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Epidemiological analyses for Clinical Practice Guideline focused on the diabetic patients treated with insulin

The use of epidemiological analyses in Clinical Practice Guideline development focused on the diabetic patients treated with insulin

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**Masaryk University
GRADE
Centre**



**Cochrane
Czech Republic**



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**M U N I
M E D**

Disclosure

Speaker Name: Andrea Pokorná

I have the following financial interest or relationship(s) to disclose with regard to the subject matter of this presentation:

I am the core staff of the Czech National Centre for Evidence-Based Healthcare and Knowledge Translations (CEBHC-KT) which consist of three parts: Cochrane Czech Republic, Masaryk University Grade Centre and the Czech Republic Centre for Evidence-Based Healthcare: The Joanna Briggs Institute Centre of Excellence.

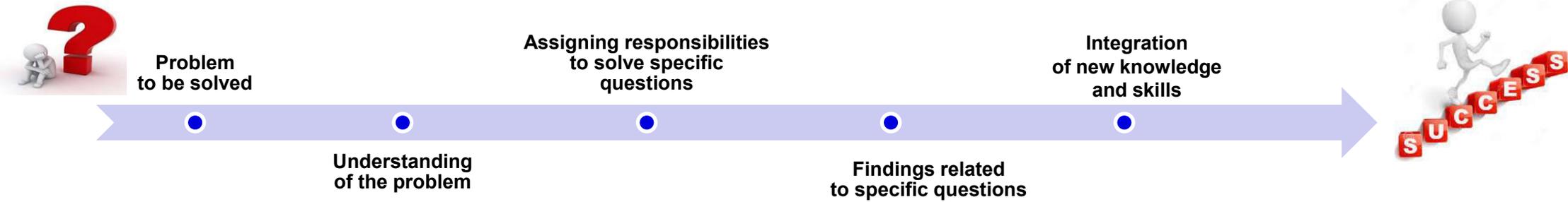
Employment:

Masaryk University, Faculty of Medicine, Department of Nursing and Institute of Biostatistics and Analyses, Brno, Czech Republic + CEBHC-KT.

Content of the presentation



- Basic facts about diabetes
- Description of the available data about patients with diabetes in NHIS
- The pros and cons /limitation/ of data usage in CPG development
- Need for accurate interpretation of health statistic data
- Conclusion



Facts about diabetes mellitus

- The prevalence of diabetes is on the rise worldwide especially in developed countries.
- The aim of glucose management in all types of diabetes is to minimize chronic and acute complications associated with diabetes.
- All patients with type 1 diabetes mellitus (T1DM) require insulin.
- Main areas of technology advances in diabetes are:
 - continuous subcutaneous insulin infusion (CSII)
 - continuous glucose monitoring (CGM) systems
- Treatment of patients with diabetes requires a multidisciplinary approach and a good description of the patient's „passage“ in the health care system.

the high risk of heterogeneity of care and the need to standardize procedures

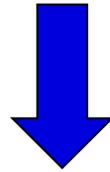
it is important to analyse epidemiological situation during CPG development

analyses allow us to monitor the effect of the CPG after its implementation

MAIN AIM: to analyse epidemiology of prevalence and incidence of diabetes mellitus and use of continuous subcutaneous insulin infusion (CSII) to inform development of CPG in the Czech Republic in this area.

Methodology – data sources and analyses

- National Health Information System – special national registers



- National Register of Reimbursed Health Services (NRRHS)

2015 – 2017

- Annual report type A (Ministry of Health) 1-01: for Diabetology

(A MH 004) 2007 – 2017 (validation source)

Criteria for patients identification

Patients with T1DM were identified by following criteria:

- at least once in given year a diagnosis of E10.0 – E10.9 was reported by diabetologist (specialization 103).
- the diagnosis of E11.0-E11.9 were not given in the whole time frame (2015 – 2017) by diabetologist.
- because of potential source of bias, diagnosis E10.0 – E10.9 and E11.0-E11.9 diagnosed by physicians with other specializations were not taken into account.

