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# **Influence of Diabetes Mellitus (DM) on Health Care Resources Usage in Multimorbid Patients**

**Protocol proposal**



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# Background

- Type 2 diabetes is one of the most common chronic conditions diagnosed in multimorbid subjects.
- Currently, integrated diabetes care programs focus on diabetes-related complications, omitting other chronic conditions frequently diagnosed in patients with diabetes.
- Integrated data on diabetes care costs in multimorbid subjects and their effect on overall usage of health care resources are scarce.

# Estimating the prevalence of comorbid conditions and their effect on health care costs in patients with diabetes mellitus in Switzerland

Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy 2014:7

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**Results:** A total of 932,612 persons, including 50,751 patients with diabetes, were enrolled. The most frequent potentially diabetes- and nondiabetes-related comorbidities in patients older than 64 years were cardiovascular diseases (91%), rheumatologic conditions (55%), and hyperlipidemia (53%). The mean total health care costs for diabetes patients varied substantially by comorbidity status (US\$3,203–\$14,223). Patients with diabetes and more than two comorbidities incurred US\$10,584 higher total costs than patients without comorbidity. Costs were significantly higher in patients with diabetes and comorbid cardiovascular disease (US\$4,788), hyperlipidemia (US\$2,163), hyperacidity disorders (US\$8,753), and pain (US\$8,324) compared with in those without the given disease.

**Conclusion:** Comorbidities in patients with diabetes are highly prevalent and have substantial consequences for medical expenditures. Interestingly, hyperacidity disorders and pain were the most costly conditions. Our findings highlight the importance of developing strategies that meet the needs of patients with diabetes and comorbidities. Integrated diabetes care such as used in the Chronic Care Model may represent a useful strategy.

# The aims of this study

## **I. To assess health care resources usage in the following groups of patients:**

- Patients with one chronic disease – diabetes mellitus (optional)
- Patients with one chronic disease without diabetes mellitus (optional)
- Multimorbid patients (multimorbidity defined as the coexistence of two or more chronic conditions in the same person) with diabetes included.
- Multimorbid patients (multimorbidity defined as the coexistence of two or more chronic conditions in the same person) without diabetes.

# The aims of this study (cont.)

## II. Within and between the described patient groups:

- To assess the rate of GP's and specialists ambulatory care visits and home visits.
- To assess frequency of hospitalisations, rehospitalisations within 30 days, the time of stay in the hospital.
- To identify 10 most frequent chronic conditions in multimorbid patients with and without diabetes.
- To analyse the data in age and gender groups, rural and urban population.

# The aims of this study (cont.)

**In case the data are available and databases of other partners can be consolidated:**

- III. To analyse health care costs within and between the groups:
- Overall patient's care cost per year.
  - Cost of reimbursed medications for ambulatory treatment of chronic diseases.
  - Cost for hospital stays.

# The list of the selected chronic conditions associated with ICD-10-AM diagnostic codes

Chronic conditions with ICD-10-AM diagnostic codes	
1	Cancer C00–C96
2	Anaemia D50
3	Hypothyroidism E02; E03; E89.0
4	Diabetes E10.0–E10.9; E11.0–E11.9
5	Obesity E66
6	Dyslipidaemia E78
7	Dementia F00.0–F00.9; G30.0–G30.9; F01.0 - F01.9; F02.0–F02.8; F03
8	Mental disorders F20.0–F20.9; F30.0–F39; F40.00–F40.9; F41.0–F41.9; F42.0–F42.9; F43.0–F43.9
9	Parkinson disease G20
10	Multiple sclerosis G35
11	Epilepsy G40.00–G40.91
12	Sleep apnoea G47.3
13	Back Pain G54.1; G54.4; G55.1; M51
14	Glaucoma H40–H42
15	Blindness H53–H54
16	Hearing loss H90.0– H90.8; H91.0–H91.9
17	Hypertension I10–I15
18	Ischemic heart disease I20–I25
19	Arrhythmias I44–I49
20	Heart failure I50.0–I50.9
21	Intracranial bleeding I61–I62
22	Stroke I63 - I64; I69
23	Chronic obstructive pulmonary disease J44.0–J44.9; J96
24	Asthma J45.0–J45.9
25	Inflammatory bowel disease K50; K51
26	Psoriasis L40.0–L40.9
27	Rheumatoid arthritis M05–M06
28	Gout M10.0–M10.99
29	Osteoarthritis M15–M19
30	Systemic lupus erythematosus M32
31	Osteoporosis M80–M82
32	Renal failure N18–N19

## Lithuanian database:

- Lithuanian National Health Insurance Fund under the Ministry of Health (NHIF) database.

