OPEN ACCESS

GAVIN PUBLISHERS

Family Medicine and Primary Care: Open Access

Carlsson L, et al. J Family Med Prim Care Open Access 3: 126.

Research Article

DOI: 10.29011/2688-7460.100026

Multimorbidity Patterns in Patients with Back Pain: A Study of Patient Records at a Primary Health Care Centre in Sweden

Lennart Carlsson[1*], Holger Olofsson[2], Bo Christer Bertilson[1,3]

[1]Division of Family Medicine and Primary care, Department of Neurobiology, Care Sciences and Society, Karolinska Institutet, Solna, Sweden

[2]Kallhälls Nya Vårdcentral, Region Stockholm, Sweden

[3]Academic Primary Healthcare Centre, Region Stockholm, Sweden

[*]**Corresponding author:** Lennart Carlsson, Division of Family Medicine and Primary Care, Department of Neurobiology, Care Sciences and Society, Karolinska Institutet, Solna, Sweden. Tel: +46706084507; Email: lennart.carlsson@ki.se

Citation: Carlsson L, Olofsson H, Bertilson BC (2019) Multimorbidity Patterns in Patients with Back Pain: A Study of Patient Records at a Primary Health Care Centre in Sweden. J Family Med Prim Care Open Access 3: 126. DOI: 10.29011/2688-7460.100026

Received Date: 29 January, 2019; **Accepted Date:** 14 February, 2019; **Published Date:** 21 February, 2019

Abstract

In Primary Care, multimorbidity is the norm in most patients. A large part of these have pain disorders, very often related to the spine. Patients with back pain have a higher degree of multimorbidity than many other groups of patients. The aim of this epidemiological study was to elucidate various patterns of multimorbidity in terms of clusters of diseases among patients with low back pain (LBP).

Methods: A retrospective cross-sectional study was performed containing all registered encounters with patients receiving a LBP related diagnosis at one Primary Health Care Centre (PHCC) in Stockholm area, Sweden. The period October 2011 to September 2014 was studied. The Johns Hopkins Case-mix System "Adjusted Clinical Groups" (ACG©) was used for grouping and analysing data.

Results: Out of 15,092 patients visiting the PHCC during the 3-year period exactly 10,000 got at least one diagnosis and 1,431 of those patients were diagnosed with LBP. Most common simultaneous groups of diagnoses were in order administrative concerns, hypertension, other musculoskeletal disorders and neurologic signs and symptoms. The proportion of patients with LBP disorders having five or more diagnoses was about 29%, and the equivalent proportion of patients without LBP was 9%. Different types of morbidity in terms of Aggregated Diagnosis Groups (ADGs) showed that about 55% of patients with LBP had three or more ADGs compared to 26% among patients who had no LBP. Patterns of multimorbidity in terms of the ACGs showed that patients with LBP were about twice as common in higher risk categories than patients without those diagnoses (52% vs 26%).

Discussion: Our study showed that patients with LBP had a high degree of multimorbidity compared to those who did not have LBP and type of concurrent diseases differed between the two groups. The patterns of diagnosis clusters were analysed further and showed results that differed between various groups of patients with LBP, predominately depending on age. Further analysis is needed in order to understand what causes the various patterns of multimorbidity among patients with LBP.

Keywords: Low Back Pain; Multimorbidity; Adjusted Clinical Groups; Primary Care

Introduction

The concept of multimorbidity is defined as the simultaneous occurrence of several diseases where none of them is seen as an index disease [1,2]. Some international studies are focusing on the overall multimorbidity [3,4]. Studies in Sweden have shown patterns of multimorbidity, departing from some specific diseases [5,6]. However, there is a trend towards more patient oriented, or person-centred care, indicating a greater interest to deal with the consequences of co-morbidity and multimorbidity [7,8].

In Primary Care, as the first tier, all diseases might be relevant in the diagnostic process in order to decide what kind of treatment is the most suitable one in each case. Thus, in order to be able to deliver adequate care, the understanding of multimorbidity ought

to play an important role.

Patients with back pain disorders often suffer from pain also in other parts of their body [9,10]. It is also known that low back pain (LBP) plays a central role in multimorbidity [11]. Much activity within Primary Care relates to LBP and its treatment; this group of patients is the single most frequent among patients with pain [6]. Most patients with LBP tend to become chronically ill, also leading to sick leave. Swedish studies describing LBP in general care have been published [12], but so far just two on Primary Care level [6,13].