Data NRRHS
2015

Data NRRHS 2016:
identified **61 553** person with T1DM
person without T2DM diagnose in 2015, 2016 and 2017 reported by diabetologist

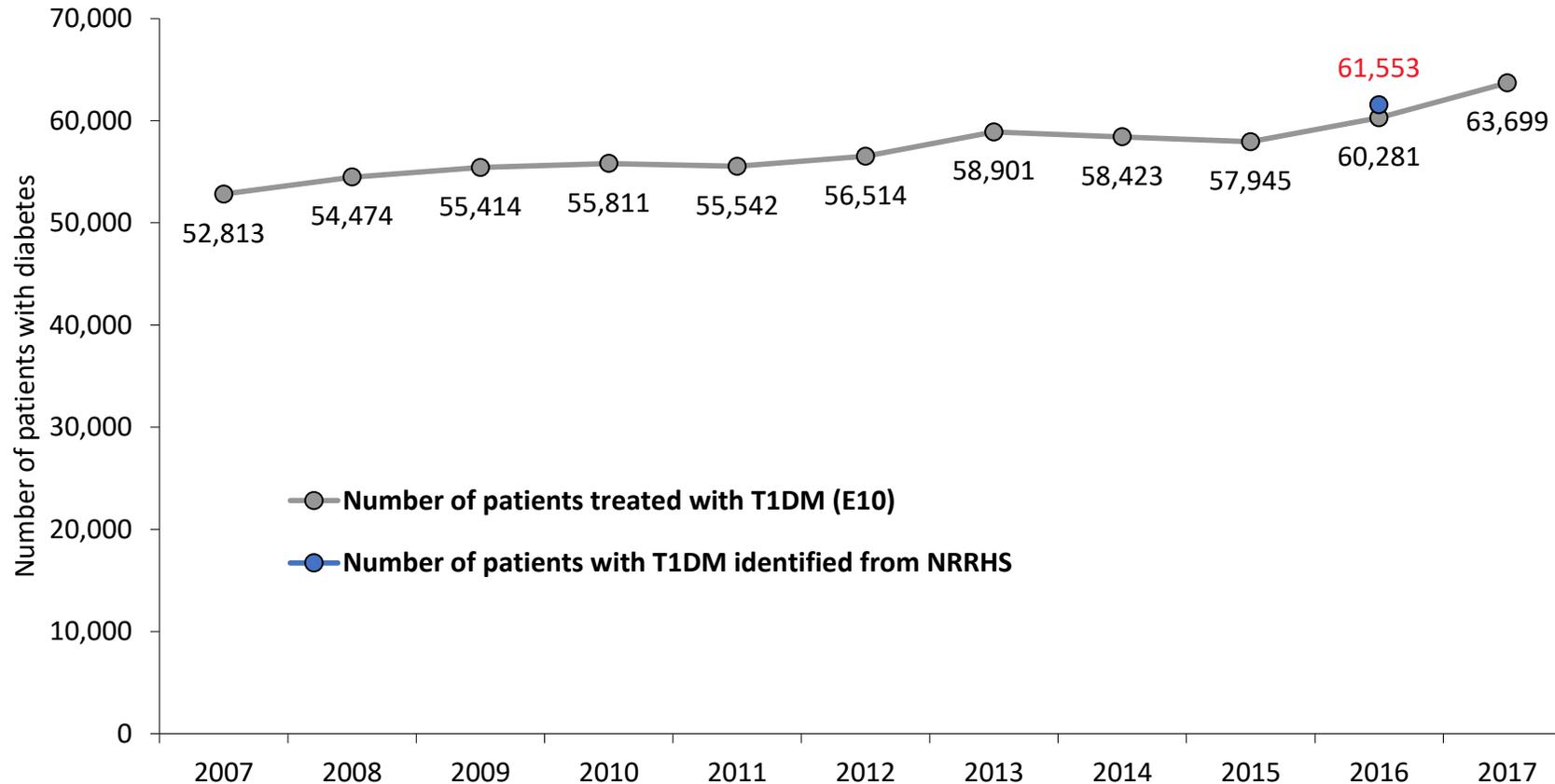
Data NRRHS
2017

Only the population of persons with T1DM identified in 2016 is analysed

There are available records for the cohort from the previous (2015) and the following year (2017) on the basis of which we can verify that for people with T1DM was not reported also a diagnosis of T2DM by diabetologist.

