

# IPOGLICEMIE e CHETOACIDOSI GRAVI NEI DIABETICI stima dell'impatto economico tramite uno studio di popolazione

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Università Milano-Bicocca

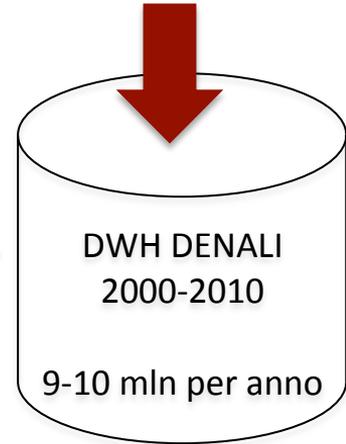
# OBIETTIVO DELLO STUDIO

- ◆ Impatto economico su base di popolazione tramite dati amministrativi
  - ◆ HYPO e DKA in T1DM
- ◆ Estensione dello studio
  - ◆ Sopravvivenza HYPO in DM (lavori in corso)
  - ◆ Sopravvivenza HYPO vs AMI e PAD (lavori in corso)

# Data Warehouse DENALI (RL e Univ. Milano-Bicocca)

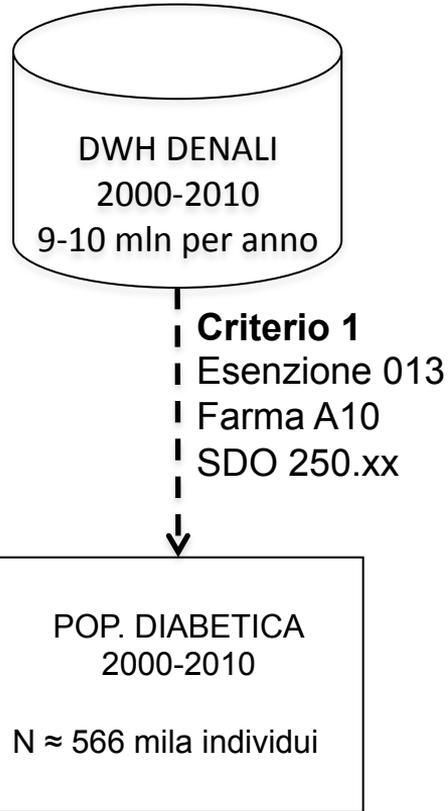
- Dati amministrativi Regione Lombardia
  - Esenzioni
  - Farmaceutica
  - Schede di Dimissione Ospedaliera (SDO)
  - Specialistica ambulatoriale
  - Anagrafica: data di nascita, sesso, data decesso,...

Software DENALI

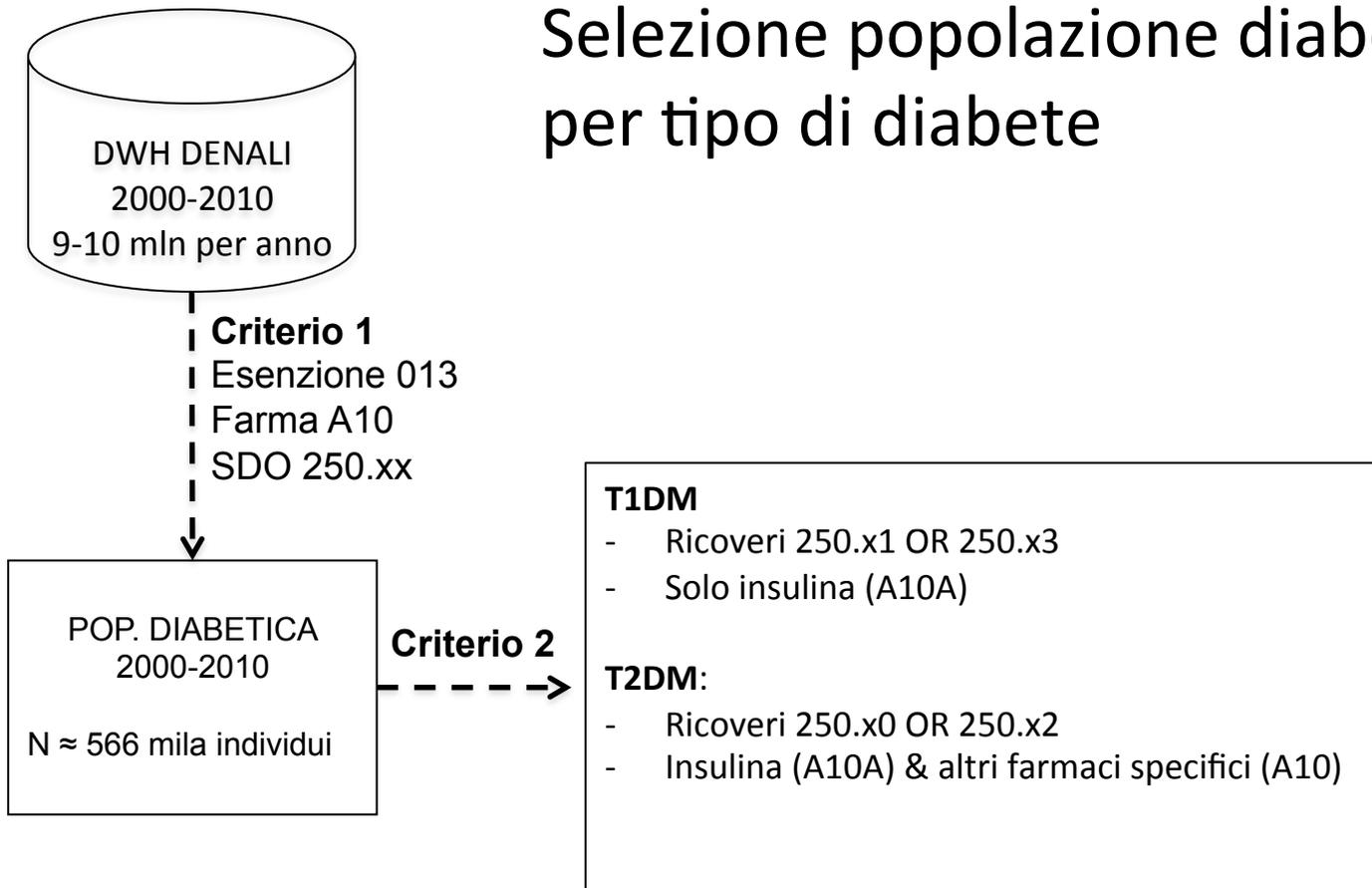


- ◆ Storia sanitaria degli assistiti RL attraverso record linkage probabilistico
- ◆ Accesso ai dati anonimizzati nel rispetto delle leggi sulla privacy

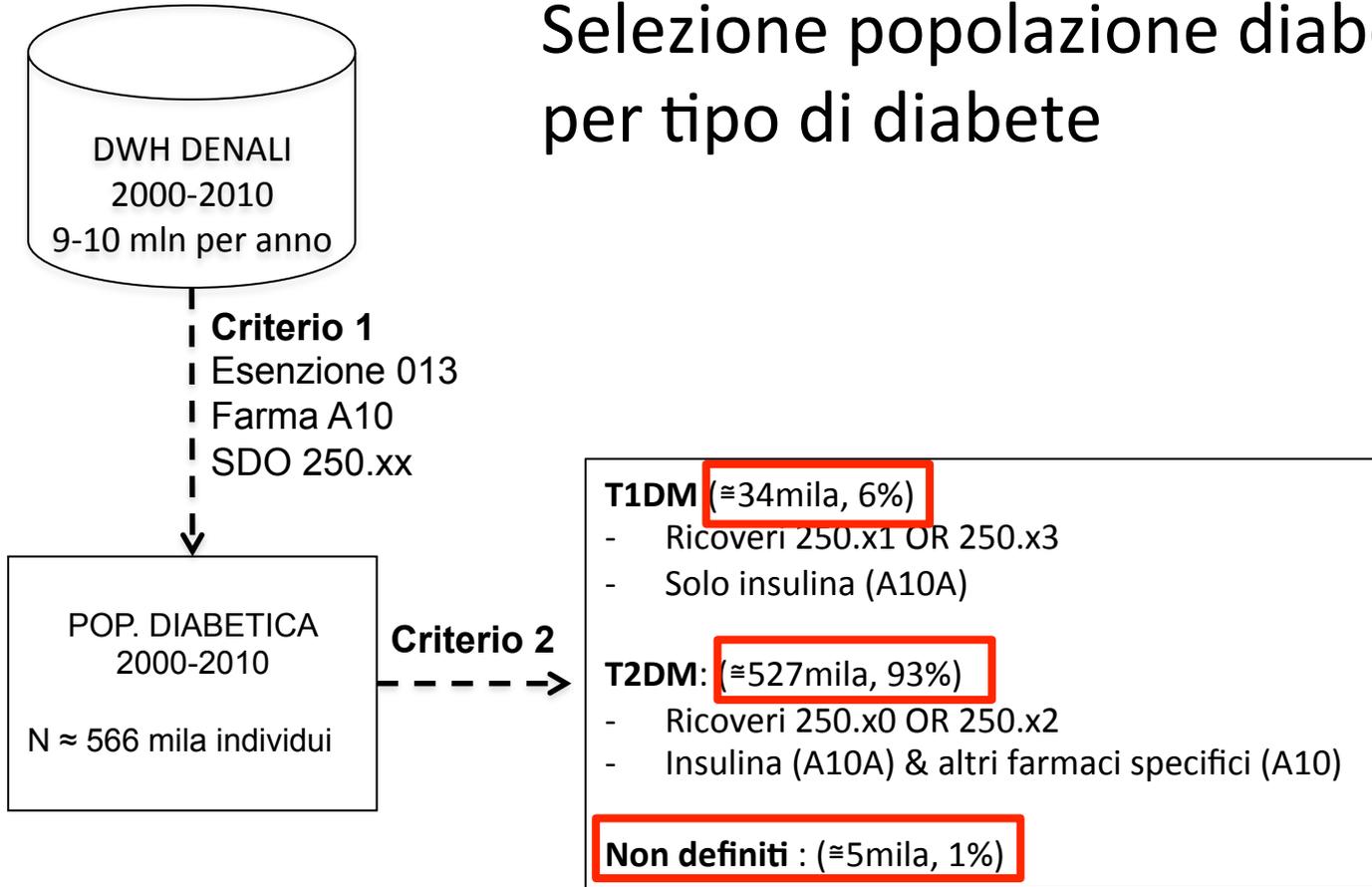
# Selezione popolazione diabetica (DM)