The purpose of this study was to describe multimorbidity in patients with LBP and analyse various patterns of simultaneous diagnoses. Our study was approved by the regional ethical approval board in Stockholm, Sweden (Dnr: 2015/232-31/5).

Materials and Methods

This study is a retrospective cross-sectional approach based on patient's record data from one Primary Health Care Centre (PHCC) in Stockholm Region in Sweden. All patients, enrolled at the PHCC at the end of September 2014, were included in our study. Information from the medical records regarding all those patients' visits to physicians at the PHCC between 2011-10-01 and 2014-09-30 was retrieved. Data used were the age and gender of the patient, dates of the visits and all registered diagnoses. Identity numbers were decoded before the usage. Every diagnosis by each patient was retrieved. Patients with LBP were identified by the following three ICD-10 diagnoses: M54.4 (Lumbago with ischia), M54.5 (Lumbago) and M54.9 (Unspecified back pain). This group of patients was compared with all other patients, not given those diagnoses, who visited the PHCC each year during the defined 3-year period (Table 1). The three periods from October one year to September next year in our article further on are marked with "2012", "2013" and "2014" respectively.

	2012	2013	2014
All patients	14.955	15.075	15.092
Patients with any diagnosis	9.151	9.452	9.287
Patients without LBP	8.626	8.904	8.631
Patients with LBP	525	548	656

Table 1: Characteristics of our study population.

Data was processed and analysed by the Johns Hopkins Case-mix System, Adjusted Clinical Groups (ACG©), version 11.1 [14]. The resulting patterns of multimorbidity were represented in three dimensions; the 93 patient complexity categories (ACG), the 32 Aggregated Diagnosis Groups (ADG) and the 286 Expanded Diagnosis Clusters (EDC), bundled into 27 major clusters (MEDC), all built into the ACG system. When grouping into patient categories, the ACGs, the system uses ADGs that differentiates between types of morbidity for each diagnosis, meaning that the ADGs are the building blocks, which are combined, when constructing the ACGs. The intention of the EDCs is to describe, in a clinically meaningful way, what clusters of diagnoses are involved in a complex patient category.

ACGs were designed to represent categories for persons expected to require similar levels of healthcare resources. Because patients have different epidemiological patterns of morbidity they fall into different ACG categories. The full set of ACGs can be collapsed into six classes, Resource Utilization Bands (RUB), depending on the expected low or high use of healthcare resources.

Results

The total number of patients involved in our study was 15,092 and 10,000 of them were registered with a diagnosis during the 3-year period. Among the latter, 53.4% were female and 46.6% were male patients.

The distribution of age groups is presented in Figure 1. Middle age groups contained a great proportion of patients with LBP.

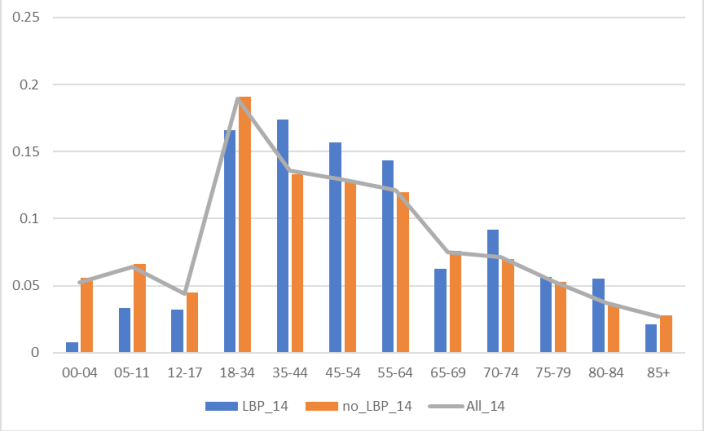


Figure 1: Distribution of age groups among patients with vs without low back pain vs all patients, year 2014.

The number of diagnoses per patient during each year differed between those patients with LBP and the others, as shown in Figure 2.