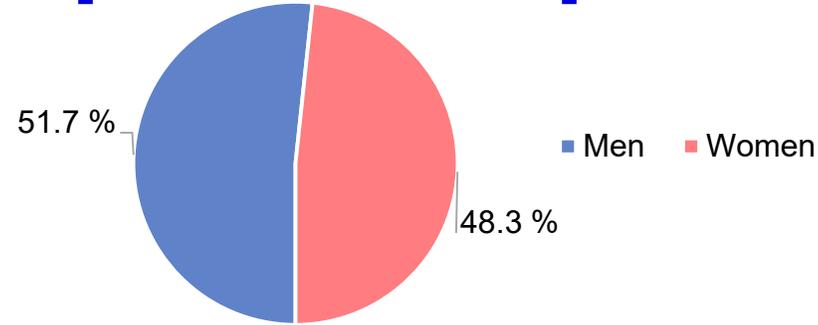
Prevalence of T1DM in the Czech Republic

Estimation of T1DM prevalence from NRRHS data compared to annual report A (MZ) 1-01 data: Diabetology (A004)



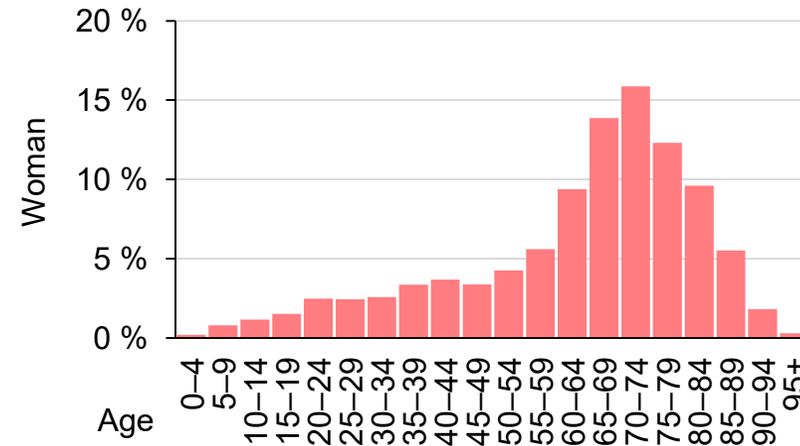
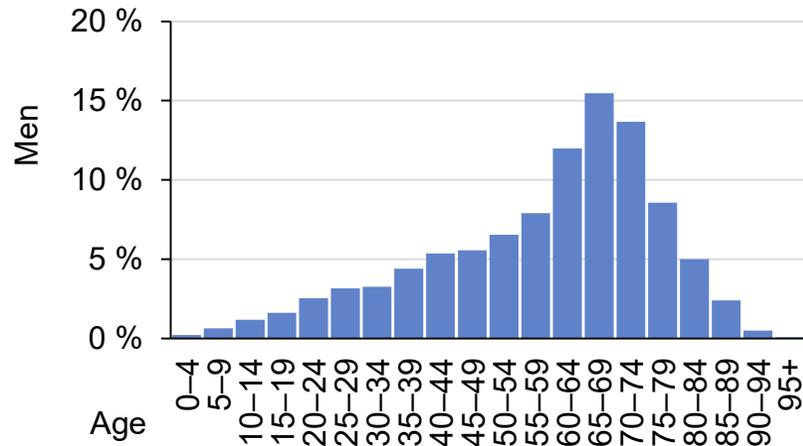
NRRHS / výkaz A004 (%)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
	-	-	-	-	-	-	-	-	-	102,1 %	-

Demographic profile of patients with T1DM



Men:	N (2016)	Mean (SD)	Median (IQR)
Age	31 813	58,3 (18,1)	63 (47; 71)