- Period : from the 1st of January 2012 to the 30th of June 2014

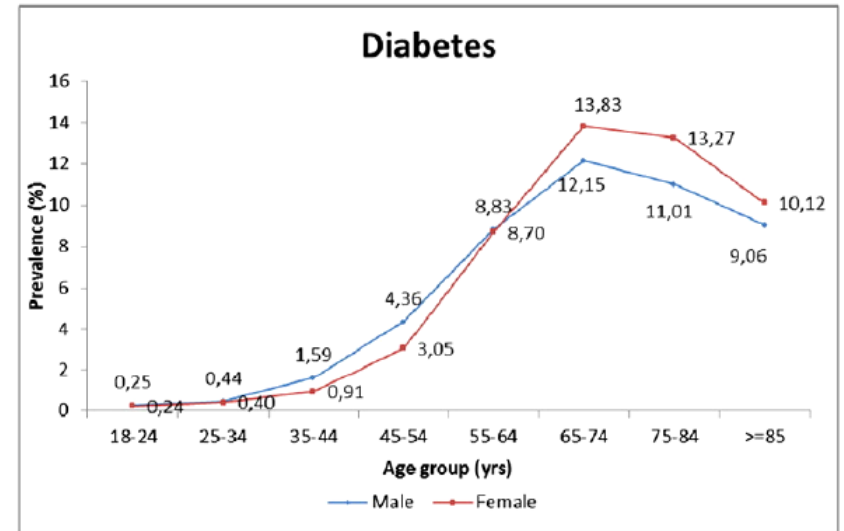
- Data extracted:

- demographic information (gender, age, place of residence)
- the use of primary and secondary healthcare services (overall and home visits, consultations of PC physicians and specialists, hospitalisations, rehospitalisations, length of hospital stay)
- prescriptions of reimbursed medications for chronic diseases

# Prevalence and structure of chronic conditions in Lithuanian population

**Table 3**  
Distribution of diseased people into ten most frequent chronic condition groups and the prevalence of these chronic conditions in Lithuanian adult population.

Top	Chronic condition	Adults with chronic conditions (N = 452,769)		Lithuanian adult population (N = 2,410,825)
		No. of diseased people	Percentage of diseased people	Prevalence in population
1	Hypertension	387,781	85.65%	16.08%
2	Ischaemic heart disease	304,698	67.3%	12.64%
3	Heart failure	190,791	42.14%	7.91%
4	Arrhythmias	177,402	39.18%	7.36%
5	Diabetes	124,416	27.48%	5.16%
6	Osteoarthritis	117,972	26.06%	4.89%
7	Back pain	101,406	22.4%	4.21%
8	Dyslipidaemia	98,082	21.66%	4.07%
9	Stroke	58,858	13.00%	2.44%
10	Cancer	56,260	12.43%	2.33%