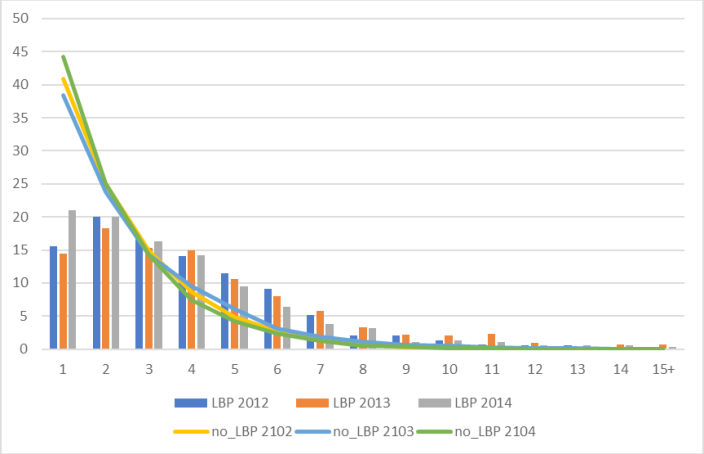


Figure 2: Diagnoses per patient with vs without low back pain.

The multimorbidity pattern displayed by different types of morbidity, the ADGs, during 2014 for patients diagnosed with LBP is presented in Figure 3. Comparison was made with all other patients visiting the PHCC during the same time. There are similar numbers for all three years, with about the same proportion between the two populations compared.

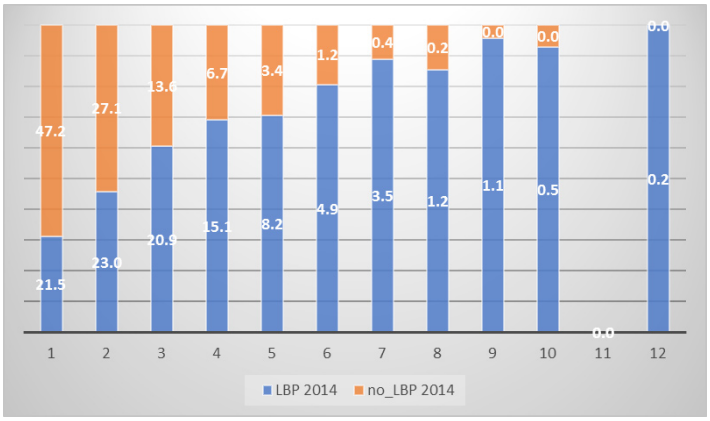
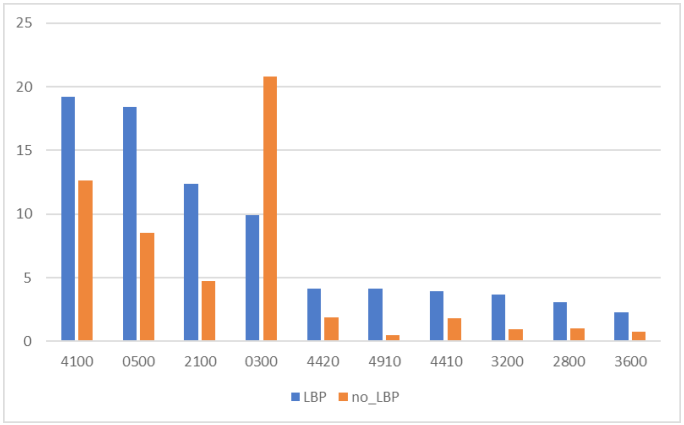
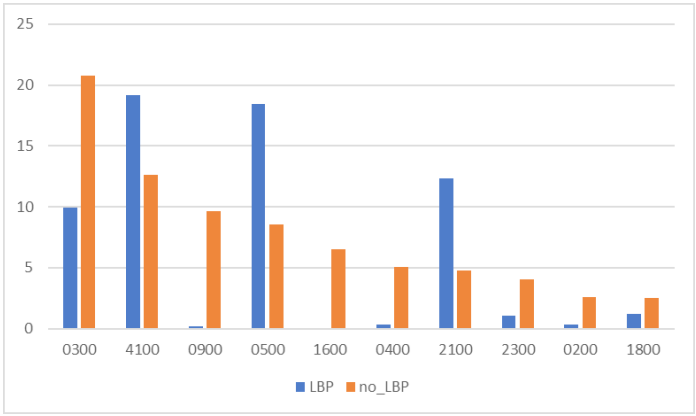


Figure 3: ADGs per patient with low back pain vs all other visiting patients, year 2014.