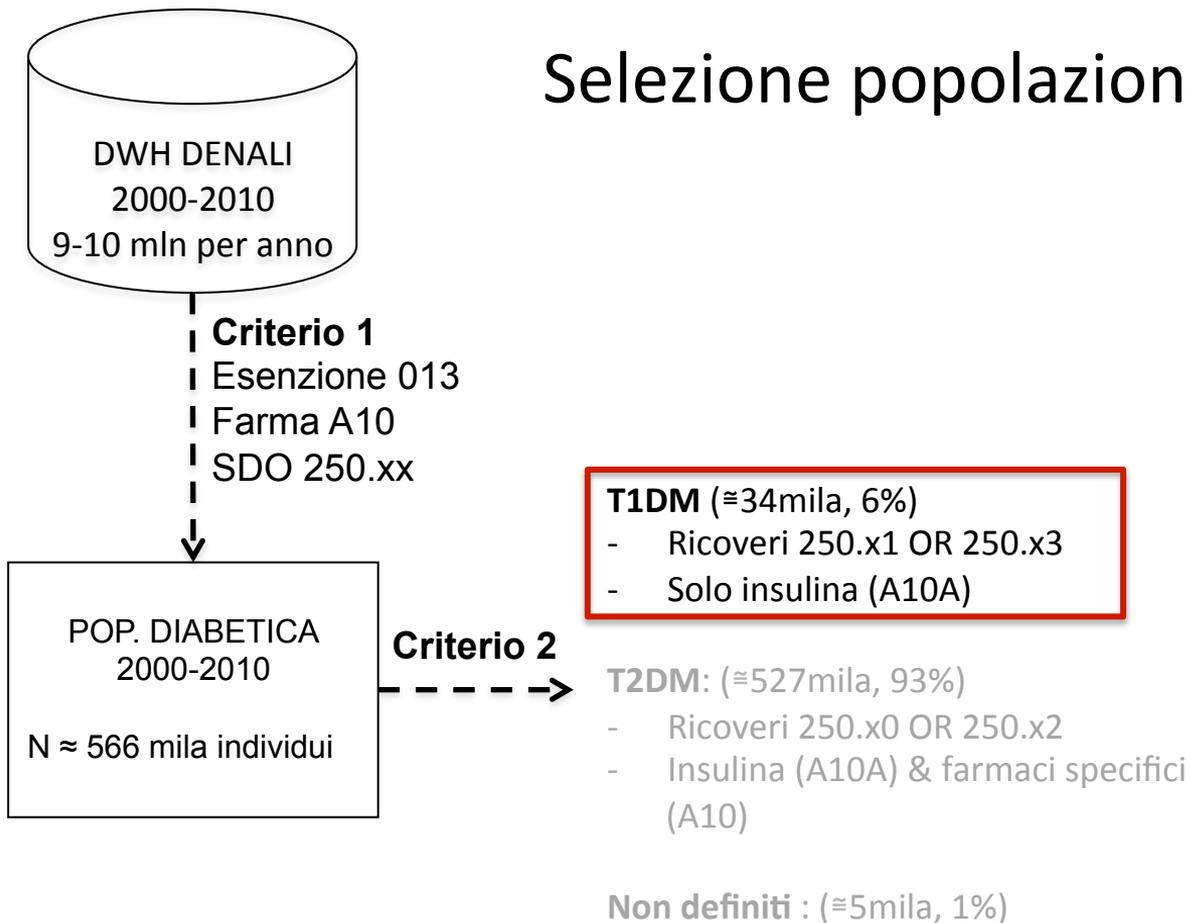
# Selezione popolazione diabetica (DM) per tipo di diabete



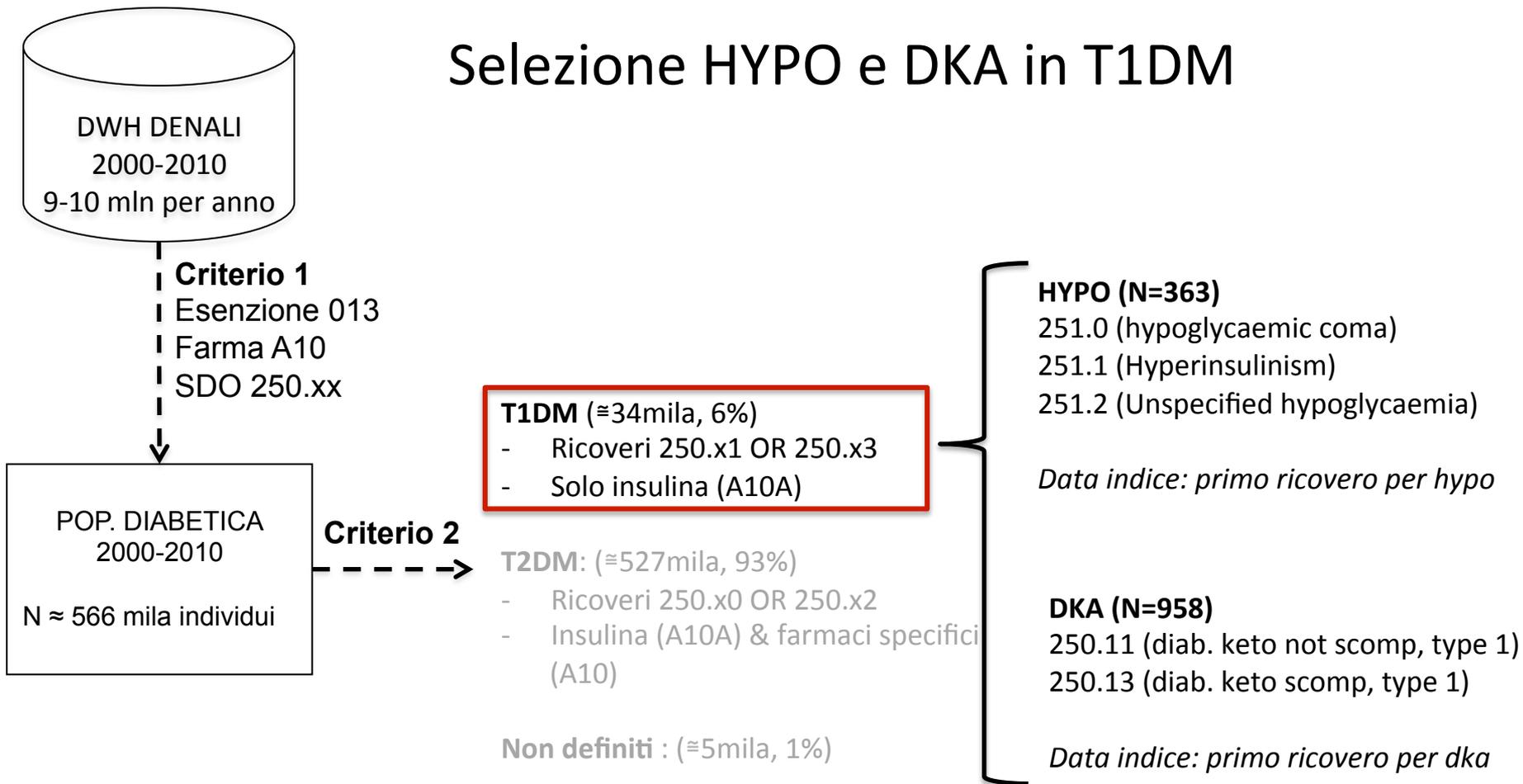
# Selezione popolazione diabetica (DM) per tipo di diabete