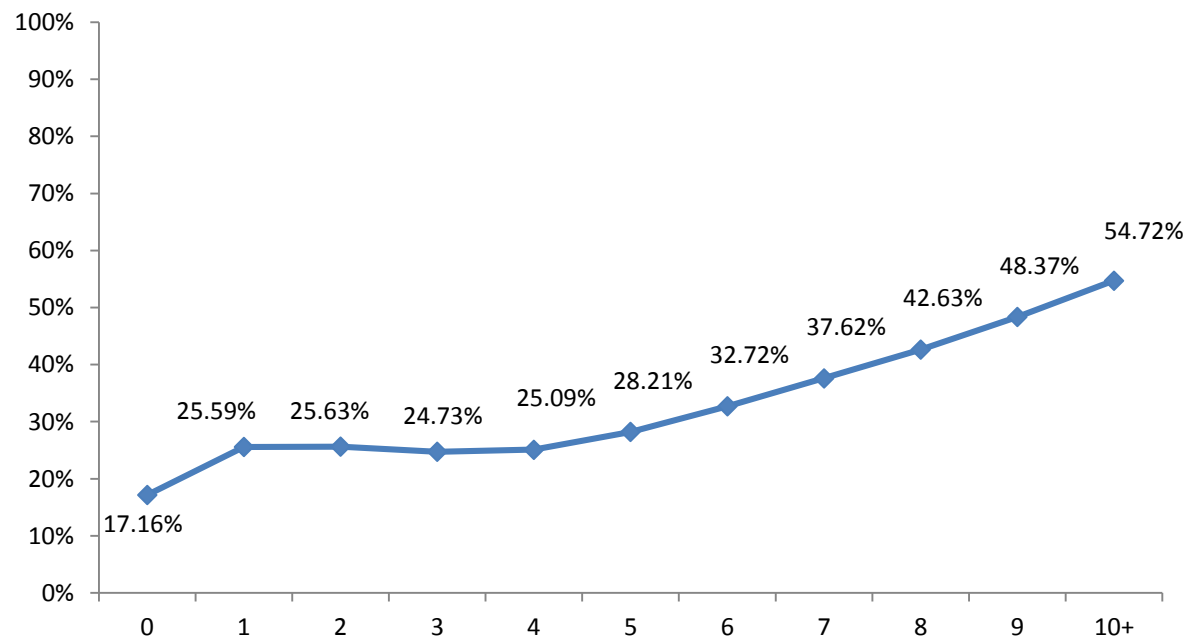




# TOP 10 chronic conditions in the groups with and without DM

Chronic condition	DM-		Chronic condition	DM+	
<b>Hypertension</b>	271434	88,07%	<b>Hypertension</b>	112756	93,78%
<b>Ichemic heart disease</b>	241990	78,52%	<b>Ichemic heart disease</b>	57880	48,14%
<b>Heart failure</b>	148258	48,11%	<b>Heart failure</b>	42449	35,30%
Arrythmias	142731	46,31%	Osteoarthritis	34026	28,30%
Osteoarthritis	83663	27,15%	Back Pain	28950	24,08%
Back Pain	71792	23,29%	Arrythmias	27843	23,16%
Dislipidemia	69930	22,69%	Dislipidemia	27842	23,16%
Stroke	44930	14,58%	<b>Obesity</b>	24638	20,49%
Cancer	40767	13,23%	<b>Glaucoma</b>	18326	15,24%
COPD	38628	12,53%	Cancer	15283	12,71%