The multimorbid patient categories in terms of ACG for patients with LBP at the end of the period studied is shown in a table attached to this article, Appendix A. Comparison is made with all patients without LBP for each of the three years in Figure 4, reduced to the ten most frequent groups of patients with vs without LBP the last year.



A: Sorted by patients with low back pain.



B: Sorted by patients without low back pain.

Figure 4: ACG distribution 2014 among patients with vs without low back pain.

As shown in Figure 4, patients with LBP were represented in the more complex categories of the ACGs (21xx-49xx) to a higher degree.

The multimorbidity patterns are more obvious when the ACGs were collapsed into RUBs. This is shown below for all three years (Figure 5). RUB 0, containing patients with no diagnoses at all, is not displayed here.

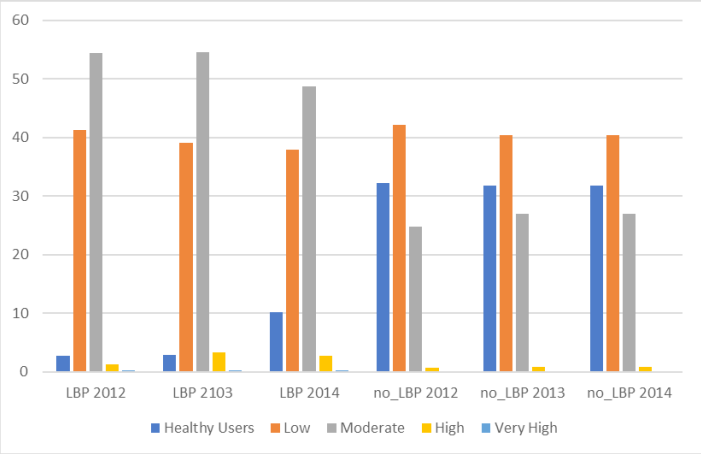


Figure 5: RUB distribution among patients with low back pain vs all other patients.

The diagnosis clusters, the EDCs, differed between patients with LBP and the others. A total of all EDC in numbers, summarized in terms of MEDC, are shown for all three years as Appendix B.

Table 2 compares the distribution of all MEDCs during 2014 for the two populations and for the sum of them, meaning all patients registered with a diagnosis during 2014. The distribution is shown as a percentage within each population.

MEDC Code	LBP_2014	no_LBP_2014	all_2014
ADM	10.613	13.966	13.624
CAR	6.129	8.724	8.460
MUS	32.686	5.643	8.399
EAR	3.986	8.447	7.993
SKN	4.733	8.233	7.876
NUR	7.324	7.266	7.272
INF	3.538	7.266	6.886
RES	4.434	5.829	5.687
GSI	4.534	5.552	5.449
END	4.185	5.004	4.921
GSU	3.089	4.156	4.047
PSY	2.940	3.998	3.890
GUR	2.740	3.805	3.697
ALL	2.292	3.308	3.204
GAS	1.943	2.556	2.493
EYE	1.146	1.973	1.889
HEM	0.747	0.876	0.863
REC	0.349	0.809	0.762
RHU	0.747	0.718	0.721
NUT	0.698	0.577	0.589
REN	0.399	0.334	0.340
FRE	0.349	0.305	0.310
MAL	0.199	0.277	0.269
TOX	0.050	0.187	0.173
DEN	0.149	0.136	0.137
GTC	0.000	0.040	0.036
NEW	0.000	0.017	0.015

Table 2: MEDC distribution 2014 among patients with vs without low back pain vs all patients.

In Figure 6 the top-ten MEDCs during 2014 from the two patient groups are presented. The 30 most common EDCs among patients in our study, are shown in Table 3. Table 3a displays the population with LBP, while Table 3b contains the population without LBP; both regarding the year 2014 and in numbers of patients.

