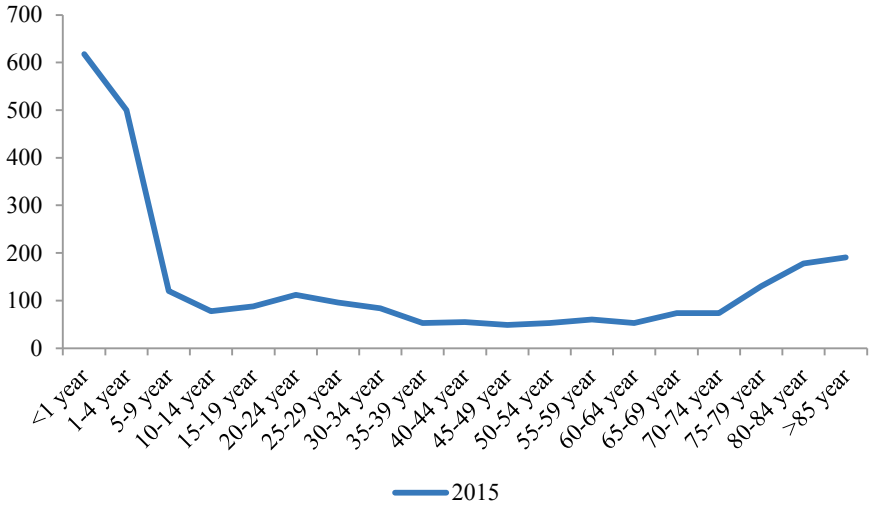
The highest incidence for men and women was seen in 2006.
In 2015 the incidence is comparable to the preceeding years. The highest incidence in 2015 in contrast to previous years is found in rural areas and in the northern part of the country. The difference between men and women has been inconsistent over time, however in 2015 the incidence in women was higher than in men like in the preceeding seven years.

Age distribution

Table 8.2 Numbers of patients with acute gastro-enteritis per 10,000 inhabitants, 2006-2015

	total									
age group (year)	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
≤1	690	588	689	586	766	554	684	925	653	618
1-4	472	349	368	326	350	240	324	455	353	500
5-9	156	114	114	101	118	83	111	113	132	120
10-14	107	56	61	89	68	36	57	69	58	78
15-19	84	53	54	58	79	46	73	83	97	88
20-24	121	84	85	78	98	62	65	109	103	112
25-29	104	82	80	66	90	38	68	94	102	96
30-34	80	84	83	77	92	47	86	87	76	84
35-39	86	44	72	56	57	41	71	59	90	53
40-44	61	38	56	54	56	34	41	77	63	55
45-49	65	49	44	45	58	41	57	63	53	49
50-54	67	57	42	38	54	32	33	52	61	53
55-59	67	76	53	61	51	58	67	71	63	60
60-64	61	48	54	42	66	43	75	69	65	53
65-69	92	63	73	89	55	53	73	64	77	74
70-74	102	100	61	58	89	44	89	107	96	71
75-79	125	131	119	86	104	79	120	89	68	130
80-84	193	152	141	107	142	84	104	128	108	178
≥85	166	152	174	1242	226	216	249	193	217	191

Figure 8.1 Numbers of patients with acute gastro-enteritis in 2015, by age group per 10,000 inhabitants

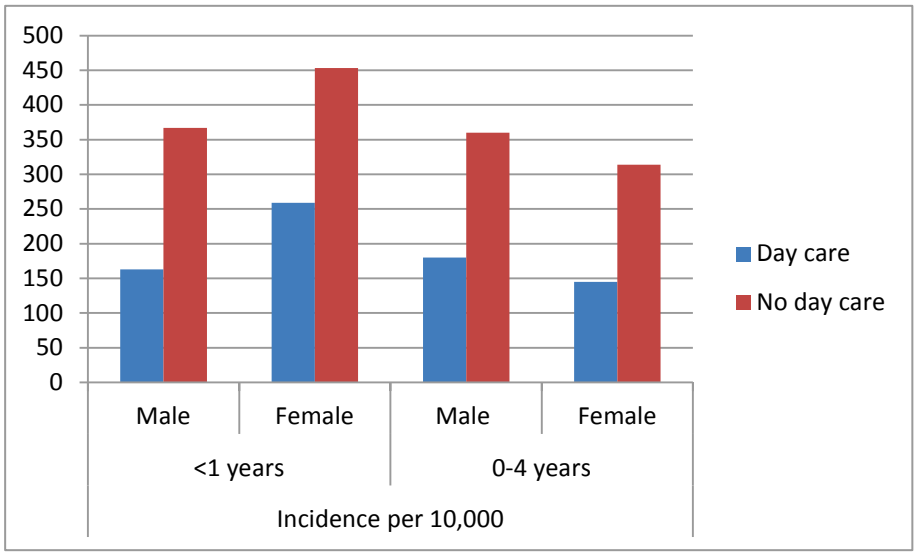


During the whole registration period, most cases of acute gastro-enteritis were diagnosed among babies and 1-4 years olds. In 201 this occurred as well and comparable to the previous years a higher incidence was found for persons older than 80 years.
In 2015 for the first time a question was added in the age group 0-4 years whether the child is attending a day care center. Figure 8.2 shows the difference in incidence of acute gastro-enteritis in the age group concerned between those attending and not attending a day care center. Contrary to the hypothesis those who attend a day care center present acute gastro-enteritis less frequently to the GP. However, cautious interpretation is required due to small numbers .

Seasonal influences

Table 8.3 shows the numbers of cases of acute gastro-enteritis that were reported per season.

Figure 8.2 Incidence per 10,000 children in the age group 0-4 years attending or not attending a day care center in 2015



Seasonal influence

Table 8.3 Numbers of patients with acute gastro-enteritis per 10,000 inhabitants from 2006-2015, arranged per quarter

quarter	1 : weeks 1-13	2 : weeks 14-26	3 : weeks 27-39	4 : weeks 40-52
2006	41	28	27	23
2007	25	24	18	22
2008	37	18	17	16
2009	28	15	22	22
2010	37	21	20	20
2011	23	14	13	14
2012	23	21	19	27
2013	31	28	23	25
2014	27	23	23	25
2015	35	24	22	23

Similarly as in most earlier years the highest incidence in 2015 is seen during winter time (first quarter).

Faeces test in cases of acute gastro-enteritis

Table 8.4 shows a summary of the number of reports of acute gastro-enteritis for which the GP requested a faeces test, arranged per province group, by address density and for the Netherlands as a whole.

Table 8.4 Number of times that the GP requested a faeces test in cases of acute gastro-enteritis, per province group by address density and for the Netherlands as a whole, per 10,000 inhabitants for 2006-2015

	province group				address density			Netherlands
	N	E	W	S	1*	2*	3*	
2006	35	10	32	18	22	24	34	26
2007	20	33	29	13	16	25	31	25
2008	6	3	13	22	9	11	13	11
2009	10	5	13	8	8	8	16	10
2010	15	8	9	9	9	10	11	10
2011	2	5	9	3	4	4	10	6
2012	7	14	12	10	7	11	16	11
2013	5	9	15	14	6	12	19	12
2014	7	6	10	11	5	10	12	9
2015	5	8	11	6	8	8	9	8

* 1: $\leq$500/km^2 2: 500-2500/km^2 3: $\geq$2500/km^2

The number of requests for faeces tests in 2015 was slightly lower than in the previous three years. In 2015, the number of requests for a test was the highest in the big cities and in the western provinces.

Age distribution

Table 8.5 shows the number of requests for a faeces test in cases of acute gastro-enteritis per age group and per 10,000 persons.

Table 8.5 Number of requests for a faeces test in cases of acute gastro-enteritis per age group per 10,000 inhabitants from 2006-2015

age group (year)	2006	%	2007	%	2008	%	2009	%	2010	%	2011	%
≤1	45	6	118	17	28	4	(50)	4	(15)	2	28	7
1-4	61	13	77	18	30	8	32	12	31	10	25	10
5-9	25	16	27	19	(6)	5	(7)	7	10	8	8	10
19-14	19	17	9	14	(3)	5	(3)	4	8	14	(3)	9
15-19	26	31	21	29	(8)	15	(1)	2	16	26	-	-
20-24	42	35	29	26	12	14	14	23	11	13	(6)	9
25-29	41	39	35	30	13	16	15	30	10	13	(5)	10
30-34	31	38	25	23	10	12	(6)	9	15	17	(5)	10
35-39	19	22	24	35	12	17	14	31	(5)	10	9	21
40-44	23	38	13	25	(9)	16	(8)	26	9	18	(4)	10
45-49	10	15	22	31	(9)	20	(5)	14	9	20	(4)	13
50-54	22	33	18	24	12	29	(4)	11	6	13	(4)	12
55-59	19	28	14	15	15	28	13	39	(5)	12	9	18
60-64	27	43	26	35	(8)	15	(4)	10	(5)	8	(4)	10
65-69	20	22	23	27	(9)	12	15	42	13	32	(2)	3
70-74	21	21	15	13	(5)	8	17	57	13	31	(2)	6
75-79	26	19	10	7	(9)	8	(3)	4	(5)	5	(3)	4
80-84	31	16	17	10	13	9	-	0	(7)	5	(4)	5
≥85	(7)	4	(12)	7	(2)	1	(15)	8	(4)	2	(5)	2

% = number of faeces tests: number of reports of acute gastro-enteritis x 100

Numbers in brackets are based on N<5

to be continued

Table 8.5 Number of requests for a faeces test in cases of acute gastro-enteritis per age group per 10,000 inhabitants for 2006-2015

age group (year)	2012	%	2013	%	2014	%	2015	%
≤1	53	9	52	6	(20)	3	(31)	5
1-4	37	14	40	9	37	10	31	6
5-9	15	16	(4)	4	9	7	(5)	4
19-14	10	23	10	14	(2)	3	(3)	4
15-19	13	26	17	20	(6)	6	10	11
20-24	11	17	17	16	9	9	12	11
25-29	10	23	15	16	(6)	6	15	16
30-34	13	20	12	14	10	13	10	12
35-39	16	33	(7)	12	11	12	(4)	7
40-44	7	24	20	26	6	10	(3)	5
45-49	(4)	9	10	16	6	11	(5)	11
50-54	(2)	(4)	10	19	8	13	(4)	8
55-59	12	23	8	11	7	11	(6)	10
60-64	(6)	10	(3)	4	10	15	(5)	9
65-69	(6)	(7)	10	16	12	16	8	11
70-74	15	22	12	11	(4)	4	(7)	10
75-79	(10)	(13)	(3)	3	(6)	9	(9)	7
80-84	9	16	(4)	3	(16)	15	-	-
≥85	(6)	(2)	(10)	5	(5)	2	(5)	3

% = number of faeces tests: number of reports of acute gastro-enteritis x 100

Overall, the number of registered requested faeces tests per 10,000 people per age group shows the same pattern as for the total number of reports of acute gastro-enteritis per age group. In absolute numbers most requests for a faeces test were made in 2015 for 0-4 years olds.

However, this is not the case for the number of faeces tests per age group as a percentage of the total number of reported cases of acute gastro-enteritis in that age group. In adults a faeces test is performed more often.
Children (≤ 15 years old) with acute gastro-enteritis consult their GP more often than older children or adults. However in adults consulting their GP with symptoms of acute gastro-enteritis the GP will relatively more often request a faeces test in 2015, but in the oldest age categories less frequently.

Extrapolation

Table 8.6 Extrapolation of incidence rates gastro-enteritis to the Dutch population

	frequency incidence rate (per 10,000)*			Netherlands** (absolute numbers)		
topic year	m	f	total	m	f	total
gastro-enteritis						
2006	121	117	119	98,000	97,000	194,000
2007	86	95	90	71,000	80,000	151,000
2008	90	93	91	73,000	77,000	150,000
2009	81	91	86	66,000	76,000	142,000
2010	90	104	97	74,000	87,000	161,000
2011	54	75	65	45,000	63,000	108,000
2012	82	98	91	68,000	83,000	152,000
2013	91	122	107	76,000	103,000	180,000
2014	92	105	99	77,000	89,000	167,000
2015	95	112	104	80,000	96,000	176,000

* number gastro-enteritis per 10,000 men and/or women (data from sentinel practices)

** extrapolation of the incidence rates to the Dutch population as a whole (for the year in question), rounded off to the nearest thousand

Discussion

In 2015 the incidence was relatively high, but not as high as in 2006 and 2013. In 2006 the incidence was the highest, predominantly in the first quarter. Similarly as in 2002/2003 this coincided with a high incidence of Norovirus and in 2006, 2009 and 2010 a Rotavirus epidemic occurred.[16,17] In 2014, however, the incidence of rotavirus was extremely low especially during the first trimester in children 1-4 years of age. In 2015 the incidence of gastro-enteritis caused by rotavirus was comparable to the preceeding years.[18, 19]

As part of regular health care GPs request a faeces test relatively more frequently in 2015 for adults. This is the consequence of a difference in consultation behaviour between cases of acute gastro-enteritis involving children (≤ 15 years old) and cases involving adults (≥ 15 years old). This latter group consults the doctor when they have more serious longer lasting symptoms. Diarrhoea following a trip abroad occurs more often in adults, too.[15]
Contrary to expectation our data do not show an increased incidence of acute gastro-enteritis in children attending day care centers although cautious interpretation is required due to small numbers.
A comparison of the incidence of gastro-enteritis in the Sentinel Practices with the incidence in children visiting day care centres showed a twofold incidence of gastro-enteritis in children 0-4 years of age visiting day care centres. One third of day care centres reported the absence of hand washing protocols before meals (34%) and after visiting the toilet (15%) or to not daily clean the toilets (17%) (see publication Enserink et al. 2013).[15]

This topic is unchanged continued in 2016.

