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## Radiculopathy and radiating low back pain in general practice

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# Chapter 2

## **Radiating low back pain in general practice: Incidence, prevalence, diagnosis and long-term clinical course of illness**



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## **ABSTRACT**

### *Background*

Little is known about the long-term clinical course of illness of radiating low back pain in general practice or about the treatment strategies employed by GPs. The aim of this study was to calculate the incidence and prevalence of radiating low back pain, to explore the long-term clinical course of radiating low back pain including the influence of radiculopathy (in a sample population) and non-radiating low back pain thereon, and to describe general practitioners' treatment strategies for radiating low back pain.

### *Method*

We performed a historic prospective cohort study in Dutch general practice. Patients over 18 years of age with a first episode of radiating low back pain in 1998 or 1999, as registered by the ICPC code L86, were included and followed for ten years. Main outcome measures were incidence and prevalence, long-term course of illness, initial diagnoses established by the GPs and treatment strategies.

### *Results*

Mean incidence was 9.4 and mean prevalence was 17.2 per 1,000 person years. Three-hundred and eighty-one patients had 1,193 contacts with their GPs. 50% had only 1 contact with their GP. Episodes were significantly longer in patients with a history of non-radiating low back pain and in patients with a diagnosis of radiculopathy in the first 5 years. L86 episodes represented radiculopathy in 50% cases. Medication was prescribed to 64% of patients, mostly NSAIDs, whereas 53% of patients was referred, mainly to physiotherapists and neurologists. Nine per cent of patients underwent surgery.

### *Conclusion*

The ICPC code L86 is used to identify patients with radiculopathy but we learned that it includes many cases of unspecific radiating low back pain. More research is needed to clarify the diagnoses to which the registry code of L86 translates.

## INTRODUCTION

Low back pain is a common health problem, affecting up to 80% of the population at some point in life.<sup>1</sup> The prognosis of radiating low back pain is less favourable than of non-radiating low back pain in terms of pain, disability, chronicity, loss of productivity, quality of life and use of health care resources, especially if the pain radiates to below the knee, indicating radiculopathy.<sup>2-5</sup>

Several aspects of radiating low back pain in general practice have not yet been clarified. Most descriptive research on the subject is performed in hospital settings with a short-term follow-up. Incidence and prevalence rates vary widely between studies because populations and definitions vary.<sup>6,7</sup> Little is known about the long-term clinical course of illness of radiating low back pain in general practice or about the treatment strategies employed by general practitioners (GPs). Radiating low back pain is registered with the ICPC code L86 which includes radiculopathy as well as non-radicular radiating low back pain in unknown proportions.<sup>8,9</sup> It is unclear if and how the presence of non-radiating low back pain at any time in a patient's medical history influences the course of illness in radiating low back pain. We performed a historic prospective cohort study in a general practice population with a ten-year follow-up. We aimed to calculate incidence and prevalence of radiating low back pain and to explore the long-term clinical course of illness including the influence of non-radiating low back pain and radiculopathy thereon. Next, we aimed to investigate which proportion of patients was initially diagnosed with radiculopathy and to describe the GPs' treatment strategies for radiating low back pain.

## METHOD

The data for our study were extracted from the Registration Network Groningen (RNG). The RNG consists of three group practices with a combined dynamic patient population of approximately 30,000 patients. Anonymized data on reasons for encounter, prescriptions and referrals are uploaded from the electronic patient records to the RNG database. In the Netherlands, with no free access to hospital care, a GP is the first physician to be consulted for virtually every health problem. The RNG therefore contains an overview of its population's health care consumption. The GPs participating in the RNG are trained and experienced in accurate registering.<sup>10</sup> Health problems are registered in electronic patient files using units

called 'episodes'. An episode contains all information concerning a single health problem: correspondence, investigations, out-of-hours general practice encounters, (repeat) prescriptions and the GP's personal work notes. It is important to realize that these healthcare episodes represent the care provided by the GP, which correlates to, but does not equal, the disease as experienced by patients. All elements within one episode are coded with one International Classification of Primary Care (ICPC) code.<sup>8,9</sup> The ICPC code L86 registers radiating low back pain. Our study database was created by including all patients over 18 years of age who had their first episode of radiating low back pain in 1998 or 1999 and following them for ten years. Registration mistakes were assessed by two independent researchers and excluded.