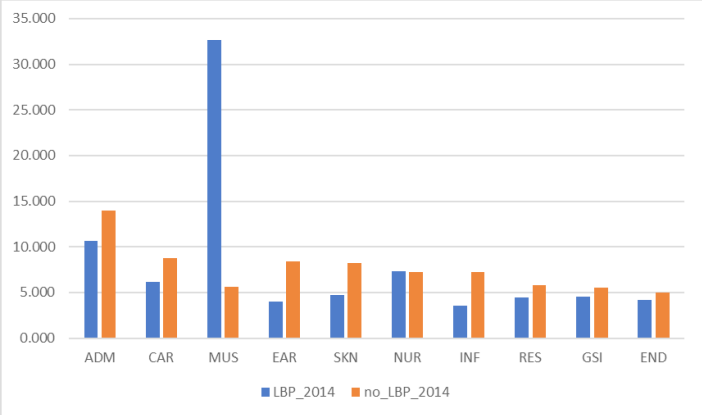


Figure 6: Top-ten MEDCs among patients with vs without low back pain, year 2014.

A comparison of the EDC distribution 2014 between the two populations is presented in Figure 7. The ten most frequent EDCs from each population are displayed (% of total EDC in each group).

EDC Code	EDC Description	LBP-14
MUS17	Musculoskeletal disorders, other	445
MUS14	Low back pain	248
ADM05	Administrative concerns and non-specific laboratory abnormalities	180
CAR14	Hypertension, w/o major complications	84
GSI01	Nonspecific signs and symptoms	69
NUR01	Neurologic signs and symptoms	61
ADM06	Preventive care	57
INF06	Viral syndromes	52

MUS15	Bursitis, synovitis, tenosynovitis	52
RES02	Acute lower respiratory tract infection	48
NUR21	Neurologic disorders, other	44
EAR11	Acute upper respiratory tract infection	40
MUS01	Musculoskeletal signs and symptoms	36
END04	Hypothyroidism	35
GSU10	Abdominal pain	32
GUR08	Urinary tract infections	31
SKN20	Dermatologic signs and symptoms	27
END06	Type 2 diabetes, w/o complication	26
PSY09	Depression	24
MUS03	Degenerative joint disease	23
PSY01	Anxiety, neuroses	23
RES05	Cough	22
SKN02	Dermatitis and eczema	20
ALL01	Allergic reactions	19
ALL04	Asthma, w/o status asthmaticus	18
EAR06	Otitis externa	18
EAR07	Wax in ear	18
CAR11	Disorders of lipid metabolism	17
CAR01	Cardiovascular signs and symptoms	16
GSU09	Nonfungal infections of skin and subcutaneous tissue	16

Table 3a: Patients with low back pain in numbers, year 2014.

EDC Code	EDC Description	no_LBP-14
ADM05	Administrative concerns and non-specific laboratory abnormalities	1788
CAR14	Hypertension, w/o major complications	1119
INF06	Viral syndromes	993
EAR11	Acute upper respiratory tract infection	809
ADM06	Preventive care	801
GSI01	Nonspecific signs and symptoms	665
NUR01	Neurologic signs and symptoms	544
RES02	Acute lower respiratory tract infection	492
MUS15	Bursitis, synovitis, tenosynovitis	425
GUR08	Urinary tract infections	394

END06	Type 2 diabetes, w/o complication	382
SKN02	Dermatitis and eczema	377
END04	Hypothyroidism	347
RES05	Cough	329
GSU10	Abdominal pain	303
ALL01	Allergic reactions	288
PSY01	Anxiety, neuroses	288
PSY09	Depression	282
EAR07	Wax in ear	274
SKN20	Dermatologic signs and symptoms	273
GSU09	Nonfungal infections of skin and subcutaneous tissue	262
EAR01	Otitis media	255
MUS01	Musculoskeletal signs and symptoms	232
ALL04	Asthma, w/o status asthmaticus	216
EYE07	Conjunctivitis, keratitis	208
CAR11	Disorders of lipid metabolism	200
NUR10	Sleep problems	192
INF09	Infections, other	168
NUR04	Vertiginous syndromes	167
PSY13	Adjustment disorder	167

Table 3b: Patients without low back pain in numbers, year 2014.

Table 3: EDC distribution 2014 – patients with vs without low back pain.