# Selezione popolazione T1DM



# Selezione HYPO e DKA in T1DM



# **RISULTATI**

## Descrizione delle popolazioni (HYPO e DKA in T1DM) alla data indice

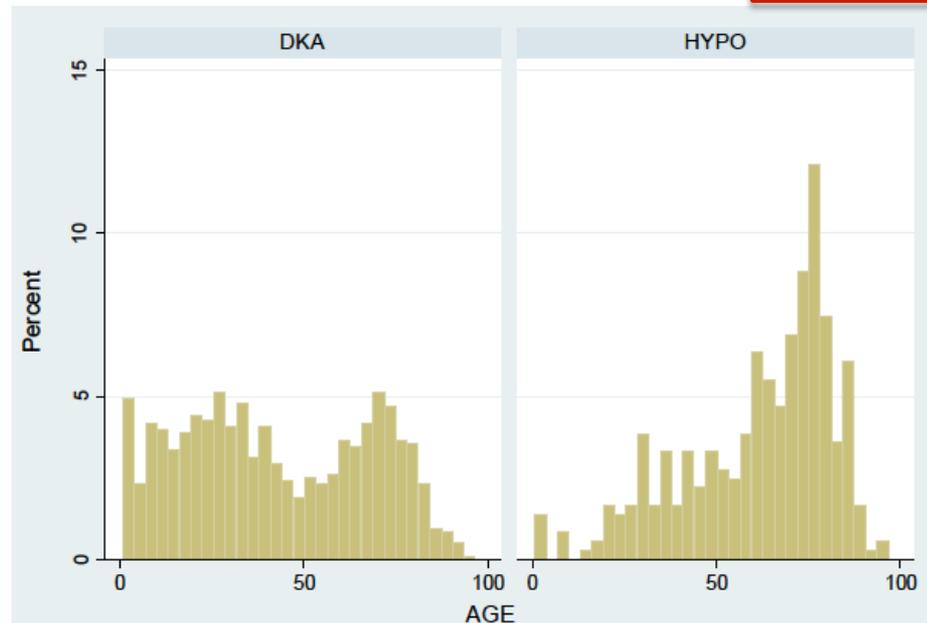
<b>Populations</b>	<b>N</b>	<b>% on T1DM</b>	<b>% of male</b>	<b>mean age (SD)</b>
HYPO	363	1.1	49	61.6 (20.2)
DKA	958	2.8	54	42.5 (25.3)

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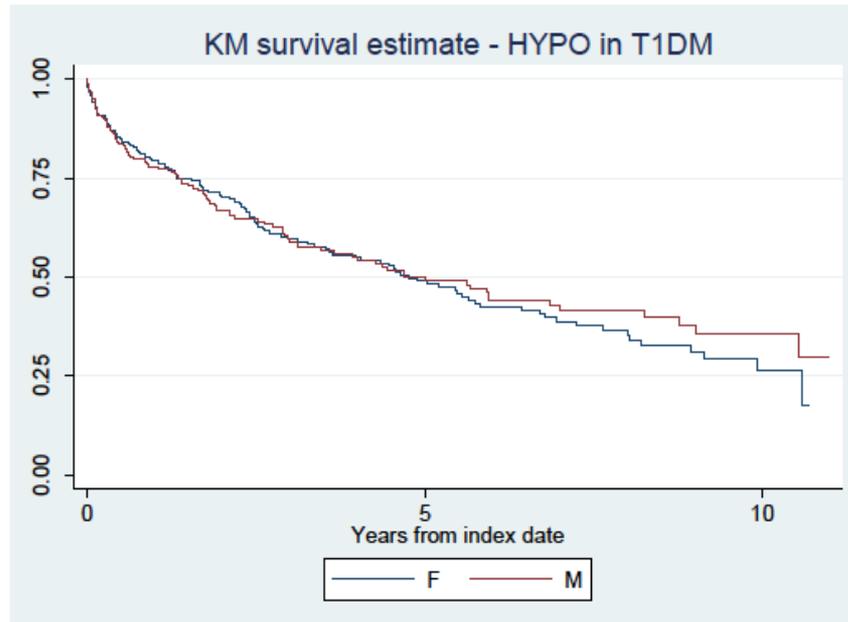
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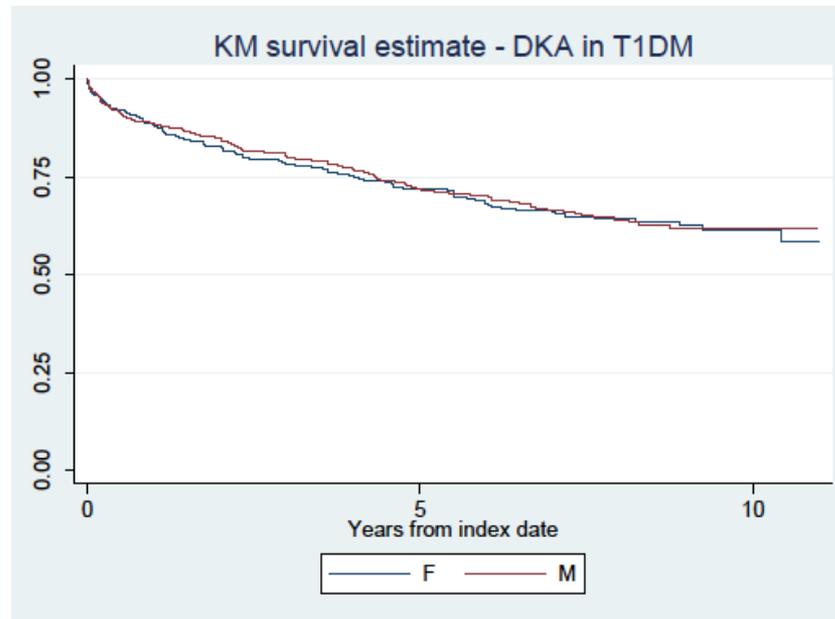
# Sopravvivenza osservata: HYPO in T1DM

<b>HYPO in T1DM</b>	<b>person-years</b>	<b>failures</b>	<b>ratex100</b>	<b>95% ll</b>	<b>95% ul</b>
<b>F</b>	729	107	14.70	12.10	7.40
<b>M</b>	659	91	13.80	11.30	7.00
<b>Tot</b>	1,388	198	14.30	12.40	16.40