Publications based fully or partly on NIVEL Primary Care Database, Sentinel Practices

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Pelt W van, Notermans D, Mevius DJ, Vennema H, Koopmans MPG, Duynhoven YTHP van. *Trends in gastro-enteritis van 1996 – 2006: Verdere toename van ziekenhuisopnames, maar stabiliserende sterfte.* Infectieziekten Bulletin 2008;19(1)

Pelt van W, Friesema I, Doorduyn Y, Jager de CM, Duynhoven YTHP. *Trends in gastro-enteritis in Nederland; notitie met betrekking tot 2007.* RIVM project V/210221/TS. RIVM, Bilthoven, December 2008

Pelt van W, Notermans D, Giessen AW, Mevius DJ, Vennema H, Koopmans M, Asten van L, Duynhoven van YTHP. *Trends in gastro-enteritis van 1996-2005; Toename van ziekenhuisopnames en sterfte: een toenemende rol van virale infecties?* Infectieziekten Bulletin 2006;10:364-70

Brandhof van den WE, Bartelds AIM, Koopmans MPG, Duynhoven van YTHP. *General practitioner practices in requesting laboratory tests for patients with gastro-enteritis in the Netherlands*, 2001-2002; BMC Family Practice 2006;7:56

9 Sexually Transmitted Diseases (STD)

Topic owner: Mrs. dr. I. Van den Broek (RIVM)(2008-2015)

Introduction

Together with respiratory, gastro-intestinal and urinary tract infections, Sexually Transmitted Diseases (STD) are the most frequently occurring infectious diseases in the Netherlands. Chlamydia, gonorrhea, syphilis, genital warts, hepatitis-B and HIV infection are the most important STDs.

National surveillance of STD is predominantly performed by the electronic SOAP registration of the RIVM, used since 2004 by the STD out patients clinics of the municipal health agencies (GGD), and through registration of infections by the HIV Monitoring Foundation. The municipality out patients clinics offer low threshold STD-care to high risk groups. In recent years the number of STD consultations at the municipality out patients clinics has increased substantially, but in 2015 this decreased due to budgetary restrictions in the number of consultations.

However, it is estimated that GPs account for 65-75% of all STD-related consultations. This was recently confirmed by the results from the Sentinel Practices topic "STD related consultations", from estimates based on data from NIVEL Primary Care Database and compared to the data of municipality out patients clinics. In general practices the estimated number of STD related consultations is about 275,000 compared to 135,000 at the municipality centers of sexual health. These trends are from 2008 onwards described in the annual surveillance report of the RIVM.[20] Therefore, registration by the Sentinel Practices, may serve as a welcome addition to these data, especially because the questionnaires that have been included will provide insight into the background and reasons of a request for an STD test. The topic Sexually Transmitted Diseases for men and women started from 1-1-2008 and was preceeded by more specific topics and target groups such as 'fear of HIV' and 'urethritis in men'. In this chapter only data regarding STD-related consultations by sentinel GPs are being reported. The collected additional data are published separately.[20-22]

Method

The sentinel GPs are instructed to register this topic as a new STD consultation, except if a consultation was asked for information on i.e. prescription of anticonceptives. Proof of STD is not mandatory for registration. Also fear of STD and the possibility of STD and/or HIV should be registered. In addition a questionnaire addressing additional information emerging from the consultation should be completed. If diagnostic STD-tests are requested, a form with the test results should be added to the questionnaire. The diagnostic tests for chlamydia, gonorrhea, trichomonas, genital Herpes infection, hepatitis B, HIV and/or syphilis are performed by the regional laboratory of the participating practice. Only sentinel practices reporting STD more than once per year were included, as in practices without any or with only one STD related consultation underreporting is assumed.

Results

The results are based on data from 38 reporting practices. No practice was excluded for assumed underreporting.
The number of STD-related consultations per10,000 patients per province group and address density are presented in table 9.1.The incidence is the highest in the western part of the Netherlands and in the small and big cities. The number of STD-related consultations was in 2015 especially in the small to middle size cities lower than in the previous four years.

Table 9.1 Number of new STD-related consultations per province group, address density and for the Netherlands as a whole per 10,000 in 2008-2015

	province group				address density			Netherlands
	N	E	W	S	1*	2*	3*	
2008	35	38	65	50	20	46	88	49
2009	40	27	73	48	28	40	98	51
2010	37	32	61	51	32	49	62	48
2011	35	36	83	60	34	56	83	61
2012	45	38	70	72	38	66	74	61
2013	41	39	80	64	33	66	87	62
2014	45	36	70	63	31	67	62	58
2015	33	29	66	65	33	51	68	50

* 1: $\leq$500/km^2 2: 500-2500/km^2 3: $\geq$ 2500/km^2

Age distribution

In table 9.2 the data on new STD-related consultations are shown per age group. The age group between 15 and 39 years consults the GP most frequently for these problems. More women than men consult the GP for STD and/or fear for HIV.

Table 9.2 Number of new STD-related consultations per age group and per 10,000 inhabitants, 2008-2015

	2008			2009			2010		
age group	m	f	t	m	f	t	m	f	t
10-14	0	12	6	-	19	9	-	(3)	3
15-19	32	121	76	74	149	111	52	98	97
20-24	178	302	241	180	251	216	167	218	215
25-29	141	175	158	154	175	165	158	152	145
30-34	58	116	87	75	110	93	81	91	90
35-39	64	90	77	77	72	74	58	69	68
40-44	47	49	48	67	29	48	28	38	39
45-49	23	38	31	46	38	42	25	33	32
50-54	10	23	16	19	17	18	18	22	21
55-59	16	14	15	(12)	23	18	22	21	20
60-64	5	15	15	18	-	9	14	11	11
65-69	5	10	8	-	(4)	(2)	-	(2)	(2)
70-74	13	0	6	(11)	(14)	13	(5)	(5)	(5)
75-79	-	-	-	(7)	(5)	(6)	-	(3)	(3)
80-84	-	-	-	-	-	-	-	(4)	(4)
≥85	-	-	-	-	-	-	(16)	(5)	-
total	38	60	49	47	55	51	40	56	48

The numbers between bracket are based on N<5

to be continued

Table 9.2 Number of new STD-related consultations per age group and per 10,000 inhabitants, 2008-2015

	2011			2012			2013		
age group	m	f	t	m	f	t	m	f	t
10-14	-	(4)	(2)	-	-	-	-	(11)	(5)
15-19	65	227	146	51	161	105	51	201	123
20-24	216	321	269	182	270	226	231	285	258
25-29	135	248	193	171	315	245	165	259	213
30-34	130	144	137	128	132	130	75	158	117
35-39	55	66	61	78	95	86	84	78	81
40-44	53	60	57	56	46	51	42	84	63
45-49	36	(12)	24	41	35	38	43	61	51
50-54	27	44	35	24	35	29	28	27	28
55-59	(14)	(13)	14	35	24	29	30	30	30
60-64	(13)	16	14	(10)	(13)	12	20	(10)	15
65-69	(4)	-	(2)	22	(8)	15	(4)	-	(2)
70-74	(11)	-	(5)	-	-	-	(5)	(5)	(5)
75-79	-	-	-	(23)	-	(10)	-	(6)	(3)
80-84	-	-	-	-	-	-	-	-	-
≥85	-	-	-	-	(8)	(6)	-	-	-
total	49	72	61	51	70	61	49	74	62

The numbers between bracket are based on

to be continued

Table 9.2 Number of new STD-related consultations per age group and per 10,000 inhabitants, 2008-2015

	2014			2015		
age group	m	f	t	m	f	t
10-14	-	(3)	(2)	-	-	-
15-19	51	127	88	42	162	100
20-24	163	305	233	193	237	215
25-29	172	200	186	145	160	153
30-34	144	107	126	95	110	102
35-39	117	103	110	91	65	78
40-44	58	69	63	48	54	51
45-49	52	35	44	37	49	43
50-54	25	36	30	25	43	33
55-59	22	25	24	18	21	20
60-64	15	(9)	12	(3)	(10)	(7)
65-69	(6)	(9)	8	(6)	(3)	(5)
70-74	(4)	(4)	(4)	(5)	-	(2)
75-79	(6)	(5)	(6)	-	-	-
80-84	-	-	-	-	-	-
≥85	(15)	-	(5)	-	-	-
total	52	63	58	45	56	50

The numbers between bracket are based on

Extrapolation

Table 9.3 Extrapolation of incidence rate STD-related consultations to the Dutch population

	frequency incidence rate (per 10,000)*			Netherlands** (absolute number)		
topic year	m	f	total (m+f)	m	f	total (m+f)
STD						
2008	38	60	49	31,000	50,000	81,000
2009	47	55	51	38,000	46,000	84,000
2010	40	56	48	33,000	47,000	80,000
2011	49	72	61	41,000	61,000	102,000
2012	51	70	61	42,000	59,000	102,000
2013	49	74	62	41,000	63,000	104,000
2014	52	63	58	43,000	54,000	98,000
2015	45	56	50	38,000	48,000	85,000

* number STD per 10,000 men and/or women (data from sentinel practices)

** extrapolation of the incidence rates to the Dutch population as a whole (for the year in question), rounded off to the nearest thousand

Discussion

As expected, the highest incidence of new STD-related consultations were reported in the cities and the western part of the Netherlands, where most of the big cities are located, with an age peak between 15 and 39 years. GPs are consulted more frequently by women than by men for STD and/or fear of HIV. These trends are seen in all practices of NIVEL Primary Care Database.

The incidence rates from the sentinel practices are lower than from NIVEL Primary Care Database due to differences in the applied criteria for STD-related consultations, for which a questionnaire was filled in at the sentinel practices in comparison with those for the STD-episodes based on ICPC codes in the Dutch Primary Care Database. The additional data from the questionnaires were compared with the data from the Dutch Primary Care Database and other sources. Several articles in English and Dutch were published about STD and HIV related consultations in general practice in 2015 and data were presented at international conferences at several occasions.

This topic will be continued in 2016.

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10 Urinary tract infections

Rubriekhouder: Mw. Dr. E.E. Stobberingh (RIVM)(2015)

Introduction

Urinary tract infections are frequently occurring infections in general practice. The incidence varies depending on the practice population between 40-60 per 1000 per year. The antibiotic treatment prescribed by the GP is usually empiric and not based on a bacteriological culture. Mostly the choice is based on the NHG guideline for urinary tract infection, sometimes considerations may lead to a different choice. Even after a first treatment failure guidelines will lead to the choice of a second option. A bacteriological culture will usually be applied after a second treatment failure. The empirical choice of antibiotics should be based on recent sensitivity analyses for antibiotics of the bacterial population to be treated, thus of unselected uropathogens. Sensitivity of these uropathogens is presumably higher than of the uropathogens selected after failing treatment. For an optimal choice up to date sensitivity analyses are required. The most recent data stem from 2009. In that period in the sentinel practices research was carried out in sensitivity to antibiotics of uropathogens in women 12-70 years attending their GP with symptoms of an uncomplicated urinary tract infection.
Because of the increasing incidence of (multi) resistance in hospitals(Nethmap 2010) and the increasing prevalence of so-called Extended Spectrum Beta-lactamases (ESBL) in the veterinarian sector (D. Mevius, personal communication) it is important to repeat the study in order to obtain actual data. It has also become clear that sensitivity data for urological pathogens isolated from men are scarce. In connection with the extramural antibiotic surveillance of SWAB a surveillance of antibiotic sensitivity for urological pathogens has been started in genera practices in 2009. The outcome has been published in Dutch and English literature and the resistence of uropathogens in Dutch general practice was low at that moment.[23]

The aim of this study is:
Determination of antibiotic sensitivity of uropathogens isolated in male and female general practice patients with symptoms indicative of a urinary tract infection. In 2014 sufficient samples were collected from women with uncomplicated urinary tract infections. In 2015 only samples of men, children and pregnant women consulting the GP with a urinary tract infection were collected.

Method

- All male patients, children up to and including 15 years of age and pregnant women with symptoms of a urinary tract infection should be included, independant of the applied therapy, including patients with a catheter.
- Incidence and prevalence are determined using ICPC-codes U71 (cystitis) and U70 (pyelitis). New infections within one month are considered as a recurrence of the same infection. The ICPC codes U71 and U70 may be used based on clinical symptoms indicative of urinary tract infection.
- The usual diagnosis and way of treatment in general practice is continued. This is not influenced by the current study.
- In the freshly produced urine a uricult is immersed, marked with the code of the GP and patient number, to be sent to the bacteriological laboratory of the Maastricht University Medical Centre (MUMC) up till July 2013 and to RIVM/Cib since July 2013.
- Isolation and determination of the uropathogens will be performed according to the standard microbiological methods of the EUCAST and SWAB guidelines.
- The GP receives the bacteriological results weekly.
- The project leader and SWAB are informed annually. The results are published in Nethmap every year.
- When many samples are received per day the GPs are requested to sent the first 2 samples of that day.