Person days, the number of days patients were registered in one of the practices, were used to calculate person-years. Person-years were used to correct for incomplete follow-up and to calculate incidence and prevalence rates. Since we made use of a dynamic population, we defined the incidence rate as the number of new cases of radiating low back pain occurring in one year, divided by the number of person-years of the population at risk in the same year. The denominator includes the person years of patients up to the moment they are diagnosed with radiating low back pain, since they are, from that point, not at risk anymore. We defined the prevalence rate as all existing cases of radiating low back pain in one year, divided by the total number of person years of our study population in that year. This includes the patients who have already been diagnosed with the condition. The reason for choosing prevalence rates (cases per year) rather than prevalence proportions (percentage of patients diagnosed), was that from our database, it was impossible to determine whether any patient was prevalent at a given time point if the diagnosis was established at an earlier time.

Course of illness was explored by analysing the length of LRS episodes and the number of contacts within episodes, as well as recurrences of radiating low back pain and whether patients underwent surgery. An episode was defined as ended when no L86 entries were made within the year following the final contact. The treatment strategies distinguished were watchful waiting, medication and referral. Prescription drugs with the same pharmacological working mechanism (for example, NSAIDs) were analyzed as a group. Non-radiating low back pain is registered with the ICPC codes L02 and L03 in the Dutch version of the ICPC-1. When a patient had episodes coded with L02 and/or L03 before or after the L86 episode, this was defined as having a 'pre-history' or 'post-history' of non-radiating low back pain. In a representative (as to sex and age) subsample of patients (n=103),

we searched the medical files to investigate whether there was an initial diagnosis of radiculopathy.

Statistical analysis was carried out with SPSS. Kaplan-Meier analysis was used to estimate the probability of patients consulting their GP, which provides information on the length of healthcare episodes. End point was the date an episode ended (see above), which does not necessarily mean that the patient was recovered. We stratified by sex, age group, pre-history of non-radiating low back pain and initial diagnosis of radiculopathy or not (the last criterium only for the subsample in which this was investigated). Age groups were: 18-44 years, 45-64 years and 65+, determined by age at inclusion. An independent sample t-test was used to compare differences in mean consultation rates between subgroups and a logrank test to compare differences between subgroups in the Kaplan-Meier analysis. To compare incidence and prevalence the Pearson chi-square test was used. The Mann-Whitney or Kruskal-Wallis test were used in case of a skewed distribution.

## RESULTS

### *Population*

We included 390 patients (figure 2.1) with a mean age of 47 years and 50% men. 134 patients (34%), with a mean age of 50 and 49% men, left the database before the follow-up period finished, after a mean period of four years. Our sample of 103 patients had a mean age of 49 years and 52% were men.

### *Incidence and prevalence*

We found mean incidence and prevalence rates of 9.4 and 17.2 per 1,000 person years (table 2.1), lower in men than in women and the highest in patients in the oldest age group.

### *Course of illness*

Three-hundred and eighty-one patients (98%) had face-to-face contact with their GPs for radiating low back pain in 1.193 contacts. 1.006 contacts (84%) were regular visits to the GPs' office, 168 (14%) were housecalls and 19 contacts (2%) were out-of-hours general practice care. 189 patients (50%) had one contact, 161 patients (42%) had two to five contacts and 31 patients (8%) had six or more. There were no significant differences between sexes and age groups regarding the number of contacts.