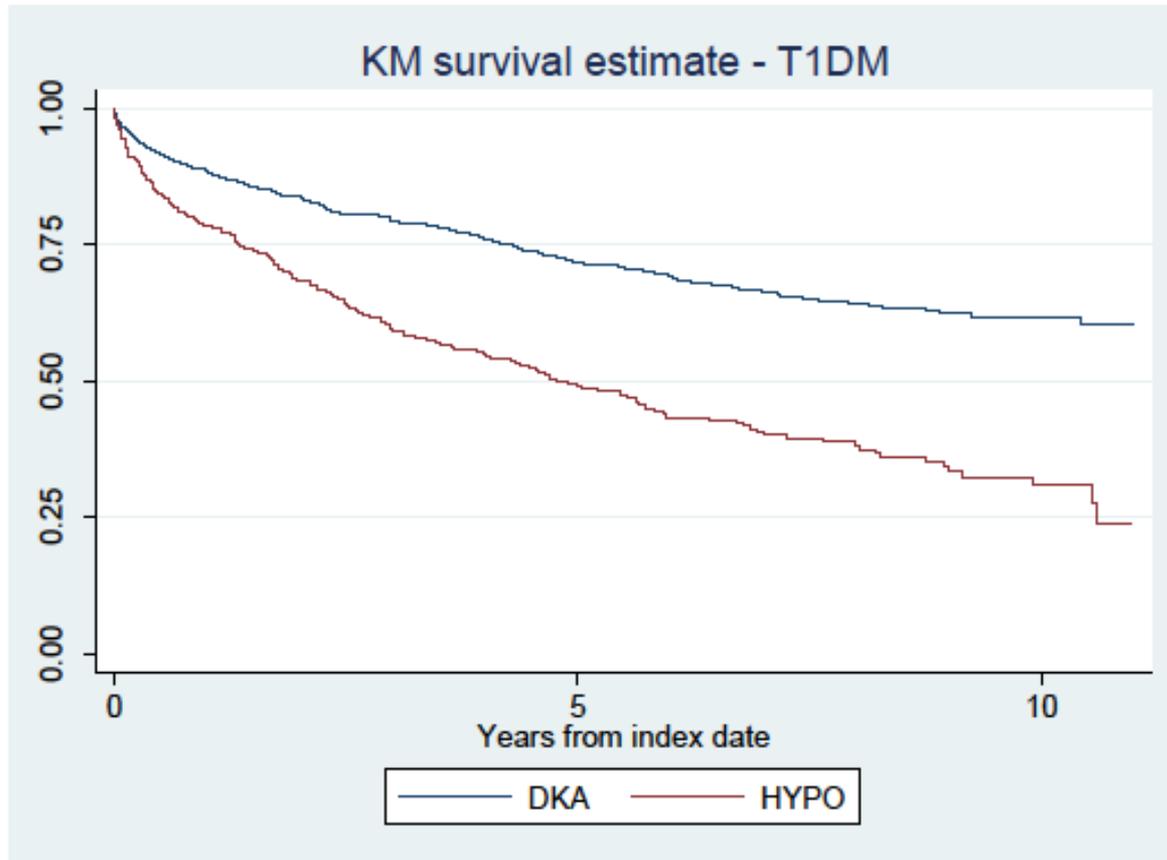


# Sopravvivenza osservata: DKA in T1DM

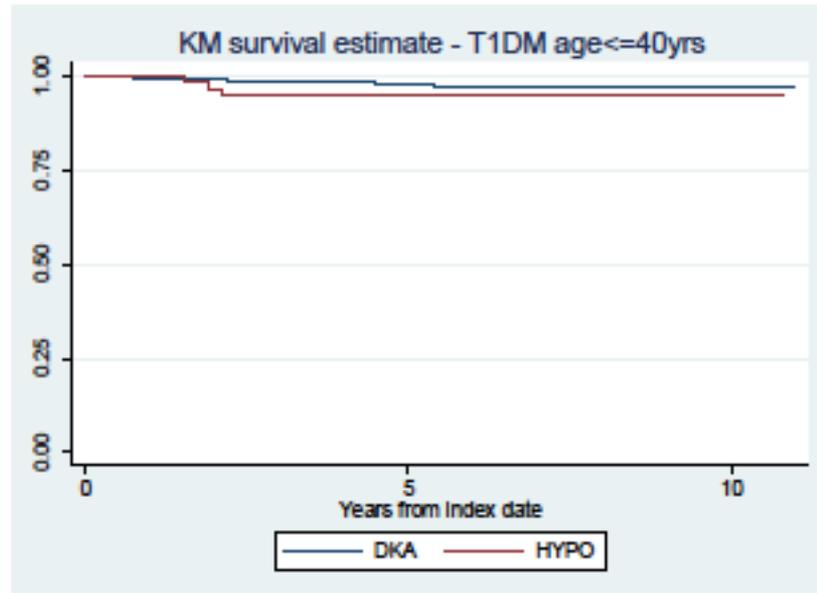
<b>DKA in T1DM</b>	<b>person-years</b>	<b>failures</b>	<b>ratex100</b>	<b>95% ll</b>	<b>95% ul</b>
<b>F</b>	2,069	129	6.20	5.30	7.40
<b>M</b>	2,545	152	6.00	5.10	7.00
<b>Tot</b>	4,613	281	6.10	5.40	6.90



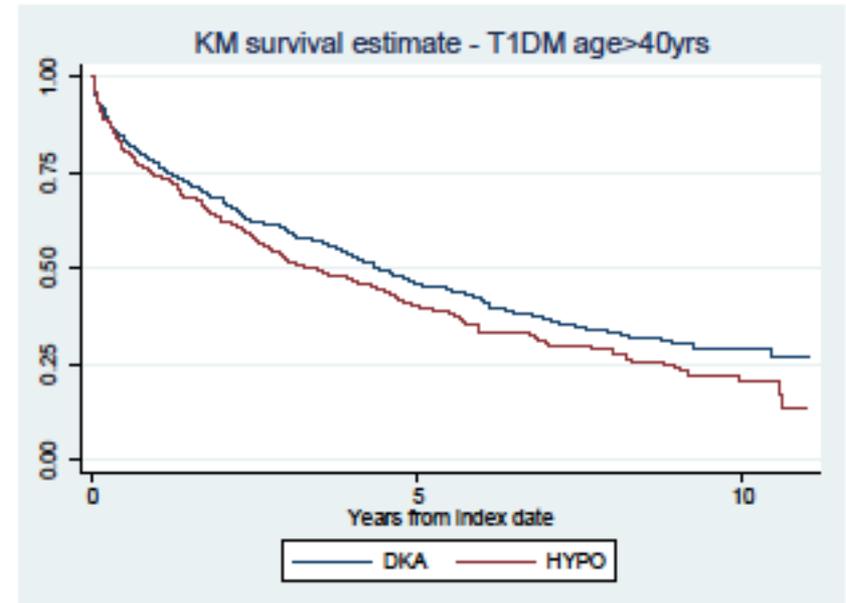
# Sopravvivenza osservata: HYPO vs DKA in T1DM



# Sopravvivenza osservata: HYPO vs DKA in T1DM



Log-rank test p-value=0.2673



Log-rank test p-value=0.051

### 6.3.5 Charlson Comorbidity Index (CCI) – HYPO patients

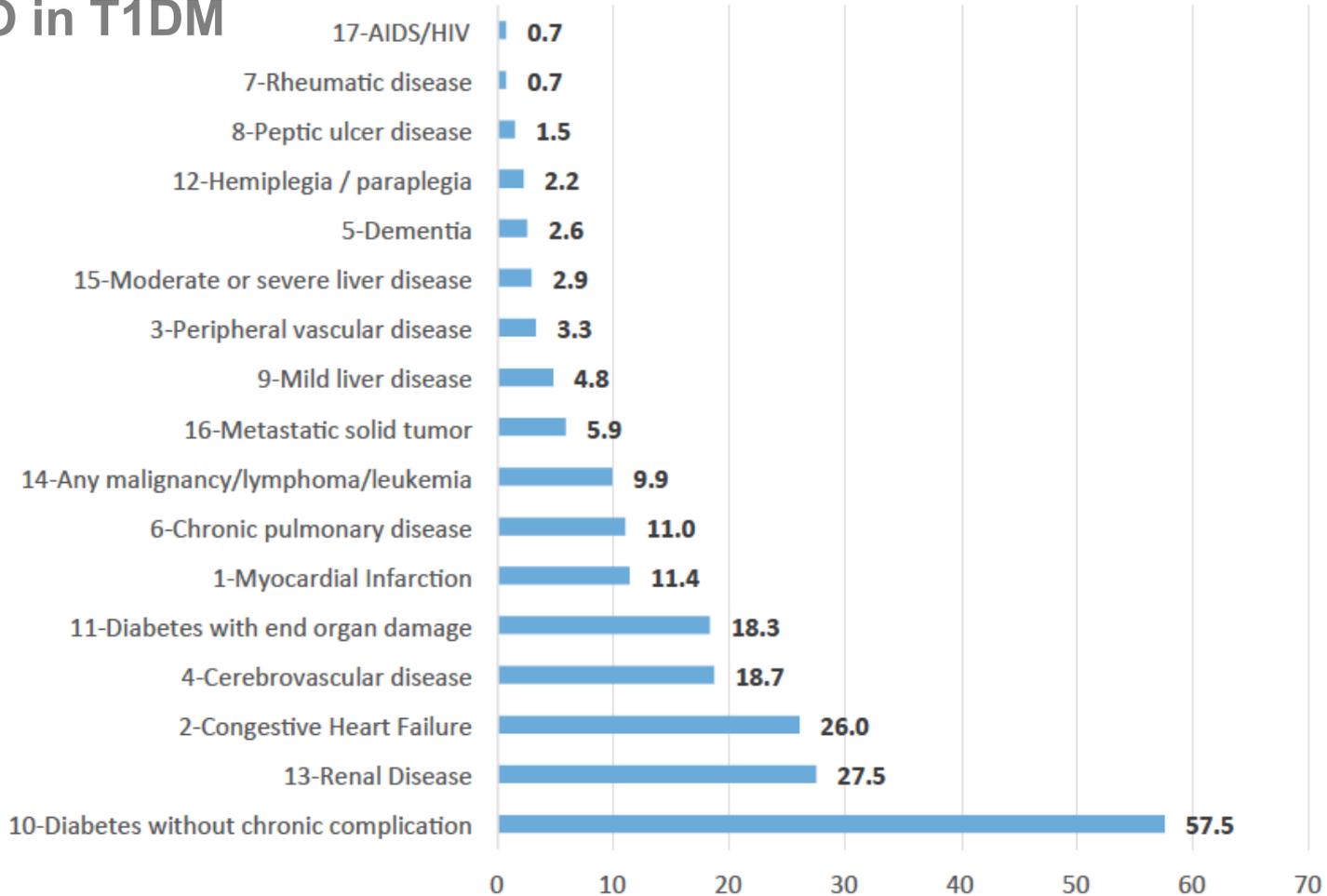
The following results are based on ICD9-CM codes reported in all diagnosis fields of hospital discharges occurred one year before the HYPO index event.