Results

Table 10.1 shows the number of reported episodes with a urinary tract infection stratified by region and address density, men, women and total. The incidences are based on analysis of episodes with the ICPC codes U70 (pyelitis) and U71 (cystitis). Underreporting is likely, because most of the activities were performed by GP assistants and the results were available only one day later. The reported incidences in 2014 and 2015 are higher in women than in men, as usual.

Table 10.1 Number of episodes with a urinary tract infection per province group and address density in the Netherlands, per 10,000 men and 10,000 women in 2014-2015

		province group				address density			Netherlands
		N	E	W	S	1*	2*	3*	
2014	m	420	231	213	236	286	263	208	258
2015		371	277	235	208	287	283	184	267
2014	f	2028	1757	1470	1625	1767	1660	1512	1656
2015		1898	1799	1800	1627	1857	1810	1563	1778
2014	t	1216	999	857	918	1014	969	870	961
2015		1128	1039	1039	900	1060	1046	891	1023

* 1: ≤500/km^2 2: 500-2500/km^2 3: ≥2500/km^2

** m=men f=female t=total

Age distribution

Table 10.2 Number of episodes with a urinary tract infection per age group and per 10,000 men, women and total in 2014-2015

	2014			2015		
age group	m	f	t	m	f	t
≤1	91	109	100	28	88	57
1-4	165	640	406	160	881	510
5-9	140	805	465	109	948	520
10-14	67	408	234	75	516	290
15-19	27	1471	718	28	1506	739
20-24	69	1793	915	61	1994	988
25-29	57	1587	820	61	1728	887
30-34	114	1486	794	54	1573	809
35-39	95	1154	628	126	1325	722
40-44	91	1246	664	104	1458	778
45-49	120	1222	660	141	1370	745
50-54	196	1365	771	166	1348	741
55-59	267	1595	926	275	1611	939
60-64	278	1759	1021	327	2015	1182
65-69	452	2032	1245	445	2316	1379
70-74	663	2653	1687	646	2236	1469
75-79	1041	3398	2283	1030	3596	2362
80-84	1533	3766	2841	1708	4450	3288
≥85	2373	5857	4774	2582	5529	4555
total	258	1656	961	267	1778	1023

Table 10.2 shows the incidence by age group for men and women. The incidence increases in men and women from the age of 65 years.

Extrapolation

Table 10.3 Extrapolation of the incidence rate of urinary tract infection to the Dutch population

	frequency incidence rate (per 10.000)*			Netherlands** (absolute number)		
topic	m	f	total	m	f	total
year			(m+f)			(m+f)
urinary tract infections						
2014	258	1656	961	215,000	1407,000	1617,000
2015	267	1778	1023	224,000	1516,000	1729,000

* number urinary tract infection per 10,000 men and/or women (data from sentinel practices)

** extrapolation of the incidence rates to the Dutch population as a whole (for the year in question), rounded off to the nearest thousand

Discussion

Regular monitoring of antibiotic sensitivity to unselected urological pathogens is the basis for an evidence based empirical choice of antibiotic treatment of a urinary tract infection. The national increase of antibiotic resistance found in human and veterinarian isolates and the fact that the last surveillance took place 5 years ago were the main reasons to start a new surveillance in 2014. The results show that the incidence in women is much

higher than in men and that the incidence increases especially after the age of 65 years, both in men and women.

The study is not continued in 2016.

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11 End-of–Life research

Topic owner: Dr. B.D. Onwuteaka-Philipsen, VUmc Amsterdam. EMGO-instituut, afdeling Sociale Geneeskunde (2005-2015)

Introduction

The percentage of persons not dying acutely, and therefore needing medical treatment and care at the end of life, is increasing. Most people die at old age, and the mortality per 1000 persons is increasing because of the absolute and relative increase in the number of elderly people. Because of this demographic change it is increasingly important to offer adequate care at the end of life, aiming at the highest quality of life possible.
At population level, nationally and internationally, scientific knowledge is lacking in how patients actually die. Existing epidemiological studies have assessed how many persons die, from what disease, and whether death was preceded by an end of life decision with the intentional or accidental effect that life was shortened. However, information about care at the end of life, the place of death, the specific problems of the patients, the quality of dying and the role of the GP in providing terminal care, is limited.
Therefore, research on these topics is mandatory, to improve the care of patients in the final months before dying. GPs are highly involved with the decease of most patients. If patients die outside the practice (hospital or other institutions), they are informed about this event. Therefore, they are particularly apt to provide data about end of life decisions. With this information indicators for quality of care at the end of life are developed. In this chapter only information is provided on the number of deaths per region, address density, season and age group. Additional research with regard to care provided at the end of life will be published separately.

Methods

Sentinel physicians are asked to report the death of a patient, registered in their practice, who did not die unexpectedly or acutely. The GP is also asked

to provide additional information on the type of care the patient may have received during the last 3 months before dying and from which caregiver, which disease(s) have led to the decease of the patient, (main diagnosis) what type of care the patient preferred, the place of death, and the amount of suffering the patient has encountered shortly before dying. A similar, but more extensive research program is currently being performed in Belgium, Italy and Spain in the years 2009/2010 and 2013-2015. The data of these four countries are compared and results are published as a consortium. Only sentinel practices that have registered more than one death are involved in the analyses, because 0 or 1 death in one year is suspect of underreporting.

Results

The number of patients per 10,000 reported for the end-of-life study is presented in table 11.1, per province group and by address density and for the Netherlands from 2006 to and including 2015. The numbers are based on 36 sentinel practices with ≥2 registrations in 2015. Two practices were excluded in 2015 due to suspect underreporting. Most reported cases came from the northern part of the country and from practices in the rural areas. In the western part of the Netherlands the registrations are lower than in previous years. Possibly especially in large cities patients have, more than in previous years, spent the last stage in a nursing home or hospice which is not part of the general practice.

Table 11.1 Number of reported End-of-Life study per 10,000 inhabitants, per province group, by address density and for the Netherlands, 2006-2015

	province group				address density			Netherlands
	N	E	W	S	1*	2*	3*	
2006	37	49	53	60	36	54	50	50
2007	43	42	65	52	40	50	83	52
2008	46	44	50	38	50	44	47	46
2009	48	55	51	44	53	46	59	50
2010	52	51	54	51	48	53	54	52
2011	50	36	33	37	44	34	36	37
2012	71	55	32	63	60	53	39	51
2013	73	60	34	64	63	53	41	53
2014	72	63	41	47	62	50	45	52
2015	74	46	43	47	66	45	46	50

* 1: ≤500/km^2 2: 500-2500/km^2 3: ≥2500/km^2

Seasonal influences

The number of patients per 10,000, reported in the end-of-life study, grouped by quarter is presented in table 11.2.

Table 11.2 Numbers of reported End-of-Life study by quarter, per 10,000 inhabitants, 2006-2015

	weeks 1-13	weeks 14-26	weeks 27-39	weeks 40-52
2006	12	12	16	11
2007	14	12	12	13
2008	12	10	13	11
2009	13	13	11	13
2010	15	13	11	13
2011	10	8	7	12
2012	12	13	12	14
2013	14	13	12	13
2014	14	13	13	12
2015	14	13	13	11

In 2015 the reported number of end-of-life cases was the highest in the first quarter. In that quarter a mild long lasting influenza epidemic occurred in The Netherlands as well.

Age distribution

The age distribution of the patients reported for the end-of-life study in 2015 is presented in table 11.3.

Table 11.3 Numbers of reports End-of-Life-study, per 10,000 inhabitants, by age group, 2006-2015

age group	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
≤1	(21)	(20)	(22)	-	-	(30)	-	(11)	-	-
1-4	(0)	(10)	(2)	-	(4)	-	-	(5)	(2)	-
5-9	(0)	(0)	0	-	-	(2)	-	-	-	(2)
10-14	(0)	(0)	0	(2)	-	-	-	-	-	(2)
15-19	0	(0)	0	(2)	(3)	-	(2)	(7)	(3)	-
20-24	(2)	10	(4)	(3)	(1)	-	4	-	-	(2)
25-29	(2)	(2)	0	(3)	(1)	(2)	-	(2)	(2)	(5)
30-34	(2)	(2)	(6)	2	(3)	(2)	9	-	-	(3)
35-39	(2)	(5)	(6)	(3)	(4)	(2)	9	(5)	(6)	(4)
40-44	(6)	(4)	(6)	8	8	(3)	(2)	15	(3)	(4)
45-49	13	14	11	15	9	8	15	21	11	(4)
50-54	19	24	32	36	26	19	21	22	20	20
55-59	21	27	40	33	40	18	34	36	32	24
60-64	87	62	62	47	58	43	52	50	54	59
65-69	80	120	64	79	90	75	86	84	66	81
70-74	173	138	137	178	145	88	133	137	142	131
75-79	282	248	201	229	231	174	238	195	222	230
80-84	426	413	308	362	370	266	407	354	334	357
≥85	915	918	761	809	840	627	774	806	886	767

The numbers between bracket are based on N<5

In the first year of life babies die from, among other things, incurable congenital diseases. In 2012, 2010, 2009 and 2015, no cases of end of life in the youngest category were reported. Subsequently the mortality rates are low until the age of 55, after which they steadily increase.

Extrapolation

Table 11.4 Extrapolation of the reported deaths to the Dutch population

	frequency incidence rate (per 10,000)*			Netherlands** (absolute numbers)		
topic year	m	f	total (m+f)	m	f	Total (m+f)
End-of-Life study						
2006			50			82,000
2007			52			87,000
2008			46			75,000
2009			50			82,000
2010			52			86,000
2011			37			62,000
2012			51			85,000
2013			53			89,000
2014			52			88,000
2015			50			85,000

* number of deaths per 10,000 inhabitants (data from sentinel practices)

** extrapolation of the incidence rates to the Dutch population as a whole (for the year in question), rounded off to the nearest thousand

Discussion

In the Netherlands the total mortality amounted to 147,010 in 2015, 8.7 per 1000 inhabitants. (Dutch Statistics, www.CBS.nl). Part of the patients who die are not under the direct care of a GP, such as patients in nursing homes or hospices. Therefore, registration by GPs results in a lower incidence rate than registered by CBS, because nursing homes have a high death rate and

admission to a hospice generally is meant for terminal care.
The highest incidence was reported from the northern part of the country and from rural areas. Possibly in cities more often patients opt for staying in a nursing home or hospice in the last phase of life which is not under the care of a GP. Also other Dutch and international literature indicates that patients in rural areas more often die at home.[24]
According to the second Dutch National Survey of General Practice the mortality rate reported in general practice is 41 per 10,000.[25] This lower rate may be due to underreporting. In the sentinel practices, with a rate of 50 per 10,000 that appears to be the case too, but to a somewhat lesser extend. Extrapolation shows that 58% of the total number of estimated deceased patients are reported in this registration. Apparently, not all deceased patients are reported by the sentinel GPs, this could be due to the care being taken over by a nursing home or a hospice. Underreporting may also be due to the extensive questionnaire that has to be filled in for this project or fast archiving after death resulting in missing cases in data collection.
Nevertheless, the study provides a wealth of information with regard to the primary care provided at the end of life in the Netherlands. It has resulted in various publications and presentations at international meetings. A comparative study with the end of life care in Belgium, Italy and Spain has also been published in several scientific papers.

The topic is continued in 2016.

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12 (Attempted) suicide

Topic owner: Mrs. Dr. G.A. Donker (NIVEL) (1979-2015)

Introduction

In consultation with the Health Care Inspectorate, this topic is included in the sentinel surveillance since 1979.
Research on suicide is also carried out in other institutions (e.g. hospitals, prisons) in order to gain insight into the scope, trend and other aspects of suicide and attempted suicide.

Method

The name of the topic is also its definition. The primary question is not whether the patient's attempt was successful, but whether the patient intended to commit suicide.
At the same time the Health Care Inspectorate made a request for additional data to be collected about the reported cases. To this end a questionnaire was designed. The form included questions about whether the attempt had been successful and about the method employed. Other questions relate to characteristics of the patient and features of care, such as contacts with health care institutions prior to the suicide (attempted suicide).

Results

The absolute numbers of reported cases (which exceeds the number of patients as recurrence is not rare) in the years 2006-2015 were: 24, 49, 28, 40, 46, 33, 39 67, 81 and 65 respectively.

The number of attempts per province group and by address density per 10,000 inhabitants is shown in Table 12.1. Breaking down the numbers into subgroups is of limited value in view of the low frequency.
In 2006, 2008 and 2011 the lowest number of suicide (attempts) of the last 10 years is reported and in 2014 the highest number. Analyses by gender (not shown here) demonstrate that the rise in the years 2012-2014 is mainly caused by a rise of the incidence in men. When address density is taken into account the highest incidence is consistently found in the big cities, except for 2002, 2007, 2012 and 2015. In 2015 the highest incidence was found in the small to middle size cities.
The distribution by province group shows a less consistent picture, possibly due to the small number of cases. In 2014 and 2015 the incidence was the highest in the northern region.