# Proportion of DM in multimorbid subjects

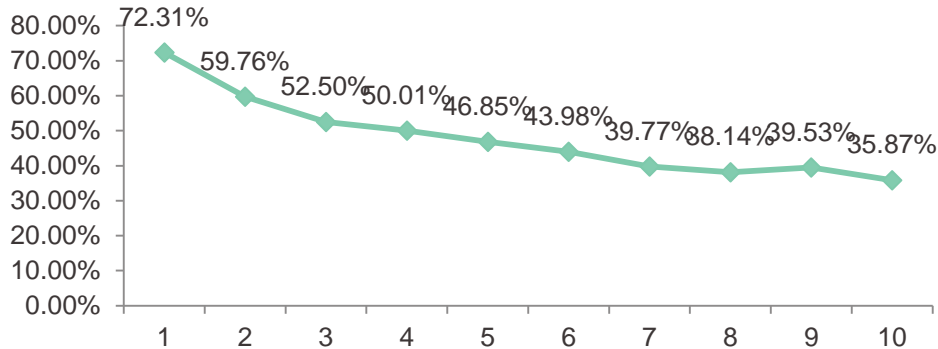


# Cost of medications in DM+ group

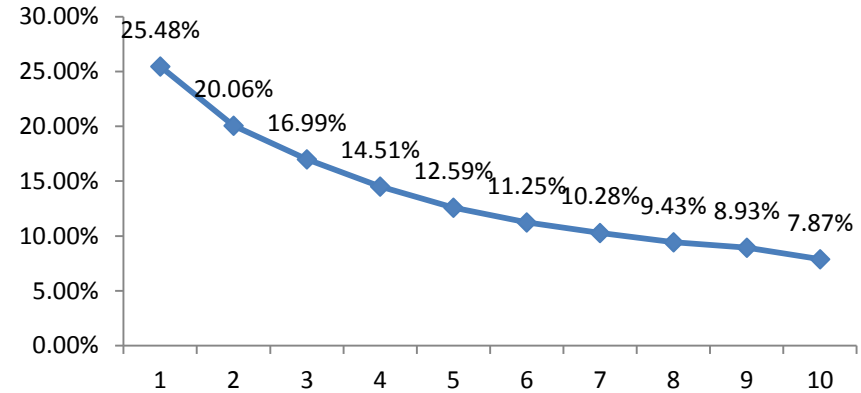
Proportion of reimbursement for DM – 49.45%  
Diabetes treatment reimbursement – 100%

Average patient's co-payment  
for DM treatment – 14.29%

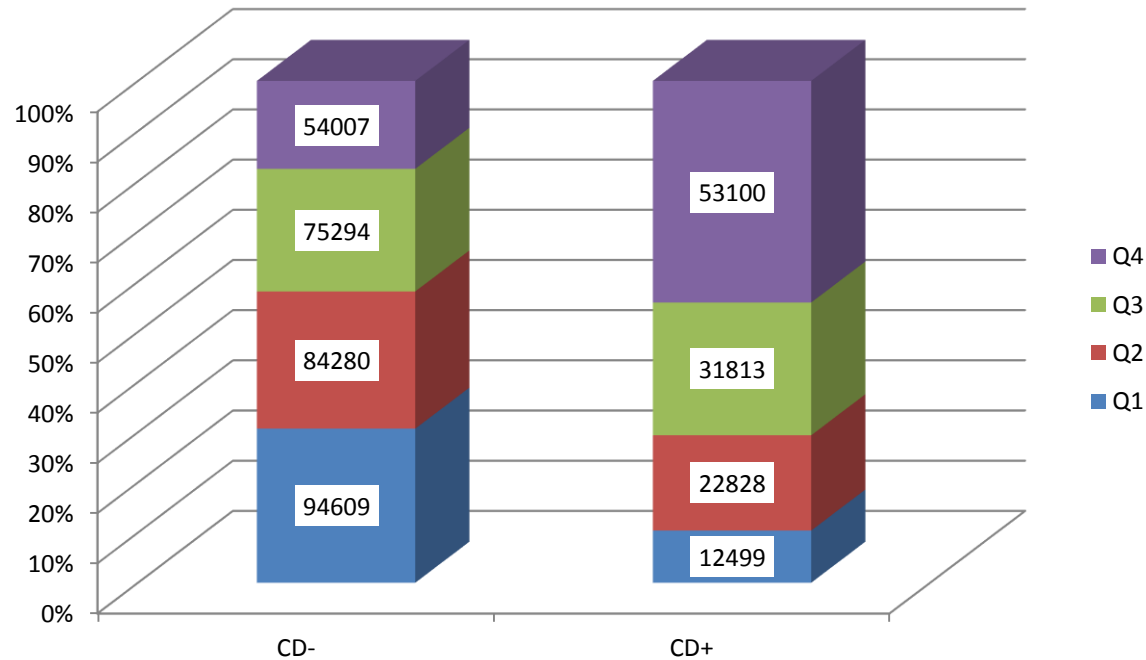
## Proportion of costs of reimbursed medications for DM treatment



## Proportion of patient's co-payment for DM treatment



# Proportion of patients in relation to overall treatment costs in DM+ and DM- multimorbid groups



# Summary of Lithuanian data sample (452,769) analysis

- 27,5 % of patients with at least one chronic condition have diabetes.
- Proportion of presence of diabetes in multimorbid subjects varies from 26 to 55% depending on the number of chronic conditions.
- Comparing DM+ and DM- groups:
  - Proportion of younger patients with multimorbidity and the number of chronic conditions is higher in DM+ group
  - The prevalence of comorbidities is higher in DM+ group
  - Number of primary and outpatient visits is higher in DM+ group
  - Overall and reimbursed treatment costs are significantly higher in DM+ group irrespectively of age and number of concomitant diseases

# The Joint Action on Chronic Diseases and Promoting Healthy Ageing across the Life Cycle (JA-CHRODIS)\*



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