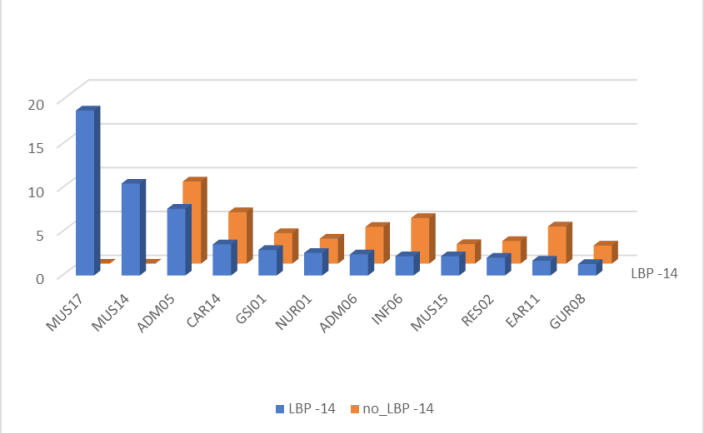


Figure 7: EDC distribution 2014 – most common clusters among patient with vs without low back pain.

Discussion

Our study showed that patients with LBP had a higher degree of multimorbidity compared to patients without LBP. Patients with LBP often have combinations of diagnoses with other musculoskeletal disorders more often than patients without LBP. Abdominal pain tends to be part of the multimorbidity of patients with LBP [15] as are some neurological signs and symptoms.

One limitation of our study was that just one PHCC has been examined with a relatively limited number of patients with LBP involved, less than 1,000 patients each year. Thus, we made no efforts to study specific correlations.

A possible strength of our study was that we were able to elucidate the multimorbidity patterns over a 3-year period following the same population all years. We found a robustness in terms of ACG patterns, although a longer follow-up period maybe would provide a more detailed view of multimorbidity in terms of types of morbidity involved, the ADGs, and maybe some changing patterns among the diagnosis clusters, the EDCs.

Further Studies

In an ongoing study we have identified more than 10,000 patients with LBP, enabling us to analyse various clusters of diagnoses (EDCs) to elucidate detailed patterns of multimorbidity. Variations between male and female patients might be of interest. Having data for four consecutive years, we will be able to study in what order the connecting diagnoses will appear.

This our study was designed with LBP disorders as a point of departure. It might be of interest to investigate multimorbidity identifying patient groups with other diseases as point of departure, such as depression, sleeping or neurological disorders. Furthermore, back pain might be studied as a trigger for pain in other parts of the body, not just localized to the spine.

Correlations by causality were not examined in this study. With a data set with more than 1 million patients we will be able to stratify the population into groups with various combinations of diseases.

Conclusions

Patients with LBP had more unique diagnoses and more various types of morbidity than patients without LBP. The degree of multimorbidity was higher among patients with LBP than in average, in terms of more complex combinations of diagnoses. The number of chronic diseases seemed not to be the most important factor. Instead, the variation of clusters of diagnoses had a great influence on the complexity, and the need for use of health care resources.

References

1. Starfield B (2006) Threads and yarns: weaving the tapestry of comorbidity. Ann Fam Med 4: 101-103.
2. Starfield B, Kinder K (2011) Multimorbidity and its measurement. Health Policy 103: 3-8.
3. Prados-Torres A, Calderón-Larrañaga A, Hancco-Saavedra J, Poblador-Plou B, van den Akker M (2014) Multimorbidity patterns: a systematic review. J Clin Epidemiol 67: 254-266.
4. Poblador-Plou B, van den Akker M, Vos R, Calderón-Larrañaga A, Metsemakers J, et al (2014) Similar multimorbidity patterns in primary care patients from two European regions: results of a factor analysis. PLoS One 9: e100375.
5. Wändell P, Carlsson AC, Wettermark B, Lord G, Cars T, et al (2013) Most common diseases diagnosed in primary care in Stockholm, Sweden, in 2011. Fam Pract 30: 506-513.
6. Olofsson H, Carlsson L, Bertilson BC (2018) Multimorbidity among Patients with Back Pain: A Study of Records at a Swedish Primary Health Care Centre, J Family Med Prim Care Open Acc: JFOA-118.
7. Smith SM, Soubhi H, Fortin M, Hudon C, O'Dowd T (2012) Managing patients with multimorbidity: systematic review of interventions in primary care and community settings. BMJ 345: e5205.
8. Valderas JM, Starfield B, Sibbald B, Salisbury C, Roland M (2009) Defining comorbidity: implications for understanding health and health services. Ann Fam Med 7: 357-363.
9. Hartvigsen J, Natvig B, Ferreira M (2013) Is it all about a pain in the back? Best Pract Res Clin Rheumatol 27: 613-623.
10. Nordeman L, Gunnarsson R, Mannerkorpi K (2012) Prevalence and characteristics of widespread pain in female primary health care patients with chronic low back pain. Clin J Pain 28: 65-72.
11. Schäfer I, Kaduszkiewicz H, Wagner HO, Schön G, Scherer M, et al Reducing complexity: a visualisation of multimorbidity by combining disease clusters and triads. BMC Public Health 14: 1285.
12. Jöud A, Petersson IF, Englund M (2012) Low back pain: epidemiology of consultations. Arthritis Care Res 64: 1084-1088.
13. Dong HJ, Wressle E, Marcusson J (2013) Multimorbidity patterns of and use of health services by Swedish 85-years-old: an exploratory study. BMC Geriatr 13: 120.
14. (2016) ACG System® Version 11.1 Applications Guide.
15. Bertilson BC, Heidermark A, Stockhaus M (2014) Irritable Bowel Syndrome-a Neurological Spine Problem. Br J Med Med Res 4: 4154-4168.