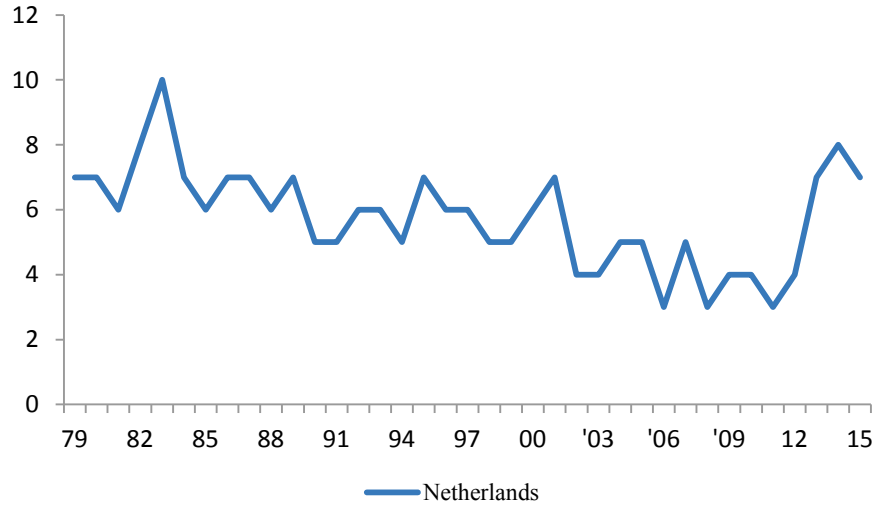
Table 12.1 Number of (attempted) suicides reported per 10,000 inhabitants, per province group, by address density and for the Netherlands as a whole, 2006-2015

	province group				address density			Netherlands
	N	E	W	S	1*	2*	3*	
2006	1	4	3	1	1	3	3	3
2007	3	4	6	4	6	4	6	5
2008	1	3	4	2	1	3	4	3
2009	3	4	5	3	3	3	7	4
2010	5	2	5	3	3	3	7	4
2011	3	1	4	3	4	3	4	3
2012	4	5	4	6	3	6	3	4
2013	7	4	7	9	5	7	8	7
2014	11	3	8	7	4	8	11	8
2015	11	4	8	5	6	7	5	7

* 1: $\leq$500/km^2 2: 500-2500/km^2 3: $\geq$ 2500/km^2

The figure shows the initially gradually decreasing trend in the number of attempted suicides registered in general practice during a period of 34 years. From 2003 through 2012 the incidence was stabile with small fluctuations. In 2013 the incidence increased and in 2014 the incidence was the highest of the past 10 years. The incidence in 2015 is comparable to 2013, higher than in the preceeding years.

Figure 12.1 Number of (attempted) suicides reported per 10,000 inhabitants for the Netherlands as a whole, 1979-2015



Age distribution

In 2015 the number of suicide attempts peaked in the age group 45-54 years, however in other years no specific age group was prominent. On the other hand, through the years the lowest incidences were found in the youngest age group (0-14 years) and in the age group ≥ 65 years and that was also observed in 2015 for the youngest age group, but in 2015 relatively many elderly committed a suicide attempt.

Table 12.1 shows the frequency of suicide and attempted suicide per 10,000 inhabitants, by age group in the last 10 years.

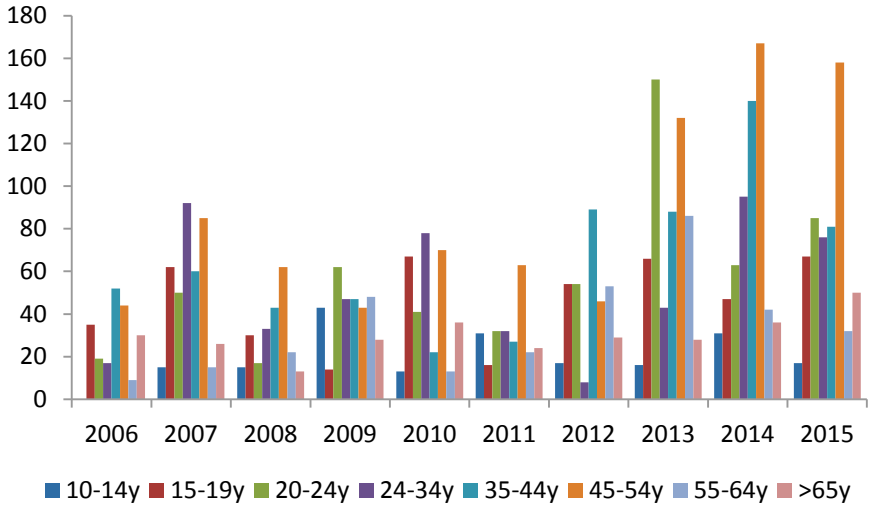
Table 12.2 shows the frequency per 100,000 inhabitants by age group in the last 10 years.

Table 12.2 Number of (attempted) suicides reported per 100,000 inhabitants, by age group, 2006-2015

age group	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
10-14	-	(15)	(15)	(43)	(13)	(31)	(17)	(16)	(31)	(17)
15-19	(35)	(62)	(30)	(14)	67	(16)	(54)	(66)	(47)	(67)
20-24	(19)	(50)	(17)	(62)	(41)	(32)	(54)	150	(63)	85
25-34	(17)	92	33	47	78	(32)	(8)	43	95	76
35-44	52	60	43	47	(22)	(27)	89	88	140	81
45-54	44	85	62	43	70	63	46	132	167	158
55-64	(9)	(15)	(22)	48	(13)	(22)	53	86	42	32
≥65	(30)	(26)	(13)	28	36	(24)	29	28	36	50

The numbers between brackets are based on N<5

Figure 12.2 Number of (attempted) suicides reported per 100,000 inhabitants by age group, 2006-2015



Extrapolation

Table 12.3 Extrapolation of the incidence rate of (attempted)suicide to the Dutch population

	frequency incidence (per 10,000)*	Netherlands** (absolute number)
topic	total	total
year	(m+f)	(m+f)
(attempted)suicide		
2006	3	5,000
2007	5	8,000
2008	3	5,000
2009	4	7,000
2010	4	7,000
2011	3	5,000
2012	4	7,000
2013	7	12,000
2014	8	13,000
2015	7	12,000

* number (attempted)suicide per 10,000 inhabitants (data from sentinel practices)

** extrapolation of the incidence rates to the Dutch population as a whole (for the year in question), rounded off to the nearest thousand

Discussion

The numbers of suicide and attempted suicide in 2014 are the highest in the past 10 years. In 2015 the numbers decreased to the level of 2013, but the incidence is considerably higher compared to the period 2006-2012. The increasing trend of the past years is mainly observed in men.
In 2015 the highest numbers were seen in the age groups 45-54 years; however the breakdown in age groups is of limited value due to the small absolute numbers which may lead to large fluctuations. Over the years, the registration does not show a preferential age group, although low incidences are consistently observed in the youngest (≤15 years) and the oldest (≥ 65 years) age groups. The increasing trend in the past years is mainly observed in men and is less frequently than before 2007 recognized as a symptom of depression by GPs, as demonstrated by an analysis of 30 years of registration of suicide in the sentinel practices, published in the BMJ Open in 2016.[26]

This topic is continued in 2015.

Publications based fully or partly on NIVEL Primary Care Database, Sentinel Practices

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13 Requests for Euthanasia

Topic owner: Dr. G.A. Donker, (NIVEL) (1976-2015)

Introduction

Since 1976 requests for euthanasia to the GP of patients with incurable disease and/or unbearable suffering without perspective of improvement are reported. Since 2011 a question has been added whether the euthanasia request resulted in performing euthanasia.

Methods

A euthanasia request is reported with ICPC code A20 and dying of a patient with ICPC code A 96. After coding A 96 the P module requests whether palliative sedation or euthanasia was applied or whether the patient committed suicide. In case the question concerning applying euthanasia or assistance in suicide is confirmed, a questionnaire related to euthanasia is completed by the GP. The doctors are asked to report the age, gender, disease and nursing location and whether or not a ‘euthanasia declaration' was signed.[27] Since 2011 a question was added whether the euthanasia was performed and if so whether the euthanasia was reported at the Regional Assessment Committee for Euthanasia.

Results

All Sentinel Practices answered the questionnaire concerning whether requests for euthanasia occurred in their practice or not in 2015. In 2015 the number of requests is 50 (29 men and 21 women) from 38 reporting practices. This amounts to 4.0 per 10,000 in general practices registered patients, slightly lower than in the previous three years (5.1, 4.8, 4.6, 3.5, 4.5 and 3.4 per 10,000 in 2014, 2013, 2012, 2011, 2010 and 2009 respectively). Of the patients who requested euthanasia in 2015 66% had a malignancy,

which is a lower proportion than in previous years (75% in the period 1976-2014). Most patients (90%) with a euthanasia request in the sentinel practices were tended at home or a care home for the elderly, four patients in a hospice and one in a nursing home. In 38 out of 50 requests (76%) the request is supported by a living will. Forty four patients asked for euthanasia. Three patients requested physician assisted suicide and three patients had not chosen between the two methods yet. In 66% of the cases (N=33) the SCEN-doctor (Support and Consultation in Euthanasia in the Netherlands) was called in and 32 out of 50 (64%) euthanasia requests were carried out. These were all reported to the Regional Assessment Committee for Euthanasia. If the SCEN-doctor is not called in, the reason is (almost always) that the eventual application of euthanasia or physician assisted suicide was not yet relevant, or the patient died without intervention. Patient data are reported at the end of the paragraph.

Requests for euthanasia 2005-2015

Table 13.1 shows the distribution of the number of requests by province group by address density and by gender.

Table 13.1 Absolute numbers of patients who requested GPs to participate actively in euthanasia, by gender, province group, address density and for the Netherlands as a whole, 2006-2015

			province group				address density			Netherlands
absolute	m	f	N	E	W	S	1*	2*	3*	
2006	11	18	2	4	21	5	4	18	10	32
2007	16	16	9	7	14	2	9	18	5	32
2008	17	20	7	5	19	6	8	20	9	37
2009	20	18	5	5	22	6	3	21	14	38
2010	28	27	8	12	23	12	12	37	6	55
2011	24	12	6	8	15	7	12	18	6	36
2012	24	19	7	14	15	7	13	23	7	43
2013	30	18	2	8	25	13	12	25	11	48
2014	30	25	4	10	28	13	6	34	15	55
2015	29	21	7	10	23	10	18	26	6	50

* 1: ≤500/km^2 2: 500-2500/km^2 3: ≥2500/km^2

The data per 10,000 inhabitants (not shown because of small numbers) indicate that in 2015 the number of requests in the rural areas (6.4 per 10,000) was higher than in the previous five years and lowest in the big cities (2.5 per 10,000).

Age distribution

The age distribution of patients who requested euthanasia is shown in table 13.2.

Table 13.2 Absolute numbers of patients asking their GP for euthanasia or physician assisted suicide per age group, 2006-2015

	≤54	55-64	65-74	75-84	≥85	total
2006	3	5	10	7	7	32
2007	3	5	12	7	5	32
2008	5	8	8	12	4	37
2009	8	5	14	6	5	38
2010	10	8	11	12	14	55
2011	3	3	11	13	6	36
2012	5	7	17	9	5	43
2013	9	7	11	16	5	48
2014	3	6	12	14	20	55
2015	6	9	11	17	7	50

Overview of reported requests

Since 1976 the sentinel general practice network has collected data on 1473 requests for euthanasia or physician assisted suicide, 766 (52%) by men. The International Classification of Diseases (1975, 9th version) was used to obtain insight into the illnesses underlying the requests for euthanasia or physician assisted suicide. One of the problems in classification is the co-morbidity, which is inherent to old age. Another problem is that sometimes no disease is reported at all: in the ICD-9-group of symptoms and not fully described diseases the requests of very old aged are included with motivation "completed life", "tired of life", without described disease cachexia.

Five categories of illnesses are used:
- malignant neoplasms;
- cardiovascular diseases;
- chronic obstructive pulmonary diseases;
- symptoms and insufficiently defined illnesses;
- other diseases, including dementia, neurological and endocrine illnesses and AIDS.

Table 13.3 indicates the diseases underlying the request for euthanasia or physician assisted suicide. In 2015 the distribution is comparable to previous years.

Table 13.3 Diseases leading to euthanasia requests, 1976-2015

	N	%
malignant neoplasms	1098	75
cardiovascular diseases	87	6
chronic obstructive pulmonary diseases	65	4
symptoms and insufficiently defined diseases	77	5
other diseases	144	10
total	1473	100

Over the years, the reported percentage of living wills has increased from 15% in 1984 to 76% in 2015. This percentage was the highest in 2009 with 92% living wills in the reported requests. Discussing a request for euthanasia in an early stage of the illness is expected to have led to a slight decrease of this percentage in the last years. Nowadays more requests for euthanasia are reported at an earlier stage of disease where performing the euthanasia is not yet a wish.