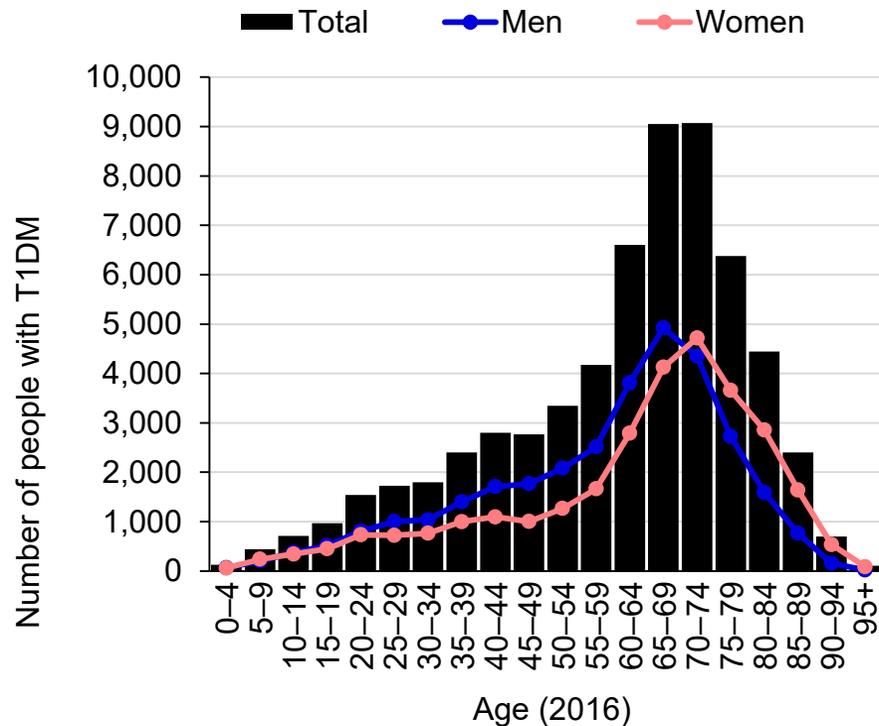
Women:	N (2016)	Mean (SD)	Median (IQR)
Age	29 740	62,9 (19,2)	68 (54; 76)



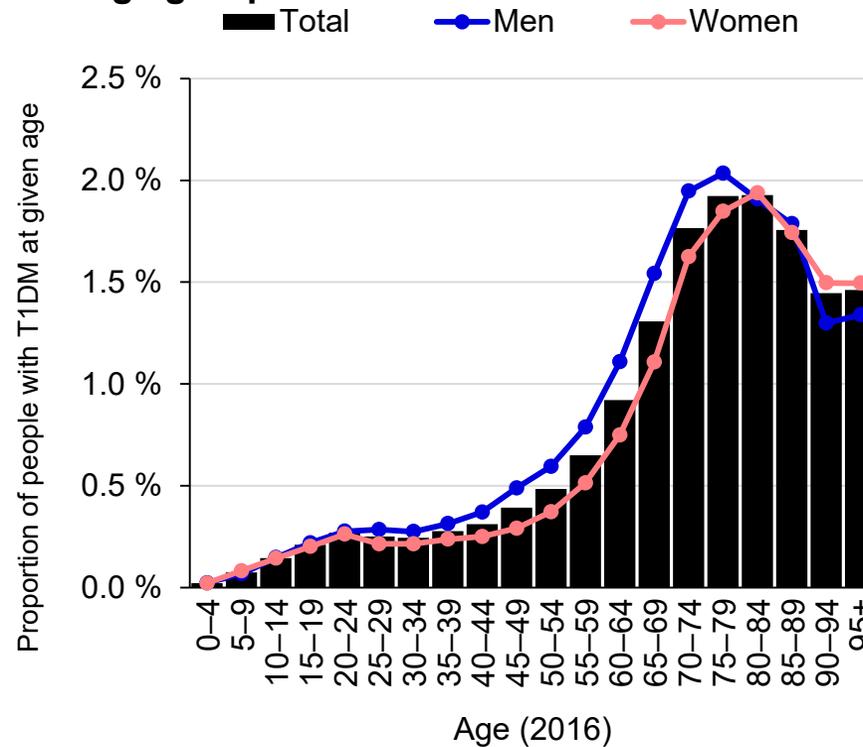
52% of reported cases with type 1 diabetics are male, 48% are female. Most T1DM are aged 60-79 years old. The average age of men is 4.6 years below the average age of women (58 vs. 63 years).