Table 9. CCI for HYPO patients and its mean (95% CI) value

CCI	N. of patient	%		CCI (0-2)	N. of patient	%
0	120	33.1		0	120	33.1
1	61	16.8		1	61	16.8
2	53	14.6		>=2	182	50.1
3	39	10.7		<b>Total</b>	<b>363</b>	<b>100.0</b>
4	31	8.5				
5	21	5.8			<b>Mean CCI</b>	<b>95% CI</b>
6	16	4.4			<b>2.1</b>	<b>1.9-2.4</b>
7	15	4.1				
8	5	1.4				
9	1	0.3				
10	1	0.3				
<b>Total</b>	<b>363</b>	<b>100.0</b>				

## Charlson Comorbidities

### HYPO in T1DM



### 6.3.6 Charlson Comorbidity Index (CCI) – DKA patients

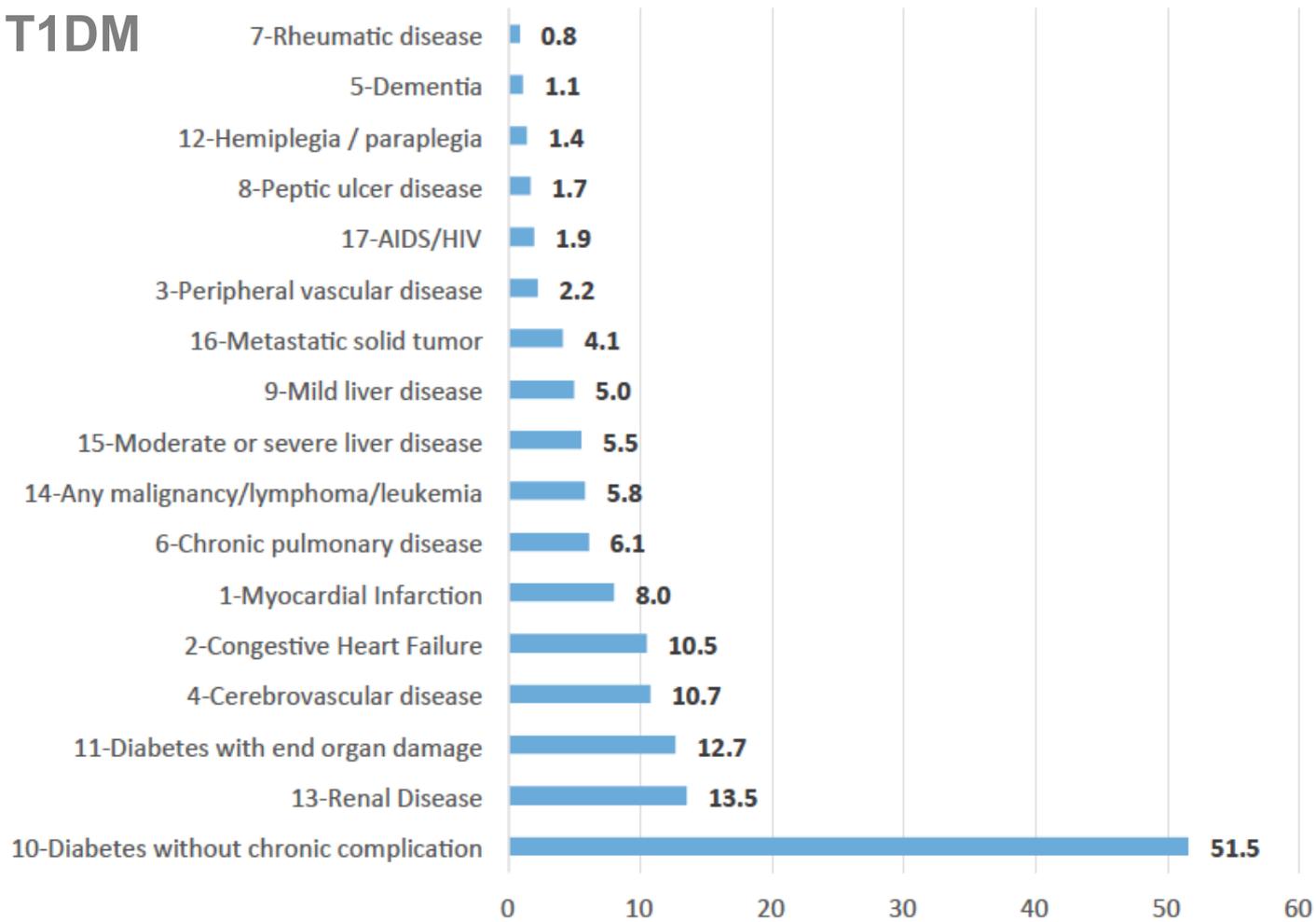
The following results are based on ICD9-CM codes reported in all diagnosis fields of hospital discharges occurred one year before the DKA index event.

Table 10. CCI for DKA patients and its mean (95% CI) evaluation

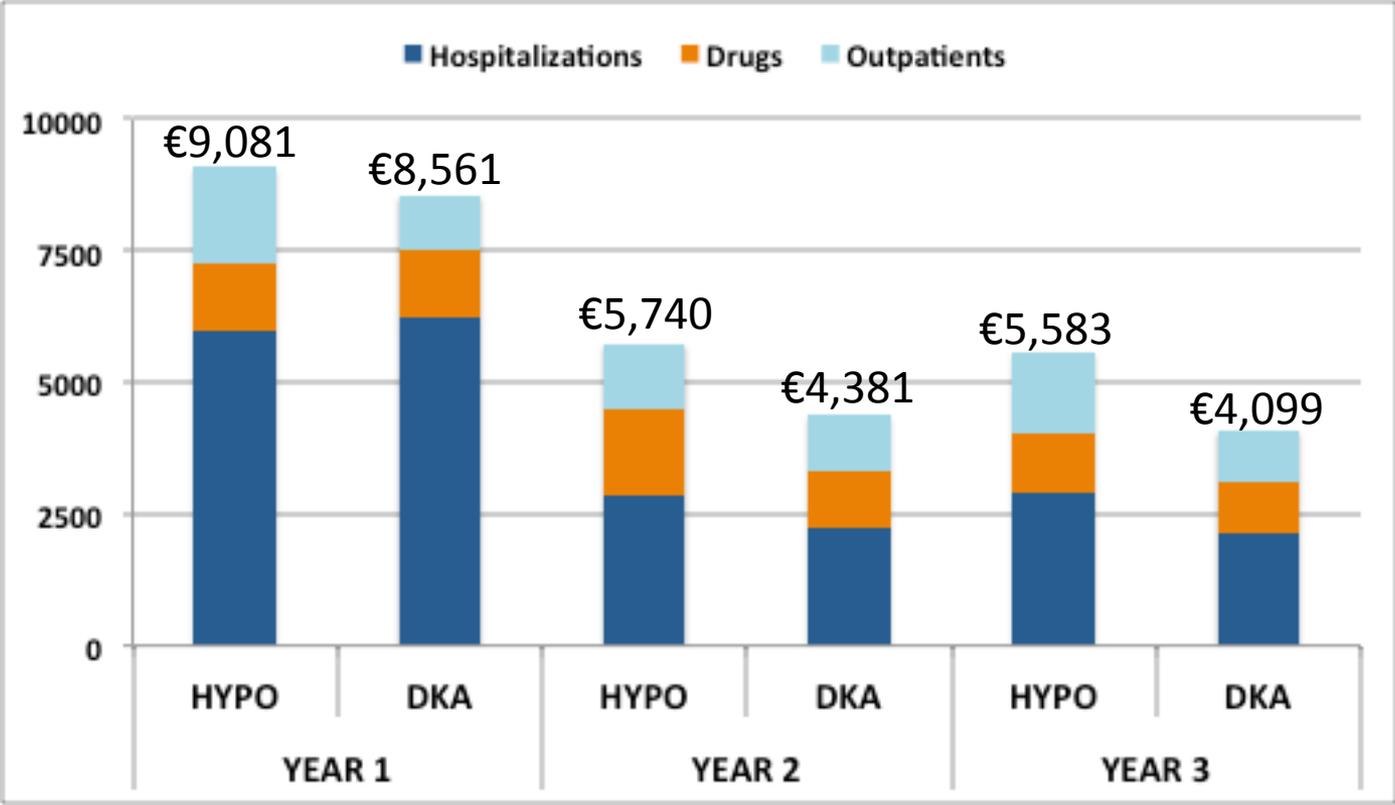
CCI	N. of patient	%		CCI (0-2)	N. of patient	%
0	667	69.6		0	667	69.6
1	128	13.4		1	128	13.4
2	46	4.8		>=2	163	17.0
3	40	4.2		Total	958	100.0
4	38	4.0				
5	13	1.4			Mean CCI	95% CI
6	12	1.3			0.8	0.7-0.9
7	5	0.5				
8	4	0.4				
9	4	0.4				
10	1	0.1				
Total	958	100.0				