Discussion

The registration of the requests for euthanasia or physician assisted suicide by the Sentinel Practices shows consistently a slightly higher percentage in men, around 52% versus 48% in women over the period 1976-2015. In other studies one other result is consistently present: mainly patients with a malignant disease ask for euthanasia and in this group euthanasia is practiced relatively more frequently. Also, it is concluded that the percentage of patients with a malignant disease at higher age is decreasing. The data of the Sentinel Practices show this too: over the period 1976-2015 75% of the patients who asked for euthanasia or physician assisted suicide had cancer. In the higher age group this is also the most frequently occurring reason, but COPD, heart failure and Alzheimer disease are also frequently occurring reasons.

Data that have been collected over a longer period of time, on requests for euthanasia and physician assisted suicide, show a gradual change in reasons to ask the GP for euthanasia. Unbearable pain and physical suffering are becoming less important motives: hopelessness and loss of dignity due to the disease are now more important reasons to request euthanasia.[28-30] Loss of dignity turns out to be more often the motive for men than for women to request euthanasia.[29,30]
Alzheimer's disease is apparently no longer an absolute contra-indication for euthanasia, provided the request was done when the patient was coherent.

Until the early 1990s, hardly any possibilities existed to compare data collected in the Sentinel Practices concerning requests for euthanasia and physician assisted suicide with the findings of other data registration projects and research.[31] Since then, major studies have been carried out to determine the action taken by GPs and other doctors in the Netherlands with regard to euthanasia, physician assisted suicide and decisions concerning the end of life of patients.[32-36] The second national survey to evaluate the follow-up of the Euthanasia Act observes a gradual increase in reporting euthanasia to the Regional Assessment Committees and an increasing acceptance in physicians to perform euthanasia, 85% in 2012.[37] In 2012 the 'End-of-Life clinic' emerged to perform euthanasia in patients whose physicians refused to do so.[37,38]

In Hoogeveen GPs committed themselves to cooperate in treating patients with a euthanasia request in case patient's GP has moral problems with executing euthanasia.[39] This example, named 'Hoogeveen model' is also followed elsewhere in the country resulting in decreasing barriers in executing euthanasia within the frame of the Dutch Euthanasia Act.

Substantial methodological differences exist between the above-mentioned studies and the registration of data by GPs participating in the Sentinel Practices. An extensive discussion of these differences is beyond the scope of this report. However, there is one difference that bears mentioning: unlike the recent studies mentioned above, the data of the Sentinel Practices are derived exclusively from GPs, and not only deal with applied cases of euthanasia, but also with discussions and deliberations about requests for euthanasia which in due course may be granted. Since 2011 a question was added concerning whether the euthanasia was finally applied, so we know the percentage of euthanasia requests carried out and whether the euthanasia was reported to the Regional Evaluation and Examination Committee for Euthanasia. In 2015 64% of the requests for euthanasia this requested intervention was applied, more frequently than in 2014 (44%) and comparable to 2013 (65%). All patients with applied euthanasia in 2015 were also reported to the Regional Assessment Committee for Euthanasia.

Also the annual reports of the Regional Assessment Committee Euthanasia provide useful information. From the 2015 annual report we know that 5516 cases of executed euthanasia or physician assisted suicide are reported to the Committee.[40] In 2015 the number was higher than in previous years (5306, 4829, 4188, 3695, 3136, 2636, 2331 reported in respectively 2014, 2013 2012, 2011, 2010, 2009 and 2008). Most likely the percentage of cases actually reported to the Assessment Committees has increased, but also the acceptance of physicians to apply euthanasia even in patients with dementia and psychiatric morbidity.[40] In most reported cases the physicians had strictly followed the rules required by law. Only in 4 interventions this was not the case at a national level in 2015.[40] The increase noted by the Regional Assessment Committee is consistent with trends found in the Sentinel Practices; however, differences in study design should be taken into consideration as well as the possibility of co-incidental fluctuation in the Sentinel Practices due to small numbers. In the Sentinel Practices we recorded euthanasia requests of which in 2015 only 64% were executed. The

percentage of living wills has increased during the past years; from 15% in 1984 to 76% in 2015. However, in 2009 it was 92%. Although a higher percentage can be considered as an indicator for the quality of care when discussing decisions at the end of life, the percentage could also decrease if these discussions occurred at an earlier stage in the illness, long before euthanasia is an actual issue. This appears to be a plausible explanation for the slightly decreasing percentage in the last years. Many of these requests were not yet actual issues, apparently. It is re-assuring that all patients who underwent euthanasia in 2015 in the Sentinel Practices were reported to a Regional Assessment Committee for Euthanasia.

The study will be continued in 2016.

Publications based fully or partly on NIVEL Primary Care Database, Sentinel Practices

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In: Euthanasia - The "Good Death" Controversy in Humans and Animals, Josef Kuře (Ed.), ISBN: 978-953-307-260-9, InTech, Available from: http://www.intechopen.com/articles/show/title/the-impact-of-the-dutch-euthanasia-act-on-the-number-of-requests-for-euthanasia-and-physician-assist

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Appendix 1

Table 13.4 Requests made by patients for active euthanasia in 2015

age	gender	disease reported	reason for request
92	m	old and comorbidity	admission nursing home
90	m	metastatic lung carcinoma	unbearable suffering without perspective of improvement
88	m	prostaae carcinoma	poor quality of life
88	v	metastatic lung carcinoma	epilepsy, problems with swallowing
87	m	depression, poor vision, deterioration	
86	v	several comorbidities due to old age	informative encounter
86	v	pancreatic carcinoma	unbearable suffering without perspective of improvement
83	m	oropharynx carcinoma	unbearable suffering without perspective of improvement
82	m	polyneuropathy	increasing dependency, loss of self esteem
81	m	metastatic prostate carcinoma	exhausted
81	m	no medical diagnosis	feeling of suffocation
81	v	lung fibrosis	increasing dyspnea, unbearable suffering
80	m	oesophagus carcinoma	pain
79	v	metastatic colon carcinoma	loss of perspective for improvement
79	v	multiple Sclerosis	deterioration
78	m	anus carcinoma	deterioration
78	m	metastatic bronchus carcinoma	unbearable fatigue, side effects of treatment

to be continued

Table 13.4 Requests made by patients for active euthanasia, 2015

age	gender	disease reported	reason for request
78	m	metastatic lung carcinoma	unbearable suffering without perspective of improvement, living will
77	m	bipyramidal syndrome with vertebral stenosis	increasing paralysis
76	m	brain tumor	deterioration
76	m	lung cancer	patient requests for the option of euthanasia
76	m	acute myeloide leucaemia	self esteem, unbearable suffering without perspective of improvement
75	m	cortobasal degeneration	unbearable suffering
74	m	M. Alzheimer	repeatment of request in case of admission in nursing home
73	v	COPD Gold4	untreatable dyspnea, exhausted
72	m	lung carcinoma	dyspnoea
72	v	COPD Gold4	untreatable dyspnoea
71	m	kidney insufficiency in Diabetes Mellitus 1	unbearable suffering without perspective of improvement
71	v	metastatic pleuraal fibroma	patient's will
69	v	anus carcinoma	deterioration
68	v	metastatic lung cancer	increase of pain
66	v	oesofagus carcinoma	unbearable suffering without perspective of improvement
65	m	Multiple Sclerosis	loss of independance

to be continued

Table 13.4 Requests made by patients for active euthanasia, 2015

age	gender	disease reported	reason for request
65	m	urotheelcell carcinoma	fast progression of disease, unbearable suffering without perspective of improvement
63	m	PSMA (like ALS)	anxiety for suffocation
62	m	metastatic prostate carcinoma	pain, anxiety for hospital admission
60	v	mamma carcinoma	unbearable suffering without perspective of improvement
	v		
59	v	metastatic mamma carcinoma	unbearable suffering without perspective of improvement
58	m	metastatic pancreatic carcinoma	no therapeutic options
58	v	metastatic mamma carcinoma	recurrent ascites, exhausted
57	v	metastatic mamma carcinoma	unbearable suffering without perspective of improvement, pain and delirium
56	v	abdominal cancer	unbearable suffering without perspective of improvement
54	v	dementia	loss of independancy
53	m	cholangiocarcinoma	untreatable pain and ascites
53	v	incomplete transverse lesion	poor quality of life
50	m	pancreatic carcinoma	request of patient to discuss end of life options
46	v	metastatic mamma carcinoma	deterioration
30	m	brain tumor	dependancy, fatigue

14 Palliative Sedation

Topic owner: Mrs. Dr. G.A. Donker, NIVEL (2005-2015)

Introduction

Even when palliative care is optimal at the terminal phase of a disease process, situations may arise in which treatment no longer provides sufficient alleviation of symptoms. Predominant features are for example severe agitation, dyspnea, pain, nausea, vomiting and fear. They leave a dreadful impression on all persons concerned in palliative care. The patient is suffering severely and may become desperate; family and friends are often hardly able to stand the situation, and doctors and caregivers feel they have failed.

In the past years severe suffering at the end of life is increasingly considered as unacceptable by patients and/or relatives. Caregivers are requested to alleviate this suffering, which is felt as meaningless. Doctors may then decide, on certain conditions, to apply deep sedation: decrease consciousness to a moderate or severe degree, short term or intermittantly, using sedative drugs (sleeping agents). The objective is to alleviate suffering, not to terminate life.

In 2002 palliative sedation was performed by Dutch GPs in 2.5% of all deaths and has found to be increasingly applied in the years thereafter.[41] The end of life study of VU Medical Centre reports in its fifth national survey in 2012 that continuous deep sedation is applied in 12.3% of all deaths occurring at home, hospital or nursing home in 2010.[41,42]

The question has been raised whether the strict criteria formulated for a request for euthanasia, should also be followed for palliative sedation. When discussing this issue, fear has been expressed that in doing so palliative sedation will become an alternative for euthanasia, which is scrutinized by an external evaluation committee. It remains to be seen to what extent euthanasia and palliative sedation are complimentary in alleviating suffering

at the end-of-life. Investigations into the practice of palliative sedation by GPs may provide some answers to these questions.

Method

Sentinel GPs were requested to register each case of palliative sedation in their practice. When completing the end-of-life registration in the sentinel module additional questions are asked whether palliative sedation was applied or euthanasia or whether the patient committed suicide. When palliative sedation was applied an additional questionnaire is completed in which questions are being asked about the reason why palliative sedation was applied, the nature of the underlying disease, whether the patient also requested for euthanasia, and who was involved in the decision-making for palliative sedation. In 2007 it was asked for the first time which circumstance had been the predominant factor to decide for palliative sedation when a request for euthanasia has been posed as well.

Results

In 2015 all 38 sentinel practices responded whether they had applied palliative sedation or not. Nine practices did not apply palliative sedation in 2015. In 2015 86 cases of palliative sedation were reported, 17% of all deaths in the 38 reporting sentinel practices and a rise compared to previous years. Palliative sedation was applied in 44 men and 42 women in 2015 and 65% of these patients suffered from cancer as underlying disease (N=56). In 75 of these 86 patients (87%) two or more refractory symptoms were the reason to apply palliative sedation. In eleven patients only one refractory symptom is was indicated (seven times delirium, dyspnea and pain each two times (see also appendix 1, table 14.5).

Fatigue and being exhausted, al;ways combined, were the most prominent reason to decide for palliative sedation in 2015, in contrast to previous years: 50 patients (58%). Also dyspnea (42 patients, 49%), pain (39 patients, 45%), delirium (23 patients, 27%), anxiety (12 patients, 14%), nausea (9 patients, 10%) and vomiting (7 patients, 8%) are prominent reasons to sedate and often occur in combination with fatigue and being exhausted.

From the 86 reported patients 10 (12%) also requested for euthanasia. The reasons to apply palliative sedation and not euthanasia in these 10 patients were, respectively: patient preferred palliative sedation after careful consideration (4 times), sudden deterioration resulting in lack of time to start a euthanasia procedure due to severe symptoms (five times) and one patient was not considered compos mentis by the consulted SCEN doctor.

Table 14.1 Absolute number of patients decreased after palliative sedation, per province group, address density and for the Netherlands in 2006-2015

	province group				address density			Netherlands
	N	E	W	S	1*	2*	3*	
2006	5	4	18	4	4	23	4	31
2007	4	2	18	6	5	24	1	30
2008	3	2	10	3	4	9	5	18
2009	7	10	9	5	7	21	3	31
2010	5	10	8	8	5	23	3	31
2011	4	1	8	2	4	6	5	15
2012	7	2	6	6	7	12	2	21
2013	3	4	12	6	7	17	1	25
2014	17	16	27	18	23	47	8	78
2015	39	17	21	9	30	47	9	86

* 1: ≤500/km^2 2: 500-2500/km^2 3: ≥2500/km^2

In 2014 and 2015 the highest number of patients (per 10,000) are reported in the northern provinces. Sorted by address density most patients per 10,000 in 2015 were reported to live in rural areas. (table 14.1 and 14.2)

Table 14.2 Number of patients per 10,000 deceased after palliative sedation, per province group, address density and for the Netherlands as a whole in 2006-2015

	province group				address density			Netherlands
	N	E	W	S	1*	2*	3*	
2006	3.0	(2.3)	4.0	(2.5)	(2.4)	4.2	(1.7)	3.3
2007	(1.6)	(0.9)	4.4	3.2	2.8	3.5	(0.5)	2.8
2008	(1.2)	(0.8)	2.9	(1.5)	(2.0)	1.4	3.1	1.7
2009	2.6	4.1	1.9	2.5	2.5	2.7	(1.1)	2.7
2010	1.9	3.8	1.9	2.5	1.9	3.0	(1.4)	2.5
2011	(3.8)	(0.4)	2.1	(0.7)	(2.3)	1.1	1.6	1.5
2012	4.2	(0.9)	1.4	2.3	2.8	2.2	(0.9)	2.1
2013	(2.1)	(2.6)	3.1	3.5	2.9	3.7	(0.5)	2.8
2014	9.1	8.0	6.1	7.4	9.3	7.7	3.7	7.3
2015	21.2	6.9	6.9	4.2	13.4	8.3	4.7	8.8

* 1: $\leq$500/km^2 2: 500-2500/km^2 3: $\geq$2500/km^2

The numbers between bracket are based on N<5

Age distribution

The age distribution is given in table 14.3.