ACG		Yr 2014	
Code	**Description**	**no LBP**	**LBP**
0100	Acute Minor, Age 1	0.74	0.30
0200	Acute Minor, Age 2 to 5	2.55	0.30
0300	Acute Minor, Age > 5	20.81	9.91
0400	Acute Major	5.04	0.30
0500	Likely to Recur, w/o Allergies	8.53	18.45
0600	Likely to Recur, with Allergies	1.09	0.46
0700	Asthma	0.45	0.00
0800	Chronic Medical, Unstable	1.46	0.00
0900	Chronic Medical, Stable	9.66	0.15
1000	Chronic Specialty, Stable	0.22	0.30
1100	Eye/Dental	0.05	0.00
1200	Chronic Specialty, Unstable	0.08	1.83
1300	Psychosocial, w/o Psych Unstable	2.35	0.00
1400	Psychosocial, with Psych Unstable, w/o Psych Stable	0.16	0.00
1500	Psychosocial, with Psych Unstable, w/ Psych Stable	0.10	0.00
1600	Preventive/Administrative	6.55	0.00
1712	Pregnancy: 0-1 ADGs, not delivered	0.06	0.00
1721	Pregnancy: 2-3 ADGs, no Major ADGs, delivered	0.01	0.00
1722	Pregnancy: 2-3 ADGs, no Major ADGs, not delivered	0.10	0.15
1731	Pregnancy: 2-3 ADGs, 1+ Major ADGs, delivered	0.01	0.00
1741	Pregnancy: 4-5 ADGs, no Major ADGs, delivered	0.01	0.00
1742	Pregnancy: 4-5 ADGs, no Major ADGs, not delivered	0.02	0.15
1772	Pregnancy: 6+ ADGs, 1+ Major ADGs, not delivered	0.00	0.15
1800	Acute Minor and Acute Major	2.54	1.22
1900	Acute Minor and Likely to Recur, Age 1	0.20	0.15
2000	Acute Minor and Likely to Recur, Age 2 to 5	1.09	0.15
2100	Acute Minor and Likely to Recur, Age > 5, w/o Allergy	4.74	12.35
2200	Acute Minor and Likely to Recur, Age > 5, with Allergy	0.86	0.46
2300	Acute Minor and Chronic Medical: Stable	4.06	1.07
2500	Acute Minor and Psychosocial, w/o Psych Unstable	1.27	0.61
2600	Acute Minor and Psychosocial, with Psych Unstable, w/o Psych Stable	0.12	0.00
2700	Acute Minor and Psychosocial, with Psych Unstable and Psych Stable	0.05	0.00
2800	Acute Minor and Likely to Recur	1.03	3.05
3000	Acute Minor/Acute Major/Likely to Recur, Age 2 to 5	0.05	0.00
3100	Acute Minor/Acute Major/Likely to Recur, Age 6 to 11	0.10	0.00
3200	Acute Minor/Acute Major/Likely to Recur, Age > 11, w/o Allergy	0.96	3.66
3300	Acute Minor/Acute Major/Likely to Recur, Age > 11, with Allergy	0.22	0.30
3400	Acute Minor/Likely to Recur/Eye & Dental	0.01	0.00
3500	Acute Minor/Likely to Recur/Psychosocial	0.51	1.68
3600	Acute Minor/Acute Major/Likely Recur/Eye & Dental	0.76	2.29