## Charlson Comorbidities

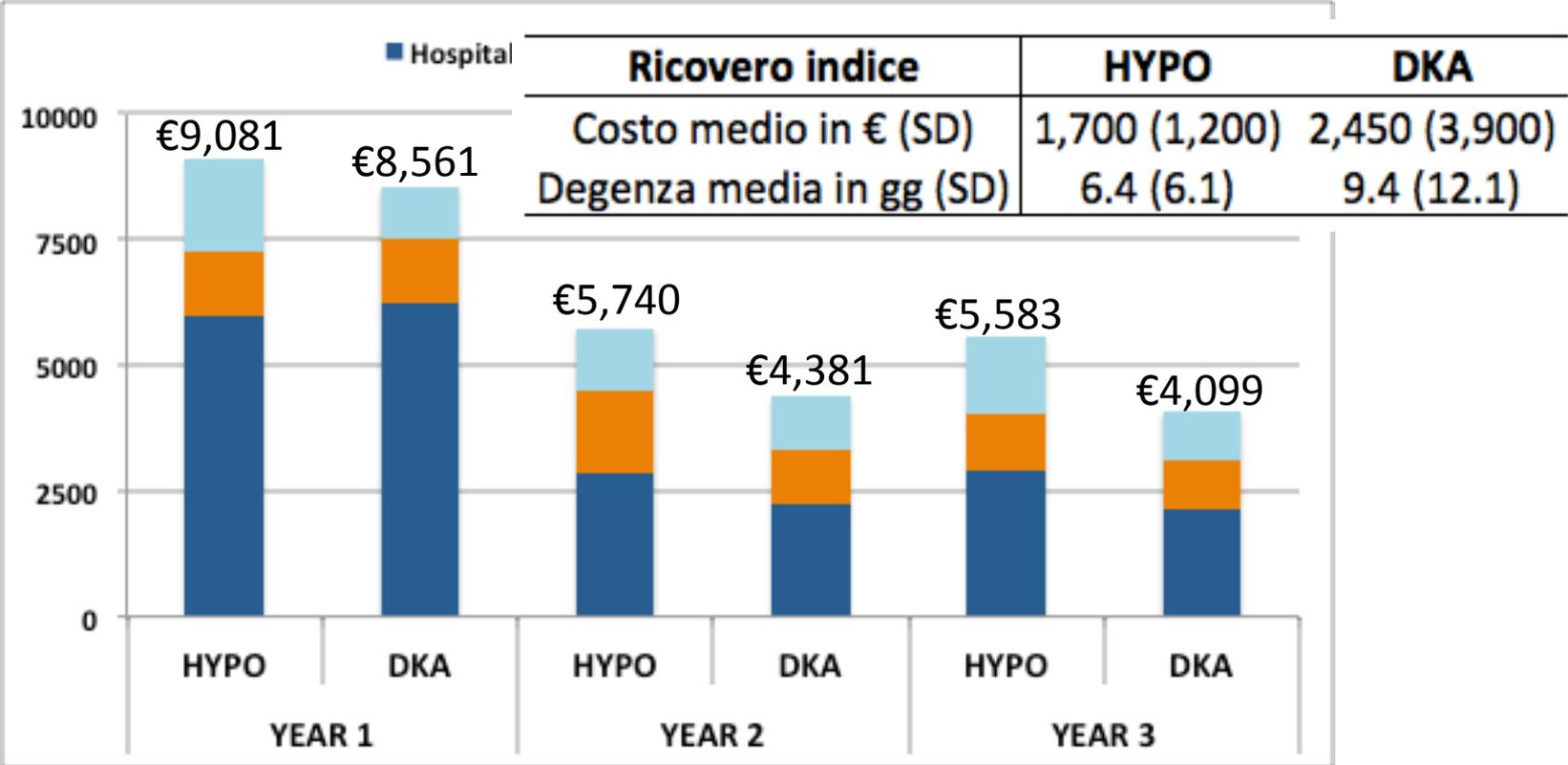
### DKA in T1DM



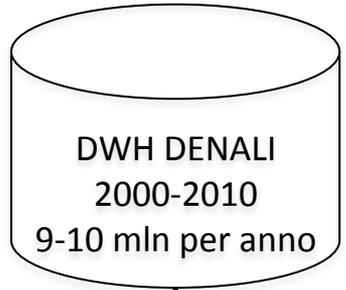
# HYPO e DKA in T1DM: Costi sanitari diretti



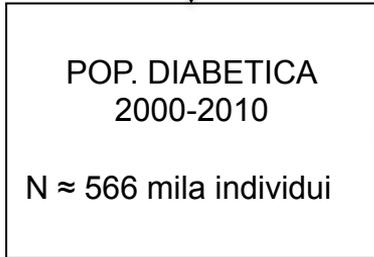
# HYPO e DKA in T1DM: Costi sanitari diretti



# Selezione HYPO, AMI e PAD in DM



- Criterio 1**
- | Esenzione 013
  - | Farma A10
  - | SDO 250.xx



**Criterio 3**

- **HYPO, no AMI (410.x) & no PAD**
- **AMI (410.x), no HYPO & no PAD**
- **PAD, no AMI (410.x) & no HYPO**
- **Vivi alla dimissione**
- **>=30 anni alla dimissione**

Confronto delle tre popolazioni  
in termini di sopravvivenza

## 5. Description of the study population (HYPO & AMI & PAD)

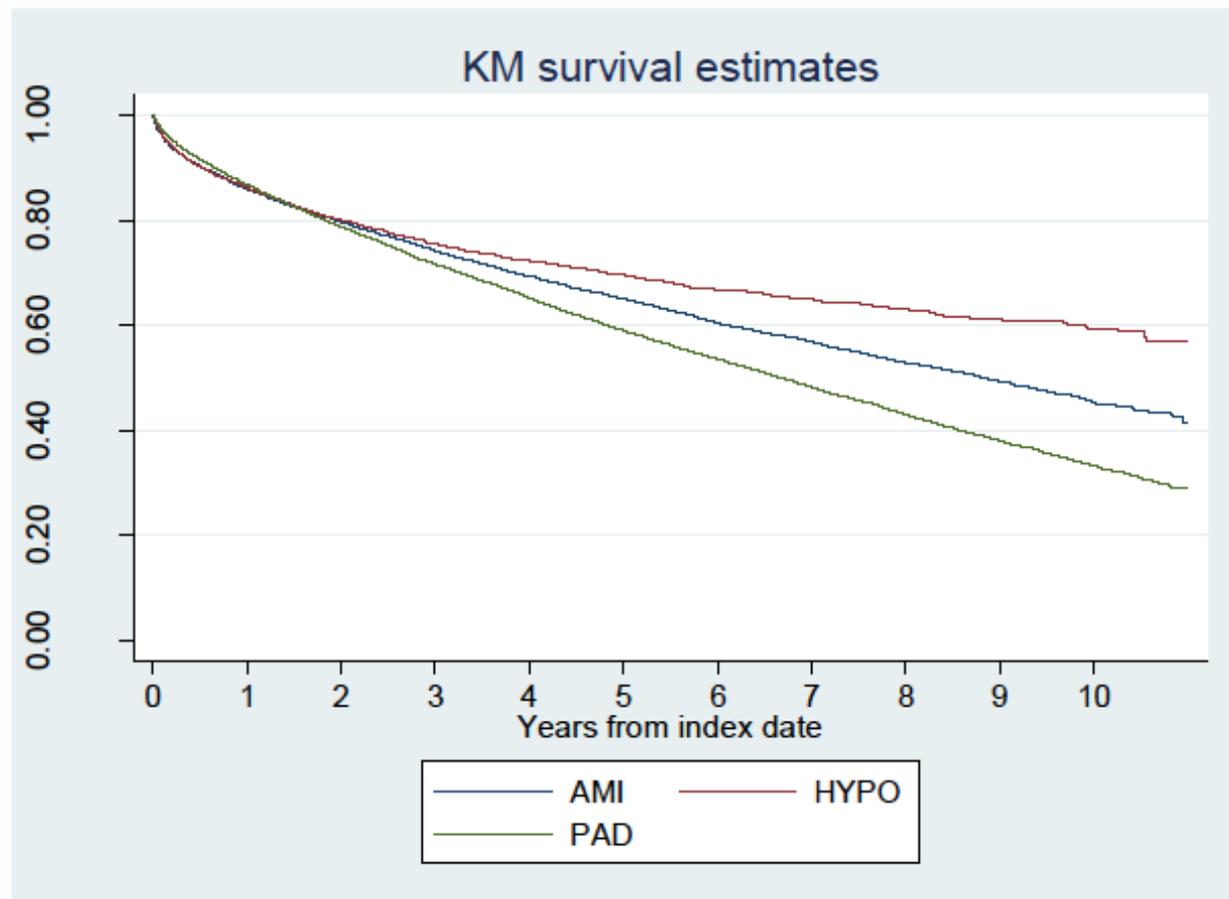
**Table 7. Study population: description of composition, age at the index event, gender, and comorbidity**