Table 14.3 Absolute number of patients per age group treated with palliative sedation by their GP in 2006-2015

	≤54	55-64	65-74	75-84	≥85	total
2006	2	6	8	8	7	31
2007	1	5	10	8	6	30
2008	4	3	2	5	4	18
2009	7	4	7	7	6	21
2010	2	7	9	6	7	31
2011	3	2	4	4	2	15
2012	1	2	2	10	6	21
2013	2	5	5	7	6	25
2014	5	8	20	17	28	78
2015	6	10	25	26	19	86

*In 2005 the age of one patient was unknown.

Palliative sedation sometimes is applied at a relatively young age and does not seem to be related to age.

Summary of reported requests

Similarly as for the topic ‘requests for euthanasia’ (see chapter 13) five major disease groups were shown to obtain insight into the disorders underlying the use of palliative sedation.

Table 14.4 Disorders for which palliative sedation was applied in 2005-2015

	N	%
malignant tumors	279	71
cardio-vascular diseases	51	13
chronic obstructive pulmonary disease	11	3
symptoms and incompletely described diseases	18	5
other diseases	33	8
total	392	100

Discussion

Similarly as for requests of euthanasia (chapter 13), cancer is the most prominent disease leading to the decision for palliative sedation, although the proportion decreases slightly in recent years and the application in cardiovascular and lung diseases gradually increases, especially at high age.

Mostly the presence of more than one refractory symptom is the reason to apply palliative sedation. Fatigue, being exhausted, dyspnea, pain, delirium and anxiety play a major role. In 2015 palliative sedation was applied in 17% of the by the sentinel GPs reported deaths. This is higher than in 2014 and considerably higher than in the preceeding years; also higher than the 12.3% mentioned in the fifth national survey concerning medical decisions at the end of life and the in the in 2013 reported 12.0% in a recent Flemish study.[42,43] Of all cases reported in the Dutch study 43% was carried out by GPs, 38% by medical specialists and 19% by specialists in the elderly. Thus, this study involves also deaths in hospitals, nursing homes and at home, and therefore is not comparable with our study in a general practice population, in which patients in nursing homes normally are not included. Probably palliative sedation is more frequently applied in nursing homes and hospitals than in general practice. Our study showed annual fluctuations and in 2014

and 2015 a clear increase while in the preceeding period from 2005-2013 no increasing trend was observed in the number of patients in which palliative sedation was applied at the end of life. Possibly this is caused by a recent calamity and it may also be enhanced by the regionally organized, but nationally available, specialistic palliative care teams assisting GPs in the application of IV-drips and subcutaneous pumps which may be necessary for applying palliative sedation.[44] In these cases the GPs remain responsible for the prescription of medication, the dosage and for accompanying the process, but are able to delegate technical procedures to palliative specialistic care teams. In the ten patients who had also asked for euthanasia there was no indication that palliative sedation had been applied to avoid euthanasia. The reasons for palliative sedation were clearly defined. These results indicate that requests for euthanasia and palliative sedation largely relate to different motives, despite similarities in the nature of underlying diseases. The study does not support the notion that the boundary between euthanasia and palliative sedation is becoming indistinct. This is also supported by the thesis about palliative sedation by Jeroen Hasselaar in 2009.[45] The guideline on palliative sedation issued by the KNMG in 2005 and updated in 2009 (www.knmg.nl), undoubtedly has contributed to professionalize this intervention. The results of 2005 to and including 2011 were analysed and published in the British Journal of General Practice [46] in 2013. This study demonstrated that the patient is mostly involved in the decision preceding palliative sedation (87.4%). However patients with COPD and/or chronic cardiovascular disease were less frequently involved in these decisions than patients with cancer ($p<0.05$), resulting in the conclusion that timely discussion of end-of-life preferences deserves more attention in patients with respiratory and cardiovascular diseases and in patients with pending declining cognition.
The results of the increased application of palliative sedation in 2014 were presented in 2015 at the Ca-PRI-congress in Arhus, the annual conference of the European Public Health Association in Milano and the WONCA conference in Istanbul.[47,48]

The topic will be continued in 2016.

Publications based fully or partly on NIVEL Primary Care Database, Sentinel Practices

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Donker GA en Van Dijk CE. *Trends and reasons of palliative sedation in cancer patients with and without pending requests of euthanasia in Dutch general practice*. Oral and poster presentation Ca-PRI Conference Arhus 20-22 May 2015. Eur. J of Cancer Care 2015;24 (Suppl. 2):Abstract P-44:47. http://onlinelibrary.wiley.com/doi/10.1111/ecc.12374/epdf

Donker GA, Van Dijk C. *Delier en palliatieve sedatie*. Huisarts & Wetenschap 2014;57(4):194

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Donker GA, Slotman FG, Spreeuwenberg P, Francke AL. *Palliative sedation in Dutch general practice from 2005 to 2011: a dynamic cohort study of trends and reasons*. Brit J Gen Pract 2013; Oct;63(615):e669-75 DOI: 10.3399/bjgp13X673676

Appendix 1

Table 14.5 Characteristics of patients treated with palliative sedation in 2015

age	gender	disease reported	reason for request
98	m	dementia	serious delirium
97	v	Malignancy of unknown origin	dyspnea, pain
96	m	terminal heart failure	serious delirium
95	v	Bladder carcinoma	dyspnea
94	m	Progressed vascular	serious delirium, fatigue, exhausted
94	v	CVA, ischaemic	serious delirium, dyspnea, fatigue, exhausted
92	v	Old age. Probably colon carcinoma	serious delirium, pain
92	v	Deterioration by old age	serious delirium, dyspnea, pain, fatigue, exhausted
91	v	M. Alzheimer, dementia	dyspnea, pain
91	v	old age	serious delirium
91	v	Serious aorta valve stenosis, cardial astma	dyspnea, fatigue, exhausted
89	m	instabile angina pectoris	dyspnea, pain
87	m	Heart failure	dyspnea, anxiety
87	v	chronisc heart failure	dyspnea, fatigue, exhausted
86	m	delirium in hospital	serious delirium
86	m	terminal kidney failure, CVA	pain, fatigue, exhausted
85	m	CVA	unknown whether sedation was applied

to be continued

Table 14.5 Characteristics of patients treated with palliative sedation in 2015

age	gender	disease reported	reason for request
85	m	old age	serious delirium dyspnea, anxiety, fatigue, exhausted
85	v	total cachexia, old age	serious delirium, vomiting
84	m	heart failure, pneumonia	serious delirium, dyspnea
84	v	respiratory insufficiency	dyspnea, kidney failure
83	m	pneumonia	dyspnea, pain, fatigue, exhausted
83	v	metastatic ovary carcinioma	nausea, vomiting, fatigue, exhausted
82	v	general deterioration due to dementia	fatigue, exhausted
82	v	heart and kidney failure	dyspnea, pain, fatigue, exhausted
81	m	Hepatocellular carcinoma with bone metastasis	serious delirium, pain
81	m	metastatic colon carcinoma	dyspnea, fatigue, exhausted
81	v	encephalopathy and reactive epilepsy, CVA	dyspnea, fatigue, exhausted, epileptic attacks
81	v	myasthenia gravis	serious delirium, pain, fatigue, exhausted
80	m	CVA	fatigue, exhausted
80	m	end stadium M. Parkinson	serious delirium
80	v	colon carcinoma, metastatic	fatigue, exhausted
79	m	cancer of unknown origin	serious delirium
78	m	metastatic lung carcinoma	dyspnea, pain, fatigue, exhausted

to be continued

Table 14.5 Characteristics of patients treated with palliative sedation in 2015

age	gender	disease reported	reason for request
78	m	bronchus carcinoma with brain metastases	serious delirium, dyspnea
78	v	mamma carcinoma	dyspnea, anxiety
77	m	pancreas carcinoma	serious delirium, pain, fatigue, exhausted
77	m	cancer	pain, fatigue, exhausted
77	v	metastatic bladder carcinoma	pain, anxiety, fatigue, exhausted
75	m	metastatic rectum carcinoma	fatigue, exhausted
75	v	respiratory insufficiency due to ALS	dyspnea, anxiety, fatigue, exhausted
74	m	rectum and sigmoid carcinoma	pain
74	m	acute myeloid leukaemia	dyspnea, pain, fatigue, exhausted
74	m	metastatic pancreas carcinoma	pain, fatigue, exhausted
74	m	glioma brain carcinoma	dyspnea, pain, nausea, vomiting, fatigue, exhausted
74	v	lung carcinoma	dyspnea, anxiety, fatigue, exhausted
73	m	kidneycell carcinoma peritonitis carcinomatosaa	dyspnea, fatigue, exhausted
73	v	metastatic lung carcinoma	pain, fatigue, exhausted
72	v	metastatic lung carcinoma	dyspnea, pain, nausea, vomiting, fatigue, exhausted
72	v	kidney cell carcinoma	serious delirium
71	m	heart failure, kidney failiure	serious delirium, dyspnea

to be continued

Table 14.5 Characteristics of patients treated with palliative sedation in 2015

age	gender	disease reported	reason for request
71	m	cranial metastatic melanoma	serious delirium, dyspnea
71	m	colon carcinoma	fatigue, exhausted
70	m	non-Hodgkin lymphoma	dyspnea, fatigue, exhausted
70	v	respiratory insufficiency, encephalopathy	dyspnea, fatigue, exhausted
69	m	lung carcinoma	dyspnea, pain
69	v	metastatic colon carcinoma	pain, nausea, vomiting, anxiety, fatigue, exhausted
68	m	pancreatic carcinoma	deterioration, dyspnea
68	m	gastric bleeding in myelodysplastic syndrome	serious delirium, dyspnea, fatigue, exhausted
68	v	lung carcinoma	fatigue, exhausted
67	m	neuro-endocrine tumor, metastatic	pain, fatigue, exhausted
67	m	Metastatic colon carcinoma	serious delirium, vomiting, fatigue, exhausted
67	v	oligodendroglioma	fatigue, exhausted, progressive paralysis
66	m	metastatic colon carcinoma	pain, fatigue, exhausted
66	m	mesothelioma	dyspnea, pain, fatigue, exhausted
65	m	renal carcinoma	pain, nausead
65	v	cancer	epilepsy and food passage disorder
64	v	metastatic mamma carcinoma	dyspnea, pain, anxiety
63	m	rectal carcinoma with lung metastases	dyspnea, pain

to be continued

Table 14.5 Characteristics of patients treated with palliative sedation in 2015

age	gender	disease reported	reason for request
63	v	pancreatic carcinoma	pain, anxiety, fatigue, exhausted
62	v	metastatic lung carcinoma	dyspnea, anxiety
62	v	pancreatic carcinoma	pain, nausea, vomiting
61	v	pancreatic carcinoma	fatigue, exhausted
58	m	metastatic pancreatic carcinoma	dyspnea
57	v	metastatic endometrium carcinoma	dyspnea, pain, nausea, fatigue, exhausted
56	m	multiple Sclerosis	pain, anxiety
53	v	colon carcinoma, metastatic	serious delirium, pain, nausea, vomiting, exhausted
52	v	metastatic melanoma	fatigue, exhausted
51	m	oropharyngeal carcinoma	fatigue, exhausted
49	v	mamma carcinoma with brain metastases	pain, nausea, vomiting, fatigue, exhausted
31	v	colon carcinoma	dyspnea, pain, anxiety, fatigue, exhausted
10	m	glioma	pain, vomiting

15 Eating disorders

Topic owner: Prof. H.W. Hoek, Parnassia group and UMCG(1985-1989 and 1995-2015)

Introduction

It is unclear whether the incidence rate of serious eating disorders such as anorexia nervosa and boulimia nervosa is increasing. Sentinel GPs registered both of these disorders between 1985 and 1989. By a renewal of registration from 1995 it is studied whether these disorders are increasing.
This chapter only provides an indication of trends in the number of patients with eating disorders in general practice. Results emerging from the questionnaires will be published separately.