3700	Acute Minor/Acute Major/Likely Recur/Psychosocial	0.14	0.91
3800	2-3 Other ADG Combinations, Age < 18	0.65	0.15
3900	2-3 Other ADG Combinations, Males Age 18 to 34	0.58	1.22
4000	2-3 Other ADG Combinations, Females Age 18 to 34	1.20	0.91
4100	2-3 Other ADG Combinations, Age > 34	12.62	19.21
4210	4-5 Other ADG Combinations, Age < 18, no Major ADGs	0.07	0.00
4310	4-5 Other ADG Combinations, Age 18 to 44, no Major ADGs	0.71	1.52
4320	4-5 Other ADG Combinations, Age 18 to 44, 1+ Major ADGs	0.23	1.22
4330	4-5 Other ADG Combinations, Age 18 to 44, 2+ Major ADGs	0.02	0.00
4410	4-5 Other ADG Combinations, Age > 44, no Major ADGs	1.84	3.96
4420	4-5 Other ADG Combinations, Age > 44, 1+ Major ADGs	1.85	4.12
4430	4-5 Other ADG Combinations, Age > 44, 2+ Major ADGs	0.43	0.91
4810	6-9 Other ADG Combinations, Females, Age 18 to 34, no Major ADGs	0.03	0.15
4820	6-9 Other ADG Combinations, Females, Age 18 to 34, 1+ Major ADGs	0.02	0.15
4910	6-9 Other ADG Combinations, Age > 34, 0-1 Major ADGs	0.51	4.12
4920	6-9 Other ADG Combinations, Age > 34, 2 Major ADGs	0.19	1.52
4930	6-9 Other ADG Combinations, Age > 34, 3 Major ADGs	0.08	0.30
5040	10+ Other ADG Combinations, Age > 17, 0-1 Major ADGs	0.00	0.15
5312	Infants: 0-5 ADGs, no Major ADGs, normal birth weight	0.20	0.00

Appendix A: ACG distribution for patients with vs without low back pain at the end of the period studied.

MEDC		**Patients with LBP**			**Patients without LBP**			**All pat**
Code	**Description**	**2012**	**2013**	**2014**	**2012**	**2013**	**2014**	**2014**
ADM	Administrative	205	247	213	3077	3391	2470	2683
CAR	Cardiovascular	97	125	123	1611	1657	1543	1666
MUS	Musculoskeletal	525	548	656	1299	1308	998	1654
EAR	Ear, Nose, Throat	92	82	80	1745	1771	1494	1574
SKN	Skin	86	88	95	1537	1579	1456	1551
NUR	Neurologic	75	110	147	753	991	1285	1432
INF	Infections	72	49	71	1259	1340	1285	1356
RES	Respiratory	89	73	89	1343	1264	1031	1120
GSI	General Signs and Symptoms	77	98	91	896	1025	982	1073
END	Endocrine	56	73	84	713	826	885	969
GSU	General Surgery	45	51	62	727	874	735	797
PSY	Psychosocial	62	56	59	771	800	707	766
GUR	Genito-urinary	48	54	55	602	679	673	728
ALL	Allergy	24	29	46	515	466	585	631
GAS	Gastrointestinal/Hepatic	45	39	39	439	449	452	491
EYE	Eye	20	18	23	349	370	349	372
HEM	Hematologic	11	7	15	136	161	155	170
REC	Reconstructive	7	5	7	163	197	143	150
RHU	Rheumatologic	15	14	15	113	133	127	142
NUT	Nutrition	6	9	14	52	70	102	116

REN	Renal	4	5	8	33	47	59	67
FRE	Female Reproductive	4	6	7	31	53	54	61
MAL	Malignancies	5	7	4	66	78	49	53
TOX	Toxic Effects and Adverse Events	2	1	1	26	40	33	34
DEN	Dental	3	4	3	23	34	24	27
GTC	Genetic	0	0	0	9	8	7	7
NEW	Neonatal	0	0	0	0	2	3	3

Appendix B: MEDC distribution for patients with vs without low back pain.