**Table 2.1:** Incidence and prevalence rates of radiating low back pain in general practice per 1,000 person-years, stratified by sex and age, for each follow-up year. (RNG population 18+ years, 1998 – 2008)

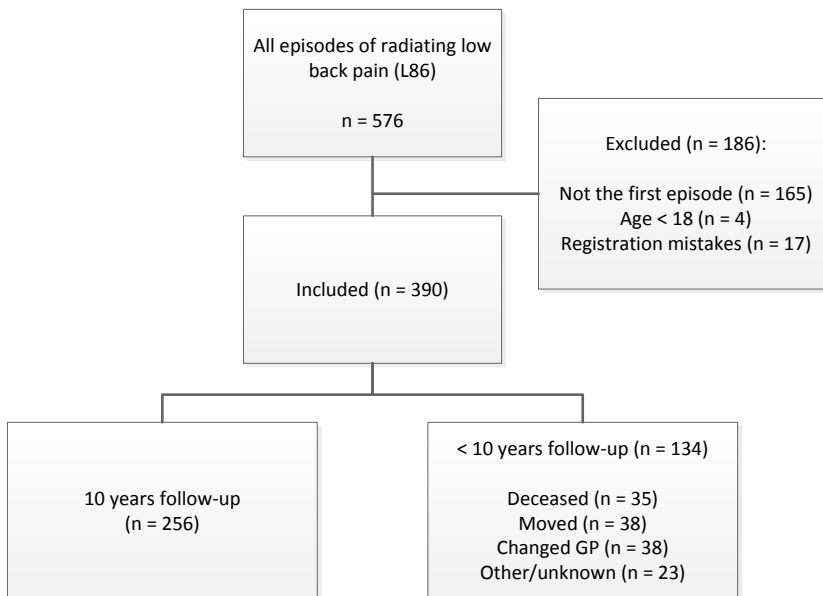
Year	Total	Incidence				
		Sex		Age category		
		Men (18+)	Women (18+)	18-44	45-64	65+
1999	10.8	10.5	11.1	9.4	19.8	18.7
2000	10.5	8.4	12.6	10.0	18.7	16.1
2001	8.5	7.7	9.1	6.6	15.9	16.3
2002	9.8	8.7	10.9	9.9	14.5	18.0
2003	8.9	8.0	9.7	8.5	14.8	14.7
2004	8.1	6.2	10.1	7.7	14.1	12.5
2005	10.0	9.1	10.9	8.8	15.5	22.6
2006	8.8	8.6	8.9	7.0	15.3	16.9
2007	10.2	9.3	11.0	10.0	16.3	16.3
2008	8.7	8.5	8.9	7.7	15.5	14.4

Year	Total	Prevalence				
		Sex		Age category		
		Men (18+)	Women (18+)	18-44	45-64	65+
1998	15.8	14.1	17.2	13.3	27.7	31.6
1999	16.5	15.6	17.3	13.8	29.1	31.7
2000	17.1	14.0	19.9	14.2	29.8	33.6
2001	15.3	13.9	16.7	12.0	27.6	30.7
2002	18.0	14.7	21.1	15.7	29.1	35.4
2003	16.7	14.6	18.8	13.9	28.2	32.8
2004	16.6	13.0	20.1	13.8	29.0	29.4
2005	17.6	14.7	20.4	13.4	31.1	35.7
2006	17.1	15.3	18.7	12.8	29.4	32.8
2007	19.4	16.7	22.0	16.0	31.4	35.8
2008	19.1	16.5	21.6	13.1	34.5	36.4

Radiating low back pain recurred in 91 patients (23%), significantly more often in women than in men: 54 vs 37 times, ( $p=0.04$ ). Eighteen patients had more than one recurrence. We found a pre-history of non-radiating low back pain in 96 patients and a post-history in 86, 79 patients had both and 120 had neither. More women than men had post-histories of non-radiating low back pain: 69 versus 96,  $p = 0.03$ . Presence of a pre-history of non-radiating low back pain did not significantly

influence the occurrence of a post-history. 33 patients (9%) underwent one to three surgical procedures, totalling 43 interventions. Eight patients had surgery more than once. Men had surgery significantly more often than women: 24 operations in 16 men versus 19 operations in 17 women ( $p = 0.03$ ). 14 patients were referred as medical emergencies, 8 of these had surgery for cauda equina syndrome. The initial diagnosis in our sample population was radiculopathy in 53 cases, non-radicular radiating low back pain in 48 cases and spinal stenosis in two cases.