Age-specific prevalence of type 1 diabetes mellitus (T1DM)

Number of people with T1DM at given age



The proportion of persons with T1DM in relation to the whole population of the Czech Republic in each age group



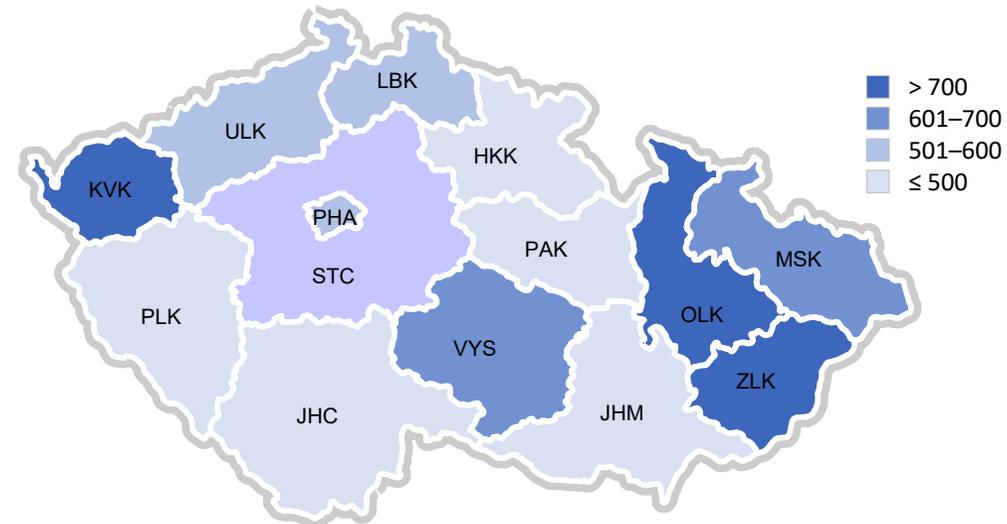
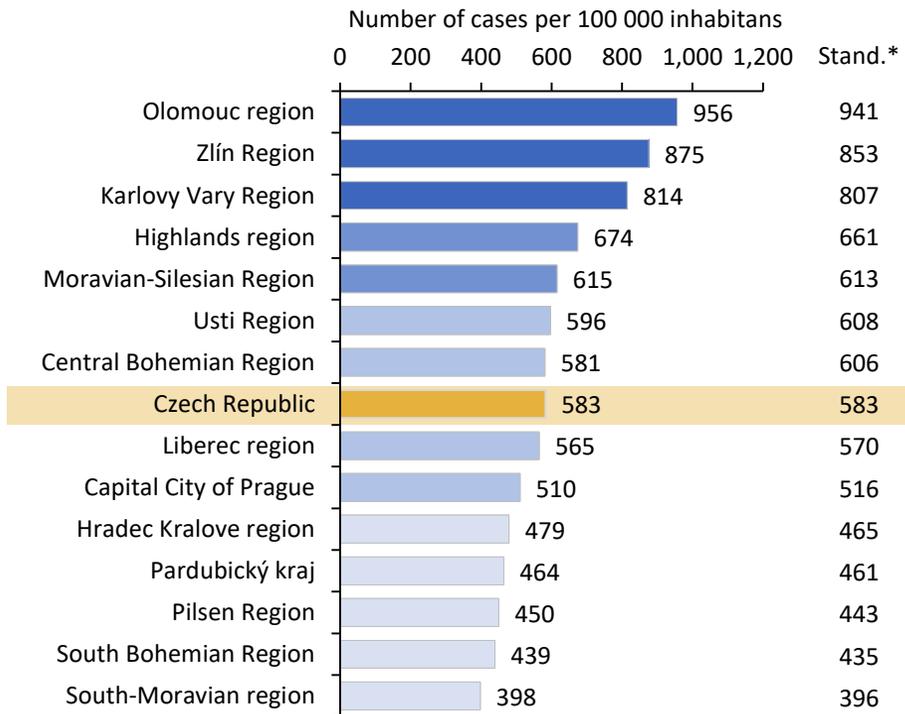
Expert validation is needed

The number and proportion of cases in the population are increasing with age - over the age of 70, DM1 occurs in more than 1.5% of the population of the Czech Republic. The highest increase in age-specific prevalence for T1DM is between 50 - 74 years. For men, the highest absolute number is in the 65 - 69 age group, for women between 70 and 74 years of age.