Methods

The trend in the incidence of eating disorders from 1995 onward will be calculated per age group, province group and address density and will be compared with the period 1985-1989. These data are not corrected yet for double counts and contain figures about incidence as well as prevalence. The numbers should therefore be interpreted with caution. For that reason no extrapolation to a national level is presented.
Since 2015 eating disorders are classified according to DSM-5 (previously DSM-4). Compared to the previous classification the diagnoses Anorexia Nervosa (AN), Bulimia Nervosa (BN) and Eating Disorder Not Otherwise Specified (ED-NOS) are in the DSM-5 regrouped to Other Specified Eating and Feeding Disorders/OSFED). New in the category Eating and Feddind Disorders are: Binge Eating Disorder (BED), Pica, Rumination, and Avoidant/Restrictive Food Intake Disorder (ARFID). Pica en Rumination were not recorded in 2015. This may imply limited comparibility of figures in 2015 compared to previous years.
The sentinel GPs have been asked to complete a questionnaire with additional information for each registered patient. Was the eating disorder newly diagnosed in 2015 and was the patient referred to a different care

provider? In addition, information was gained about some demographic data of the patient, the physical aspects of the disease and referral by the GP. The results of this study are published elsewhere.

Results

In table 15.1 the distribution is shown of the number of patients diagnosed by the GP with an eating disorder, per 10,000 inhabitants, per province group and address density and for the Netherlands as a whole, from 1985-1989 and from 1995-2015. In 2015 eating disorders are diagnosed in 42 women and 2 men.

Table 15.1a Absolute numbers of patients for whom GPs diagnosed an eating disorder, per province group, address density and for the Netherlands as a whole, 1985-1989 and 1995-2015

	province group				address density			Netherlands
	N	E	W	S	1*	2*	3*	
absolute/year								
average:								
1985-1989	7	10	35	10	6	33	24	61
1995	11	11	26	16	5	49	10	64
1996	6	8	22	9	3	37	5	45
1997	12	10	11	9	8	29	4	42
1998	10	17	15	9	5	36	10	51
1999	4	14	12	13	1	38	4	43
2000	4	9	13	9	3	26	6	34
2001	5	6	6	7	4	19	1	24
2002	2	12	14	8	5	24	7	36
2003	1	14	24	4	2	29	12	43
2004	3	11	14	11	3	30	6	37
2005	4	8	15	1	10	16	2	28
2006	2	8	16	6	5	19	8	32
2007	4	8	19	9	5	27	8	40
2008	8	12	16	13	11	31	7	49
2009	5	8	22	9	5	26	13	44
2010	6	7	16	5	6	20	8	34
2011	1	9	12	7	6	16	7	29
2012	7	7	7	9	8	19	3	30
2013	2	6	22	3	6	21	6	33
2014	6	6	21	8	5	32	4	41
2015	5	13	13	11	9	27	6	42

* 1: ≤500/km^2 2: 500-2500/km^2 3: ≥2500/km^2

Table 15.1b Numbers of women for whom GPs diagnosed an eating disorder, per province group, address density and for the Netherlands as a whole, 1995-2015, per 10,000 women

	province group				address density			Netherlands
	N	E	W	S	1*	2*	3*	
per 10,000 women								
1995	8.9	6.4	8.1	9.1	5.2	10.5	6.9	8.1
1996	4.7	4.7	8.9	4.8	3.0	8.9	3.3	6.2
1997	7.8	5.5	4.2	4.8	6.5	5.3	4.3	5.3
1998	7.2	9.1	6.7	5.6	8.6	7.1	11	7.1
1999	(3.3)	8.5	5.4	8.4	(1.1)	7.9	4.4	5.2
2000	(3.2)	4.6	3.9	6.1	(2.3)	4.9	3.8	4.2
2001	3.4	4.0	2.5	4.6	(4.4)	4.0	0.9	3.6
2002	(1.5)	7.3	5.4	3.5	4.9	4.5	4.5	4.6
2003	(0.8)	11.6	7.8	(2.3)	(1.8)	5.9	9.0	6.0
2004	(1.3)	7.0	2.6	2.9	(2.9)	3.5	2.3	3.0
2005	(3.3)	5.4	4.1	(0.6)	8.2	4.9	(1.2)	3.5
2006	(2.4)	9.2	6.6	7.5	6.0	6.6	6.5	6.4
2007	(3.2)	7.3	9.1	9.5	(5.5)	7.1	8.0	7.0
2008	6.0	8.8	8.7	12.4	10.5	8.3	8.4	8.7
2009	3.7	6.3	9.8	9.8	5.2	7.4	5.2	7.6
2010	4.5	4.5	8.0	4.9	3.1	6.2	7.5	5.8
2011	1.3	7.9	6.4	5.0	6.4	5.8	4.8	5.5
2012	8.8	5.7	3.1	7.5	5.8	6.4	3.6	5.7
2013	3.0	6.6	11.0	2.1	5.1	8.4	5.7	7.0
2014	6.5	6.0	9.3	6.7	4.1	10.4	3.7	7.6
2015	5.5	10.4	7.6	10.3	8.2	9.5	6.1	8.5

* 1: ≤500/km^2 2: 500-2500/km^2 3: ≥2500/km^2

The absolute and relative number of reports in 2015 is slightly higher than in 2014. No consistent differences were found by region and address density. Due to small numbers the fluctuations by year may be substantial.

Age distribution

Table 15.2 shows the distribution of reported eating disorders by age group.

Table 15.2 Absolute numbers of patients for whom GPs reported an eating disorder, by age, 1985-1989 and 1995-2015

women	1985-1989	1995	1996	1997	1998	1999	2000	2001	2002	2003
1-4	-	-	-	1	-	-	-	-	-	-
5-9	-	-	-	1	-	-	-	1	-	-
10-14	1	1	1	0	2	-	1	1	1	-
15-19	8	13	15	10	9	7	9	6	5	5
20-24	12	14	9	11	14	74	5	2	3	7
25-29	14	10	7	7	5	6	9	4	8	7
30-34	6	9	4	3	4	6	4	5	2	5
35-39	7	8	6	3	11	91	3	3	5	5
40-44	4	2	2	4	4	6	1	-	4	6
45-49	1	4	1	1	1	-	1	-	2	5
50-54	1	2	-	-	-	-	1	1	2	2
55-59	1	-	-	-	1	1	-	-	-	-
60-64	-	-	-	-	-	-	-	-	-	1
65-69	-	-	-	-	-	-	-	-	-	-
70-74	-	-	-	-	-	-	-	-	-	-
75-79										-
80-84										-

to be continued

Table 15.2 Absolute numbers of patients for whom GPs reported an eating disorder, by age, 1985-1989 and 1995-2015

women	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1-4	-	-	-	-	-	-	-	-	-	-
5-9	-	-	-	-	-	-	-	-	-	-
10-14	1	1	-	3	1	2	2	4	2	4
15-19	5	9	5	6	12	7	11	5	5	8
20-24	10	2	9	7	2	9	7	5	4	6
25-29	8	2	4	4	5	7	3	6	4	4
30-34	-	6	3	5	7	4	1	2	4	3
35-39	2	1	6	3	7	5	2	-	4	2
40-44	5	6	1	3	3	3	3	1	3	3
45-49	4	-	1	5	6	4	-	1	-	1
50-54	-	-	1	1	3	-	2	1	2	2
55-59	-	-	-	-	1	3	1	1	-	-
60-64	-	1	1	1	-	-	1	1	2	-
65-69	-	-	-	-	-	-	1	-	-	-
70-74	-	-	1	-	-	-	-	-	-	-
75-79	-	-	-	-	-	-	-	-	-	-
80-84	-	-	-	1	-	-	-	-	-	-

to be continued

Table 15.2 Absolute numbers of patients for whom GPs reported an eating disorder, by age, 1985-1989 and 1995-2015

women	2014	2015
1-4	-	-
5-9	-	-
10-14	1	2
15-19	11	9
20-24	10	11
25-29	4	4
30-34	3	6
35-39	2	1
40-44	1	3
45-49	2	2
50-54	2	1
55-59	3	1
60-64	1	1
65-69	1	1
70-74	-	-
75-79	-	-
80-84	-	-

The peak incidence in 2015 lies in the age group 20-24 years. In the preceeding years the peak incidence was in the age group 15-19 years. Also, it is remarkable that eating disorders sometimes still occur at old age.

Discussion

In 2015 the number of patients reported with eating disorders is somewhat higher compared to the previous six years. Since 2015 eating disorders are classified according to DSM-5 (previously DSM-4), implying limited comparability to previous years. The disorders presently being classified as an eating disorder in contrast to before occur rarely, however. Previous studies have shown that living in big cities is a risk factor for boulimia nervosa.[49,50]

The study will be continued in 2016.

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16 General comments

1 The Counselling Committee has decided to include the following topics on the weekly returns in 2016.

   a Influenza and influenza-like illnesses
   b Research on end-of-live decisions
   c Suicide and attempted suicide
   d STD
   e Acute gastro-enteritis
   f Whooping cough
   g Pneumonia
   h Request for euthanasia
   i Eating disorders
   j Palliative sedation
   k Health checks

2 The Counselling Committee welcomes suggestions concerning new topics and adjustments of existing topics.

3 Data contained in this report may be reproduced provided that the source is acknowledged.

4 A translation into English will be published on the web-site of NIVEL.

17 Literature list

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   a An acute beginning, therefore a prodromal phase of not more than three to four days (including pre-existing airway infections at a non-pathogenic level).
   b The infection must be accompanied by a rectal temperature increase of at least 38º C.
   c At least one of the following symptoms must be present: cough, coryza, sore throat, frontal headache, retrosternal pain, myalgins.
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Appendix 1: participating doctors in 2015

Name:	Location:	Province:
J. Mulder*	't Zand	Groningen
J.P.de Kroon*	Onstwedde	Groningen
P.S. Wiersema*	Oostermeer	Friesland
W.J.M. Brunninkhuis	Drachten	Friesland
H.J. Dijkstra*	Bakhuizen	Friesland
M.L. Treub	Harlingen	Friesland
T.E. Wesselius	Harlingen	Friesland
Mw. F.B. van Heest*	Schoonoord	Drenthe
S.M. Handgraaf	Nieuw Weerdinge	Drenthe
Dr. R.A. de Groot/Mw. J.T. Bos		
Mw. E.J.A. Idema *	Oldemarkt	Overijssel
P.J. van Beek	Oldenzaal	Overijssel
E. Beissel	Oldenzaal	Overijssel
J.H.M. van der Holst (to 01.07.2015)	Groenlo	Gelderland
L.B.P.M. Hendrikx*	Steenderen	Gelderland
R.J.M. Kimmenaede	Zutphen	Gelderland
Mw. D.A. Jaspers/Mw. L.W.C. 't Mannetje/ A.J.H.M. Vermeulen/ C.A.R. Rietmeijer	Barneveld	Gelderland
Mw. M.W. Gesthuizen/Mw. G. Steenveld/ A.H.A. Harfterkamp	Gaanderen	Gelderland
J.A. Nielen	Emmeloord	Flevoland
P.C. Hildering/Mw. B. Bos/Mw. I. Larsen	Urk	Flevoland
A. van Beelen	Bunschoten	Utrecht
S. Tedjoe	Broek in Waterland	Noord-Holland
Mw. S. Sluis	Hilversum	Noord-Holland
Mw. M.H. Brooks	Hilversum	Noord-Holland
A. Leemhuis/W. van der Maarel	Castricum	Noord-Holland
C. Zwart	Haarlem	Noord-Holland

to be continued

Appendix 1: participating doctors in 2015

C. Noordzij	Heemskerk	Noord-Holland
M. Voerknecht	Bussum	Noord-Holland
Mw. J. Dros/Hoekstra	Den Burg	Noord-Holland
J.C.B.M. Rensing/Mw. A. Rensing-van Dijk	Den Haag	Zuid-Holland
Mw. D. Nijman*	Nieuwveen	Zuid-Holland
W.H. van der Linden/Mw. E.A.A. van Rosmalen*	Leimuiden	Zuid-Holland
Mw. M. Heijmans, Mw. K. Jonker, Mw. C. Douma en G. Agterberg	Den Haag	Zuid-Holland
R.R. Lankhorst	Middelburg	Zeeland
P.B.A. Crama	Vlissingen	Zeeland
M.G.A.M. de Gouw	Rosmalen	Noord-Brabant
J.D.M. schelfhout/Mw. A. van Hintum	Eindhoven	Noord-Brabant
P. Meulesteen	Eindhoven	Noord-Brabant
S. Schouten/Mw. H.J.C.M. Schouten-van den Oever	Oss	Noord-Brabant
M.J.F.M. Klaassen*	Oirsbeek	Limburg