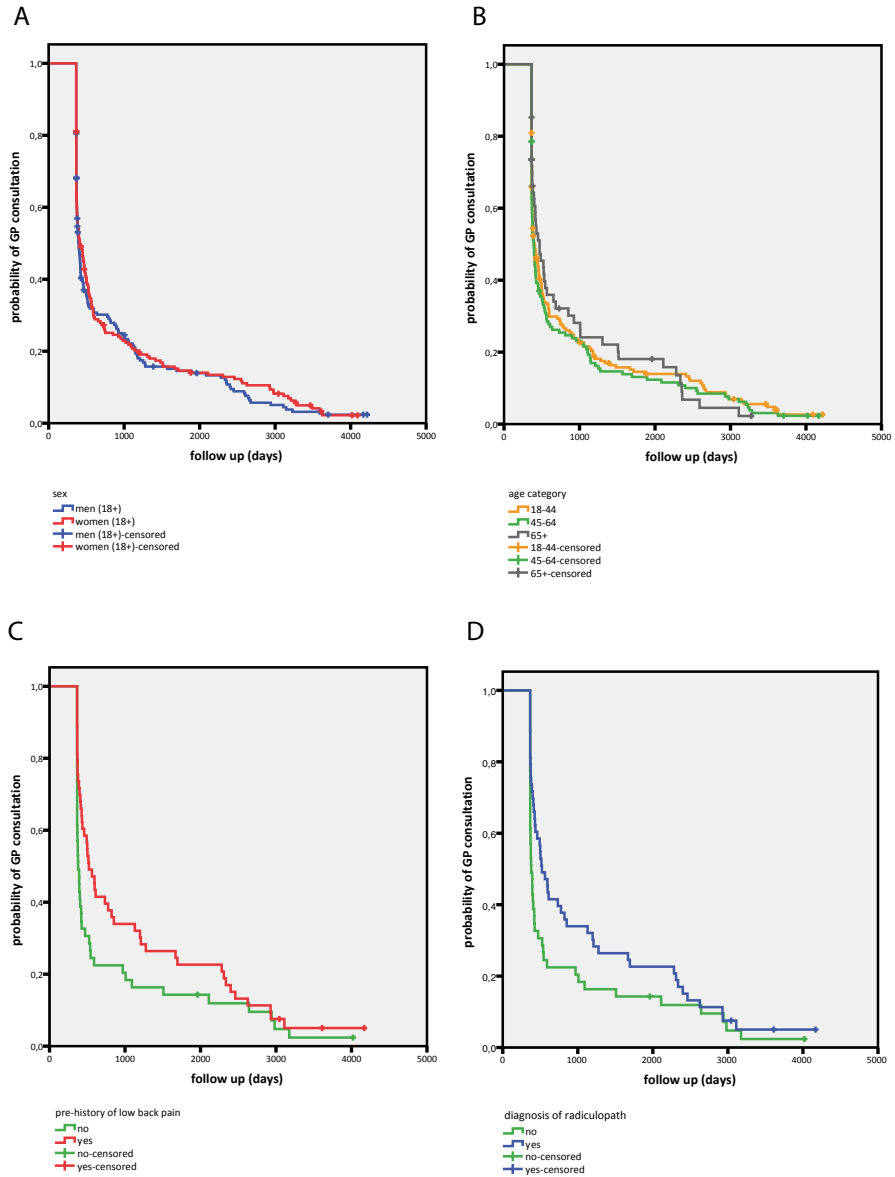


**Figure 2.1:** Patient selection flow schedule

### *Consultation rate probability*

In figure 2.2a-2.2d, the Kaplan-Meier curves estimating the probability of patients consulting their GP because of radiating low back pain are shown. Within one year, 82% of episodes had. We found no significant differences between sexes and age groups regarding episode length. Patients with a pre-history of non-specific low back pain had a significantly higher consultation rate for radiating low back pain (logrank 0.036). In our sample population we found a significantly higher consultation rate in patients with an initial diagnosis of radiculopathy than in patients without over the course of 5 years (logrank 0.020) but not with a follow up of ten years (logrank 0.059). At the end of the follow-up period there were three patients left.

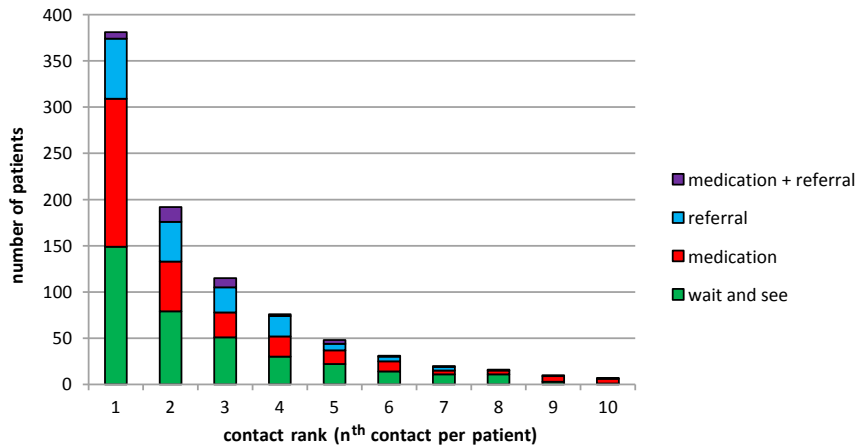




**Figure 2.2a-d:** Probability of GP consultation for radiating low back pain (ICPC L86) during 10 years of follow up stratified by sex (a), age (b), pre-history of low back pain (c) and initial diagnosis of radiculopathy or not (d) (RNG population 18+ years, 1998 – 2008)

### Treatment strategies

Treatment strategies chosen in subsequent contacts are shown in figure 2.3. No differences were found between sexes and age groups.



**Figure 2.3:** Treatment strategies employed by the GPs for each subsequent contact in the first episode of radiating low back pain (ICPC L86), up to the 10<sup>th</sup> contact (RNG population 18+ years, 1998 – 2008)

Medication and referrals for radiating low back pain stratified by sex and age groups are shown in table 2.2. Medication was prescribed to 250 patients (64%). The number of prescriptions per patient varied from 1 to 82, totalling 1,321, mostly for NSAIDs (52%). 50% of prescriptions were written in the first year of an L86 episode. During our study period, 205 patients (53%) were referred for radiating low back pain. The number of referrals varied between one and twelve per patient, totalling 400. 60% of the referrals were to other primary care professionals, mainly physiotherapists. Referral to medical specialists (40%) were mainly to neurologists. Fourteen patients were referred to neurosurgeons as medical emergencies. More than half of the referrals took place in the first year of the episode, with a median of 18 days after the first contact.

**Table 2.2:** Treatment strategies: prescriptions and referrals for radiating low back pain in general practice (RNG population 18+ years, 1998 – 2008)