Number of T1DM patients by region of residence in relation to the population of the region

Number of people with DM1 per 100,000 inhabitants of the region:

Data source: NRHZS 2015-2017; persons with DM1 in 2016 (N = 61,553), residence is not listed / out of the Czech Republic for 310 persons (0.5%)



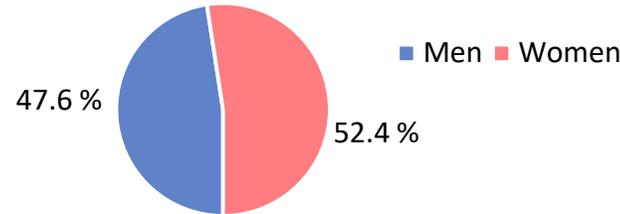
* The age-standardized value takes into account the differences in the age structure of the inhabitants of individual regions, eg. it gives the theoretical number of cases per 100 000 inhabitants of the given region in the situation where the age structure of the inhabitants of all regions is the same. The entire Czech Republic is considered the reference population.

According to NRRHS, T1DM is **recorded** in the Czech Republic with a frequency of 583 cases per 100,000 inhabitants (data for 2016). The highest occurrence with regard to the population is in the Olomouc, Zlín and Karlovarský regions (0.8-1.0% of the population in the region), while the lowest number of **recorded** cases is in the South Moravian Region (0.4% of the population in the region), namely even after age-standardization.

Demographic profile of people with T1DM treated with CSII (continuous subcutaneous insulin infusion)

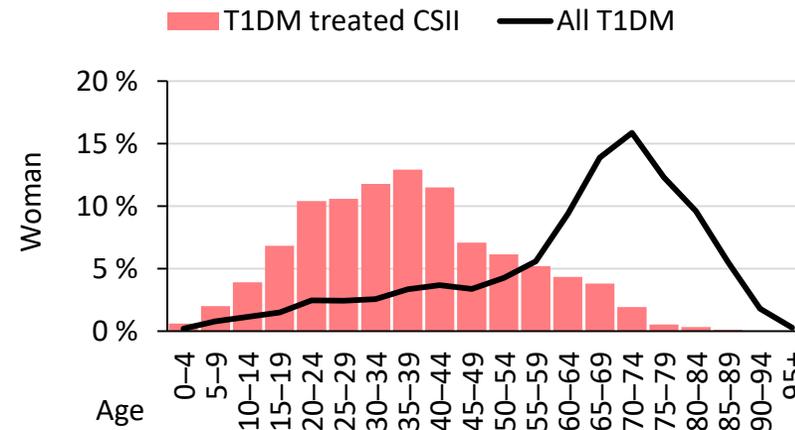
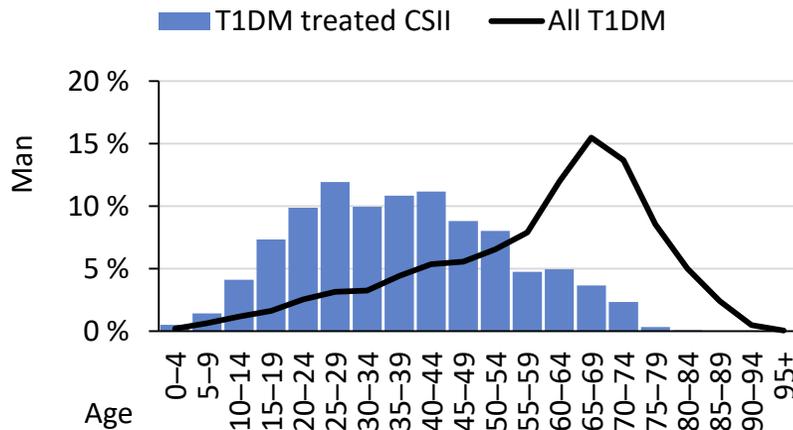
Data source: NRHYS 2015-2017; persons with DM1 in 2016 (N = 61,553)