*) With dispensary

Appendix 2: registered topics 1970-2016 (alphabetical)

abortion, spontaneous	1982-1983
abortion, induced	1971-1979
abortion requests	1970-1975
accidents	1971
accidents in a private setting	1981-1983
acute atypical headache	1988-1992
acute otitis media	1971 and 1986
acute respiratory infection	2001-2004
addiction to smoking (consultation)	1974 and 2003-2006
AIDS (fear of)	1988-2007
alcoholism	1975
anti-hypertensives and/or diuretics (prescription of)	1976
bee or wasp stings	1992-1993
bites by household pets	1986
burns	1988-1989
cerebrovascular accident	1986-1987
cervical smear	1976-1998
chickenpox	2000-2010
childbirth (at □28 weeks)	1982-1983
child abuse (suspicion of)	1973-1974
chronic benign pain disturbance	1995-1996
dementia	1987-1988
depression	1983-1985 and 2000-2002
diabetes mellitus	1980-1983 and 1990-1994 and 2000-2002
diarrhoea of unknown origin (acute)	1970
dog bite	1987 and 1998-1999
drug use (consultation)	1972-1973 and 1979-1981

to be continued

Appendix 2: registered topics 1970-2016 (alphabetical)

dwelling (certificate issued for another)	1975
echography requests	1988
environment-related health complaints	2003
exanthema of unknown origin	1970
family planning (advice)	1970-1976
gastro-enteritis	1992-1993 and 1996-2016
Health checks	2016
hay fever	1978-1982
hepatitis	1994
herpes zoster	1997-2001
gut feeling related to cancer	2010-2013
infectious mononucleosis	1977-1979 and 1991
influenza and influenza-like illnesses	1970-2016
injuries to the skeletal and locomotor systems	1984-1985
liver, gall bladder and pancreas diseases	1995-1997
malignancies	1984-1985
mammography (outpatient)	1988-2000
measles	1975-1979
measles/mumps	1990
medical aids	1999-2002
mental health care (referral)	2001-2003
morning-after pill, prescription of	1972-1991
myocardial infarction	1978 and 1983-1985 and 1991-1994
neuraminidase inhibitor (prescription)	2003-2004
oestrogen, prescription of	1994-1998
Parkinson's disease	1980-1985
penicillin, prescriptions and side effects	1982-1983
peptic ulcer (first time/relapse)	1985-1986
physical violence	1996-1999
p.i.d. (pelvic inflammatory disease)	1994-1998

to be continued

Appendix 2: registered topics 1970-2016 (alphabetical)

pneumonia	2008-2010 and 2012-2016
pregnancy (despite contraception)	1987-1991
premature birth	1982-1983
prostate complaints	1997-2002
psoriasis	1976-1977
psychiatric patients	
- discharged	1986-1988
- admitted	1988
referrals to a specialist	1984
referrals to a speech-language pathologist	1988-1989
referral/authorization for physiotherapy	1985
referral for psychosocial problems	1986-1987
research on end-of-live decisions	2005-2016
rohypnol prescriptions	1987-1988
rubella and rubella-like illnesses	1971
screening breast cancer >25 years	2012-2014
sexual problems and sexual violence	2003-2008
side-effects of cosmetics (suspected)	1992-1993 and 2009-2011
sports injuries	1979-1983 and 2005 2007
skull traumas in traffic accidents	1975-1977
sterilization of men (performed)	1972-1999
sterilization of women (performed)	1974-1999
sexually transmitted diseases (STD)	2008-2016
suicide and attempted suicide	1970-1972 and 1979-2016
Tree pest	2013-2014
tonsillectomy or adenotomy	1971
tranquillizer prescribed	1972-1974
unwanted pregnancy	2003-2011
urethritis in men	1992-2007
urinary tract infection (medicine prescribed)	1977

to be continued

Appendix 2: registered topics 1970-2016 (alphabetical)

urinary tract infection	2003-2004 and 2009-2011 and 2015-2015
ventricular/duodenal ulcer	1975
whooping cough	1998-2016
zanamivir (Relenza)	2000-2002

Appendix 3: list of incidental studies

Incidental studies and other additional studies 1977-2016 (alphabetical)

acute intoxication at work	1994-1995
aggression against GP and practice staff	1997-2000
alternative treatments (registration possible?)	1980
anorexia nervosa and boulimia	1985-1989 and 1995-2016
antibiotic resistance of Staphylococcus in general practice	2005-2006
diabetes mellitus (prevalent cases)	2000 and 2007-2012
euthanasia (request for)	1976-2016
incest	1988
lyme disease	1991-1994
malignancies	1982-1983
multiple sclerosis	1977-1982
puerperal mastitis	1982
regret after sterilization	1980-1984
serum collection	1980 and 1985
palliative sedation	2005-2016
vaccination against influenza	1992

Appendix 4: age population of the Netherlands

Age distribution of the population of the Netherlands, by gender, in thousands, 1 January 2015 (CBS)

age	men	women	total
0-4	455	434	889
5-9	476	454	930
10-14	516	493	1,009
15-19	512	489	1,001
20-24	542	527	1,069
25-29	529	521	1,050
30-34	509	504	1,013
35-39	500	502	1,002
40-44	587	590	1,177
45-49	647	639	1,286
50-54	638	632	1,270
55-59	576	576	1,152
60-64	523	523	1,046
65-69	503	511	1,014
70-74	346	369	715
75-79	247	295	542
80-84	159	232	391
≥85	108	237	345
total	8,373	8,528	16,901

Appendix 5: annual tables

NIVEL Primary Care Database – Sentinel Stations

Age group by topic

year 2015 weeks 1 t/m 53

All practices Age group	population			Influenza	STD*			Whooping-cough	Pneumonia*		
	M	F	M+F	M+F	M	F	M+F	M+F	M	F	M+F
≤1	491	464	954	1342	0	0	0	31	81	43	63
1-4	2167	2073	4240	823	0	0	0	21	162	154	158
5-9	2840	2748	5588	311	0	0	0	4	95	98	97
10-14	3080	2980	6060	175	0	0	0	12	26	17	21
15-19	3105	2905	6011	193	42	162	100	15	13	28	20
20-24	3000	2874	5874	140	193	237	215	5	23	28	26
25-29	3032	2995	6027	181	145	160	153	10	20	20	20
30-34	2943	2918	5861	200	95	110	102	3	31	58	44
35-39	2853	2788	5641	252	91	65	78	4	63	82	73
40-44	3350	3354	6705	243	48	54	51	3	57	57	57
45-49	3751	3655	7406	271	37	49	43	7	75	55	65
50-54	3670	3497	7167	285	25	43	33	3	60	86	73
55-59	3262	3273	6535	344	18	21	20	3	120	113	116
60-64	2978	3095	6073	313	3	10	7	7	141	165	153
65-69	3097	3102	6199	326	6	3	5	2	161	171	166
70-74	2101	2252	4353	308	5	0	2	0	176	231	204
75-79	1543	1681	3224	326	0	0	0	0	311	208	257
80-84	922	1264	2186	476	0	0	0	5	445	316	371
≥84	659	1322	1981	555	0	0	0	0	774	431	545
Total	48844	49240	98085	302	45	56	50	6	101	106	104

* not all GPs were included

NIVEL Primary Care Database – Sentinel Stations

Age group by topic

year 2015 weeks 1 t/m 53

All practices Age group	population			Gastro-enteritis no feces test			Gastro-enteritis Feces test			Urinary tract infections		
	M	F	M+F	M	F	M+F	M	F	M+F	M	F	M+F
≤1	491	464	954	530	711	618	20	43	31	28	88	57
1-4	2167	2073	4240	540	458	500	32	29	31	160	881	510
5-9	2840	2748	5588	134	106	120	7	4	5	109	948	520
10-14	3080	2980	6060	81	74	78	0	7	3	75	516	290
15-19	3105	2905	6011	74	103	88	10	10	10	28	1506	739
20-24	3000	2874	5874	77	150	112	7	17	12	61	1994	988
25-29	3032	2995	6027	69	124	96	20	10	15	61	1728	887
30-34	2943	2918	5861	82	86	84	7	14	10	54	1573	809
35-39	2853	2788	5641	39	68	53	0	7	4	126	1325	722
40-44	3350	3354	6705	54	57	55	3	3	3	104	1458	778
45-49	3751	3655	7406	32	66	49	5	5	5	141	1370	745
50-54	3670	3497	7167	49	57	53	5	3	4	166	1348	741
55-59	3262	3273	6535	58	61	60	6	6	6	275	1611	939
60-64	2978	3095	6073	47	58	53	7	3	5	327	2015	1182
65-69	3097	3102	6199	71	77	74	10	6	8	445	2316	1379
70-74	2101	2252	4353	48	93	71	5	9	7	646	2236	1469
75-79	1543	1681	3224	110	149	130	13	6	9	1030	3596	2362
80-84	922	1264	2186	130	214	178	0	0	0	1708	4450	3288
≥84	659	1322	1981	243	166	192	15	0	5	2582	5529	4555
Total	48844	49240	98085	95	112	104	8	8	8	267	1778	1023

* not all GPs were included

NIVEL Primary Care Database – Sentinel Practices

Age group by topic

year 2015 weeks 1 t/m 53

All practices Age group		population		End-of-life* study	Suïcide
	M	F	M+F	M+F	M+F
≤1	491	464	954	0	0
1-4	2167	2073	4240	0	0
5-9	2840	2748	5588	2	0
10-14	3080	2980	6060	2	2
15-19	3105	2905	6011	0	7
20-24	3000	2874	5874	2	9
25-29	3032	2995	6027	5	7
30-34	2943	2918	5861	3	9
35-39	2853	2788	5641	4	9
40-44	3350	3354	6705	4	7
45-49	3751	3655	7406	4	14
50-54	3670	3497	7167	20	18
55-59	3262	3273	6535	24	6
60-64	2978	3095	6073	59	0
65-69	3097	3102	6199	81	6
70-74	2101	2252	4353	131	0
75-79	1543	1681	3224	230	0
80-84	922	1264	2186	357	0
≥84	659	1322	1981	767	25
Total	48844	49240	98085	50	7

* not all GPs were included

NIVEL Primary Care Database – Sentinel Practices

Province group by topic

year 2015 weeks 1 t/m 53

All practices Province group	population			Influenza	STD*			Whooping-cough	Pneumonia*		
	M	F	M+F	M+F	M	F	M+F	M+F	M	F	M+F
GR+FR+DR	9243	9097	18340	325	35	31	33	13	97	93	95
OV+GLD+FLE	12315	12471	24786	276	20	38	29	5	97	75	86
UTR+NH+ZH	16250	17041	33292	304	55	77	66	5	87	98	93
ZLD+NB+LIM	11035	10632	21667	308	65	64	65	4	130	166	148
Total	48843	49241	98085	302	45	56	50	6	101	106	104

* not all GPs were included

NIVEL Primary Care Database – Sentinel Practices

Province group by topic

year 2015 weeks 1 t/m 53

All practices Province group	population			Gastro-enteritis no feces test			Gastro-enteritis Feces test			Urinary tract infections		
	M	F	M+F	M	F	M+F	M	F	M+F	M	F	M+F
GR+FR+DR	9243	9097	18340	153	154	153	5	5	5	371	1898	1128
OV+GLD+FLE	12315	12471	24786	62	56	59	11	4	8	277	1799	1039
UTR+NH+ZH	16250	17041	33292	86	104	95	10	12	11	235	1800	1039
ZLD+NB+LIM	11035	10632	21667	100	156	127	4	8	6	208	1627	900
Total	48843	49241	98085	95	112	104	8	8	8	267	1778	1023

* not all GPs were included

NIVEL Primary Care Database – Sentinel Practices

Province group by topic

year 2015 weeks 1 t/m 53

All practices Province group	population			End-of-Life* Study	Suicide
	M	F	M+F	M+F	M+F
GR+FR+DR	9243	9097	18340	74	11
OV+GLD+FLE	12315	12471	24786	46	4
UTR+NH+ZH	16250	17041	33292	43	8
ZLD+NB+LIM	11035	10632	21667	47	5
Total	48843	49241	98085	50	7

* not all GPs were included

NIVEL Primary Care Database – Sentinel Practices

Address density by topic

year 2015 weeks 1 t/m 53

All practices Address density	population			Influenza	STD*			Whooping-cough	Pneumonia*		
	M	F	M+F	M+F	M	F	M+F	M+F	M	F	M+F
≤500/KM2	11357	11018	22375	388	30	36	33	13	66	93	98
500-2500/KM2	28126	28372	56498	277	46	56	51	4	45	103	101
≥2500/KM2	9360	9851	19211	274	59	77	68	6	46	105	130
Total	48843	49241	98084	302	45	56	50	6	50	101	106

* not all GPs were included

NIVEL Primary Care Database – Sentinel Practices

Address density by topic

year 2015 weeks 1 t/m 53

All practices Address density	population			Gastro-enteritis no feces test			Gastro-enteritis Feces test			Urinary tract infections		
	M	F	M+F	M	F	M+F	M	F	M+F	M	F	M+F
≤500/KM2	11357	11018	22375	115	118	117	9	6	8	287	1857	1060
500-2500/KM2	28126	28372	56498	85	104	95	8	8	8	183	1810	1046
≥2500/KM2	9360	9851	19211	103	129	116	6	11	9	184	1563	891
Total	48843	49241	98084	95	112	104	8	8	8	267	1778	1023

* not all GPs were included

NIVEL Primary Care Database – Sentinel Practices

Address density by topic

year 2015 weeks 1 t/m 53

All practices Address density	population			End-of-Life research	Sucide
	M	F	M+F	M+F	M+F
≤500/KM2	11357	11018	22375	66	6
500-2500/KM2	28126	28372	56498	45	7
≥2500/KM2	9360	9851	19211	46	5
Total	48843	49241	98084	50	7

* not all GPs were included