Sub-group	N	%	Male (%)	Age (years) at the index event					CCI>=3	deaths
				mean	sd	p50	min	max		
AMI	14,285	39%	60%	70.5	12	72	31	102	19%	39%
HYPO	3,282	9%	36%	60.5	19	60	30	102	18%	32%
PAD	19,376	52%	60%	71.4	10	72	30	101	25%	48%
Total	36,943	100%	59%	70	12	72	30	102	22%	43%

Looking at Table 7, when compared to AMI and PAD populations the HYPO ones was younger at the index event and less compromised in term of comorbidity.

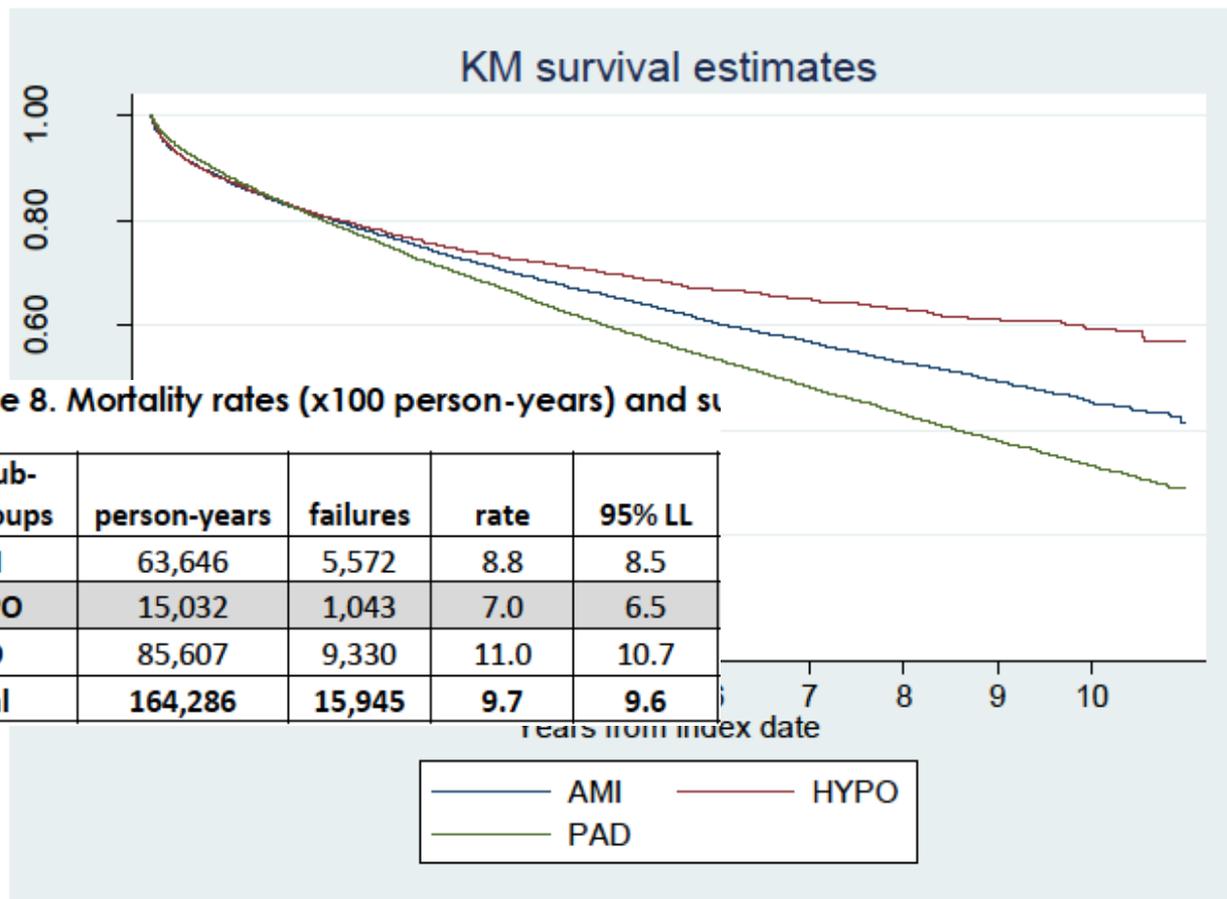
## Observed survival (Kaplan-Meier estimation)

Figure 19. Observed survival of the three groups AMI, PAD and HYPO



## Observed survival (Kaplan-Meier estimation)

Figure 19. Observed survival of the three groups AMI, PAD and HYPO



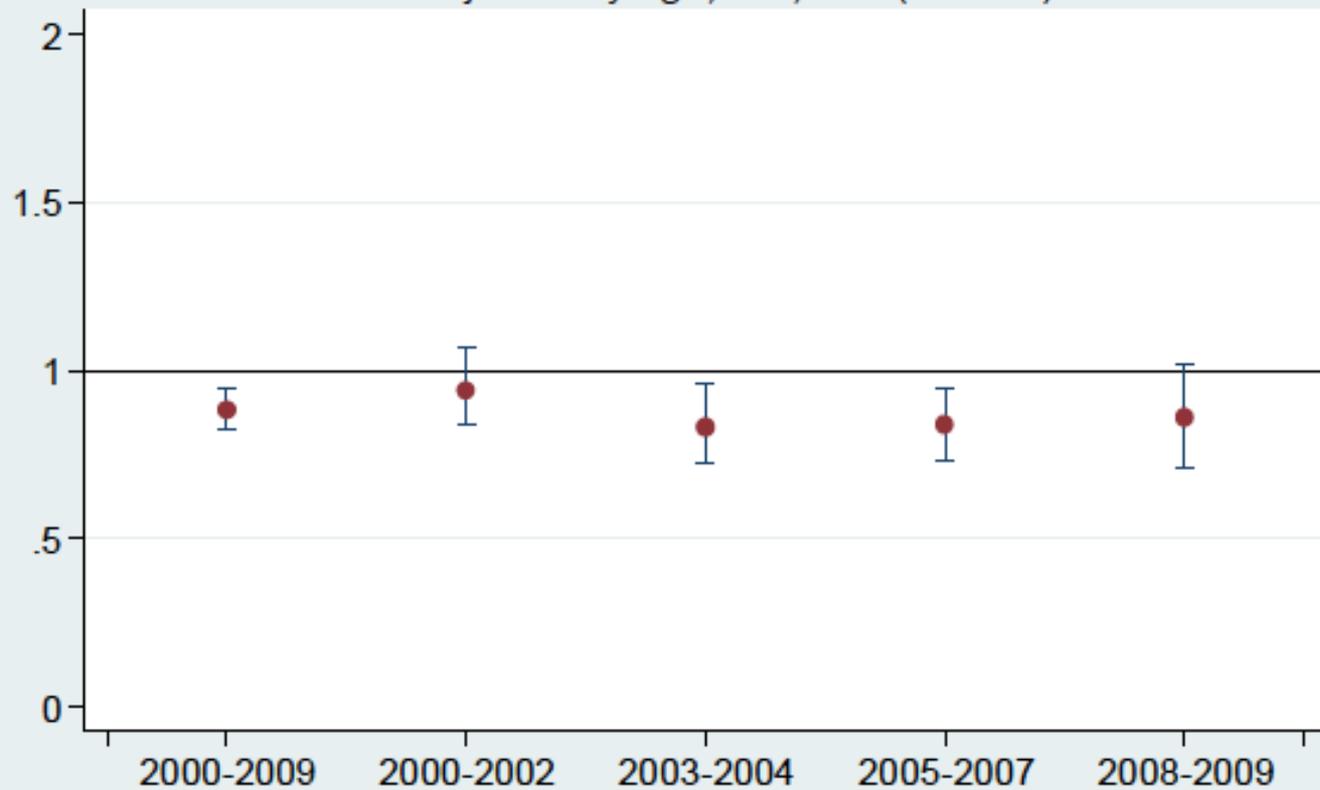
HYPO population reported a mortality rate lower than the AMI and PAD ones. Anyway, we need to consider the different age and comorbidity distributions characterizing the three populations in order to perform a mortality comparison. Indeed, we applied a regression model of the survival time that involved the following independent variables:

- age at index event (age classes: 30-52, 53-61, 63-66, 67-70, 71-74, 75-78, 79-82, 83+)
- sex
- CCI (cci=0, cci=1 opp 2, cci=3 opp 4, cci>=5),
- year of the index event

The model outcome was expressed as Hazard Ratio (HR). Because of the better fit of the model to the data, we applied the Weibull parametric model. Similar results were also achieved using

## AMI versus HYPO

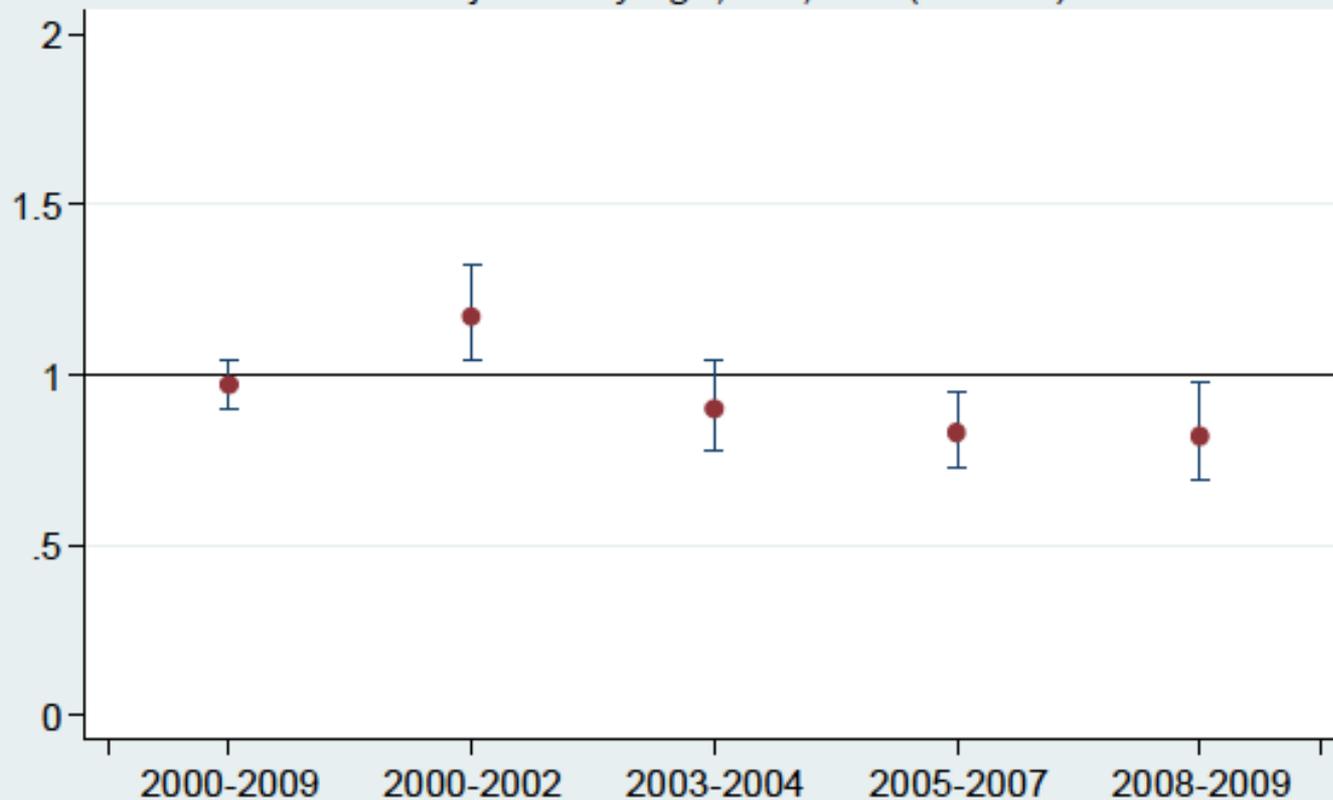
HR adjusted by age, sex, CCI (Weibull)



Integrazione con dati clinici per i necessari approfondimenti

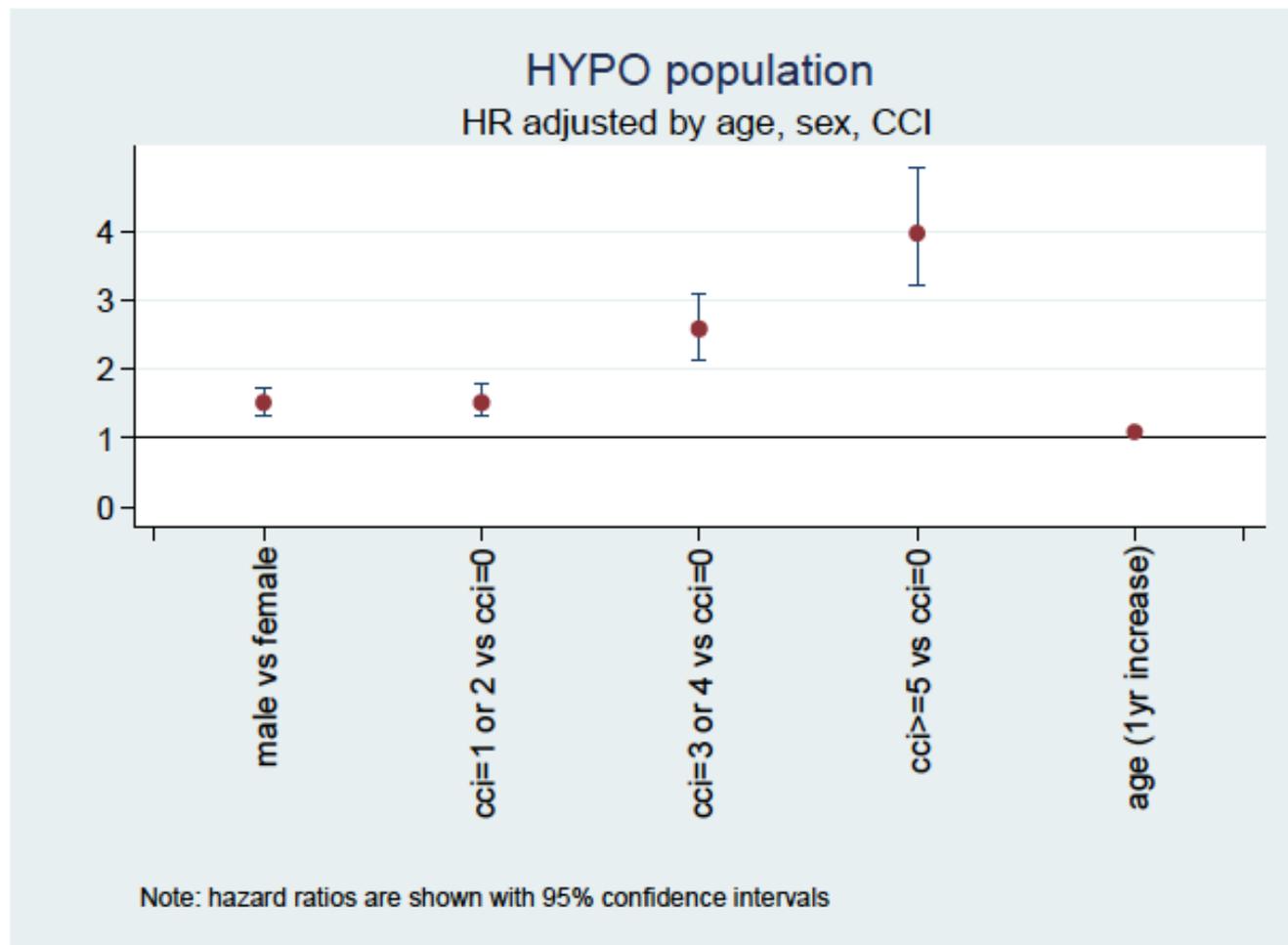
## PAD versus HYPO

HR adjusted by age, sex, CCI (Weibull)



Integrazione con dati clinici per i necessari approfondimenti

Figure 23. Group comparisons for HYPO population (all ages)



# Osservazioni finali

## DWH-DENALI e dati amministrativi

- Potenzialità esplorativa dei dati amministrativi: epidemiologia e costi di HYPO e DKA (gravi)
- Limite: dati amministrativi, precisi sulle risorse ma legati alle codifiche (spesso limitanti) per la parte clinica
- Assenza del flusso di PS: tracciabilità parziale degli eventi
- Complemento con dati clinici di dettaglio per i necessari approfondimenti

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