Treatment strategy	Total (%)	Sex		Age category		
		Men (18+)	Women (18+)	18-44	45-64	65+
<b>Prescriptions</b>						
Paracetamol	149 (11)	56	93	37	64	48
NSAIDs	690 (52)	290	400	407	186	97
Weak opiates	142 (11)	60	82	60	42	40
Opiates	14 (1)	5	9	10	4	0
Benzodiazepines	237 (18)	102	135	147	60	30
Other	89 (7)	38	51	48	31	10
<b>Total (%)</b>	<b>1,321 (100)</b>	<b>551 (42)</b>	<b>770 (58)</b>	<b>709 (54)</b>	<b>387 (29)</b>	<b>225 (17)</b>
<b>Referrals</b>						
<i>Primary care</i>						
Physical therapy	219 (54)	106	113	111	81	27
Other remedial therapy	21 (6)	8	13	12	3	6
<i>Hospital care</i>						
Neurology	120 (30)	60	60	76	32	12
Revalidation	16 (4)	6	10	11	5	0
Neurosurgery	8 (2)	1	7	5	2	1
Orthopedics	7 (2)	3	4	3	1	3
Anesthesiology	4 (1)	1	3	3	1	0
Other	5 (1)	2	3	2	1	2
<b>Total (%)</b>	<b>400 (100)</b>	<b>187 (47)</b>	<b>213 (53)</b>	<b>223 (56)</b>	<b>126 (32)</b>	<b>51 (13)</b>

## DISCUSSION

### *Principal findings*

In our study, 50% of radiating low back pain episodes consisted of one contact between patient and GP. Episodes of radiating low back pain in which patients make use of general practice care over a long period of time are uncommon. These episodes are correlated with a history of non-radiating low back pain and (probably) with an initial diagnosis of radiculopathy. It seems that radiating low back pain is a short-term problem for which not much care is needed by patients. However, no more GP contacts does not necessarily mean that patients were free of symptoms.

Episodes registered by the ICPC code L86 represented radiculopathy in about half of the cases and unspecific radiating low back pain in the other half.

### *Strengths and weaknesses*

Strengths of our study are the long-term follow-up and the general practice setting. The GPs who participate in the RNG are accurate in registering morbidity which makes our database reliable.<sup>10</sup> There are also limitations. From a caregiver perspective, it seems strange that GPs would choose a wait-and-see policy for radiating low back pain after five or more consultations, as was done in 40 cases (figure 2.3). It is possible that recurrences of radiating low back pain have been filed under previous episodes, giving the impression of single lengthy episodes with many contacts where in fact there were multiple, shorter episodes. Or, multiple L86 episodes may have occurred within one year, which in our study would be regarded as one episode. Finally, as mentioned above, information on the general practice care provided to patients does not equal information about the diseases of patients. However, especially in the Dutch healthcare system where general practice care is the pivot of the healthcare system, we think it is one of the best indicators of disease.

### *Other research*

The LINH, a Dutch national information network of primary care, explored the incidence and prevalence of radiculopathy in Dutch general practice, using the same ICPC code (L86) as we did to select their patient population.<sup>11</sup> Between 2003 and 2010, the LINH found a mean incidence of 10.3 (9.4 in our study), and a mean prevalence of 15.1 (17.2 in our study) per 1,000 person years. In our study, peak incidence and prevalence occurred in the 65+ age group but in the LINH study, peak incidence and prevalence (16.0 and 25.0 respectively) occurred in a younger population of 45-64 year olds. During our study period, the incidence per 1,000 person years remained stable while the prevalence rose. This implies that the number of new cases per year remained the same, but that the episodes lasted longer in later years. In the LINH-study, this trend is not found. In 2005, Luijsterburg *et al* performed a database study investigating GPs' prescription patterns for radiculopathy, also making use of the ICPC code L86. The GPs prescribed NSAIDs to the majority of patients, similarly to what we found.<sup>12</sup>

The ICPC code L86 is used to identify patients with radiculopathy in both the abovementioned studies and in others, but, as said, it literally registers radiating low back pain.<sup>2,13</sup> From our subsample we know that this includes probably about

as many cases of unspecific radiating low back pain, as 'true' radiculopathy. This finding has significant implications for the use of registry data since assumptions and conclusions about specific conditions may be far from the truth. More research is needed to clarify the diagnoses to which the registry code of L86 translates (and ultimately, perhaps, these codes need adjustment).

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