Gender and age structure of persons with DM1 in 2016 who were treated with CSII (N = 5 011) according to available records in NRRHS data:



Men: N (2016)	Mean (SD)	Median (IQR)
Age 2 384	37,6 (16,0)	37 (25; 49)

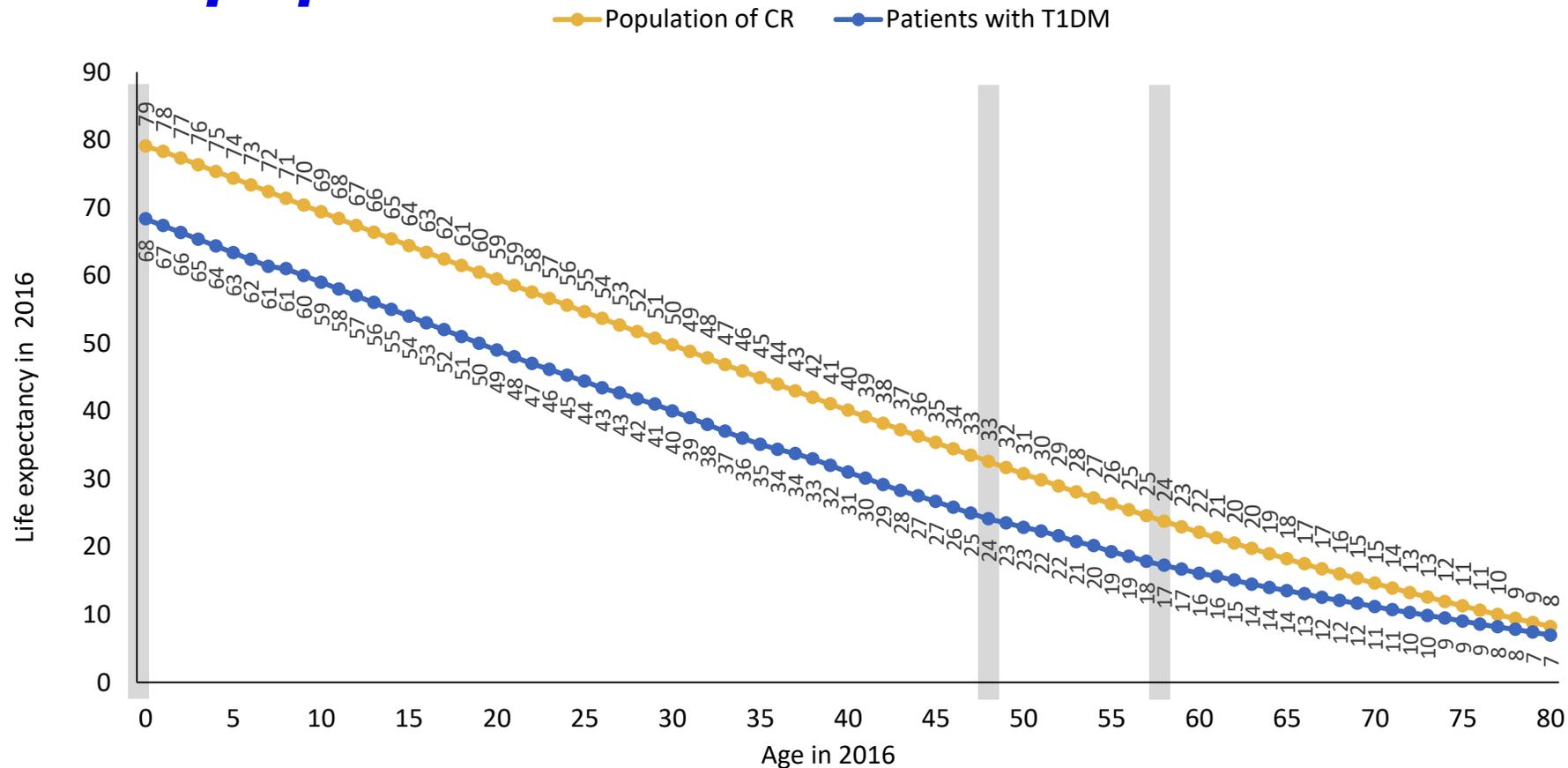
Women: N (2016)	Mean (SD)	Median (IQR)
Age 2 627	37,2 (16,1)	36 (25; 47)



Expert validation is needed

The distribution of the reported T1DM is almost the same in the case of diabetics: 48% of the type 1 diabetics treated with CSII are males, 52% are women. The age structure of diabetics treated with CSII is significantly different from the overall age structure of DM1, as CSII treatment is particularly prevalent in diabetics under the age of 50, which may be related to both higher literacy and IT literacy of younger patients but also to the availability of CSII and traditional approaches in elderly patients (established and appropriate treatment). The aspect of influencing as required by an intensified treatment regimen can not be identified from available data.

Life expectancy in patients with T1DM compare to general population in 2016



Expert validation is needed

The life expectancy in patients with T1DM is lower than in the whole population, but the difference is reduced with the diabetic burden (age of diagnose). In patients with T1DM from the earliest age the life expectancy is about 11 years lower than in the general population. The life expectancy of the 50-year-old patient with T1DM is 8 years shorter (23 vs. 31 years), while in the patients aged of 60 years life expectancy is shorter by 6 years (16 vs. 22 years). These results are consistent with the Rawshani study (2018), These results are consistent with the findings of the Rawshani study (2018) when a diagnosis of T1DM is made before the 10th year of life it results in a loss of 16 years of life, in the case of a diagnosis of T1DM between the 26 - 30year of life, life expectancy is about 10 years shorter compared to a cohort of patients without T1DM (direct numerical comparison of lost life years, however, must be made taking into account different calculation methodology).

Araz Rawshani, Sattar, N, Franzén S, Rawshani A, Hattersley AT, Svensson, A et al. (2018) Excess mortality and cardiovascular disease in young adults with type 1 diabetes in relation to age at onset: a nationwide, register-based cohort study. Lancet, Volume 392, issue 10146, P477-486.

Conclusion

- Number of patients with T1DM is increasing in the Czech Republic with no significant gender difference.
- Life expectancy is about 11 years lower in T1DM population.
- From 61533 patients with T1DM majority (81%) were reported with acute and chronic complications in 2016.
- Only 5011 of this patients were reported with CSII.



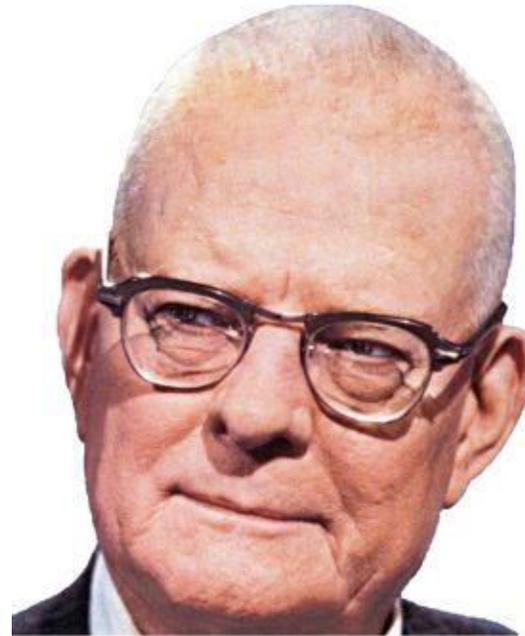
In epidemiological analyses, it is necessary to cooperate with experts, to properly describe sources, to know their limits and to be able to correctly interpret data, to identify influencing factors and potential bias....

Thank you for your attention

In God we trust.
All the others must bring
data.

If you can't describe
what you are doing
as a process you don't
know what you are doing.

Without data you are just
another person with an
opinion.



W. E. Deming