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## **Contribution of chronic disease to educational inequalities in the burden of disability**

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## Background

- Socioeconomic inequalities in health and disabilities are large and persisting.
- The extent specific chronic diseases contribute to educational inequalities in the prevalence of disability is largely unknown.

### *References*

1. Mackenbach et al. Socioeconomic inequalities in health in 22 European countries. *N Engl J Med* 2008;358(23):2468-81.
2. Kunst et al. Trends in socioeconomic inequalities in self-assessed health in 10 European countries. *Int J Epidemiol* 2005;34(2):295-305.
3. Huisman M, Kunst A, Deeg D, Grigoletto F, Nusselder W, Mackenbach J. Educational inequalities in the prevalence and incidence of disability in Italy and the Netherlands were observed. *J Clin Epidemiol* 2005;58(10):1058-65.

## Research questions

1. Which diseases contribute most to educational inequalities in the prevalence of disability?
2. Which diseases contribute by:
  - educational differences in disabling impact
  - educational differences in disease prevalence
  - both

## Methods: data

- Pooled cross-sectional data from the Dutch Permanent Life Situation Survey 2001-2007 (Statistics Netherlands); institutionalized population not included.
- Self-reported information on disease, disability, educational level, age, sex
- OECD indicator for disability:
  - 7 questions: mobility (3), hearing (2), and vision (2)
  - disabled = at least 1 question answered with  
‘No, I can’t’ or ‘Yes, with major difficulty’ (4 answer cats)

## Methods: disease groups and education

- Out of 20 questions, 10 disease groups were compiled including:  
Musculoskeletal disease, Cardiovascular disease, DM, Cancer,  
CNSLD (lung) and Other.
- Education measured according to highest completed level:
  - elementary
  - lower secondary
  - upper secondary
  - tertiary

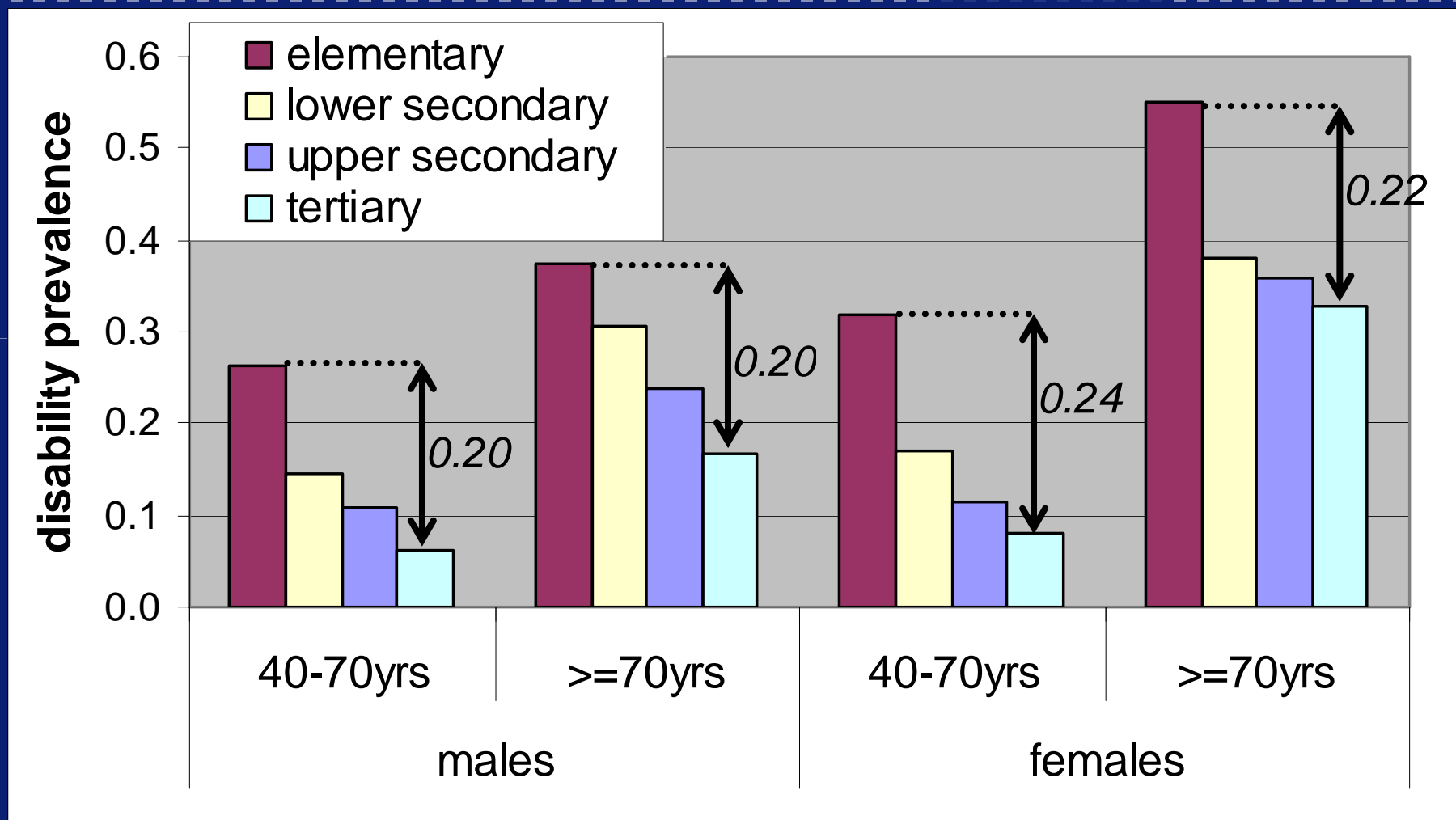
## Methods: calculations

- Attribution of disability to diseases: multivariate additive regression model yielding cause specific disability by age and sex (Nusselder & Looman; Demography 2004).
- The cause specific disability determined by:  
disease prevalence (1) and disabling impact of specific diseases (2)
- Model specifications:
  1. disabling impact: background effect + disease effect
  2. background effect varies by age
  3. disease effect varies by age, same age pattern for all diseases
  4. separate models for each educational level

## Methods: characteristics of study sample

- Approached 2001-2007: 110,766; response: 69,140
- 22,876 no disability info or <12 yrs (12,722)
- 624: information on education missing; 3268: disease info missing
- Study population: N=42,372

## Results: prevalence of disability by education





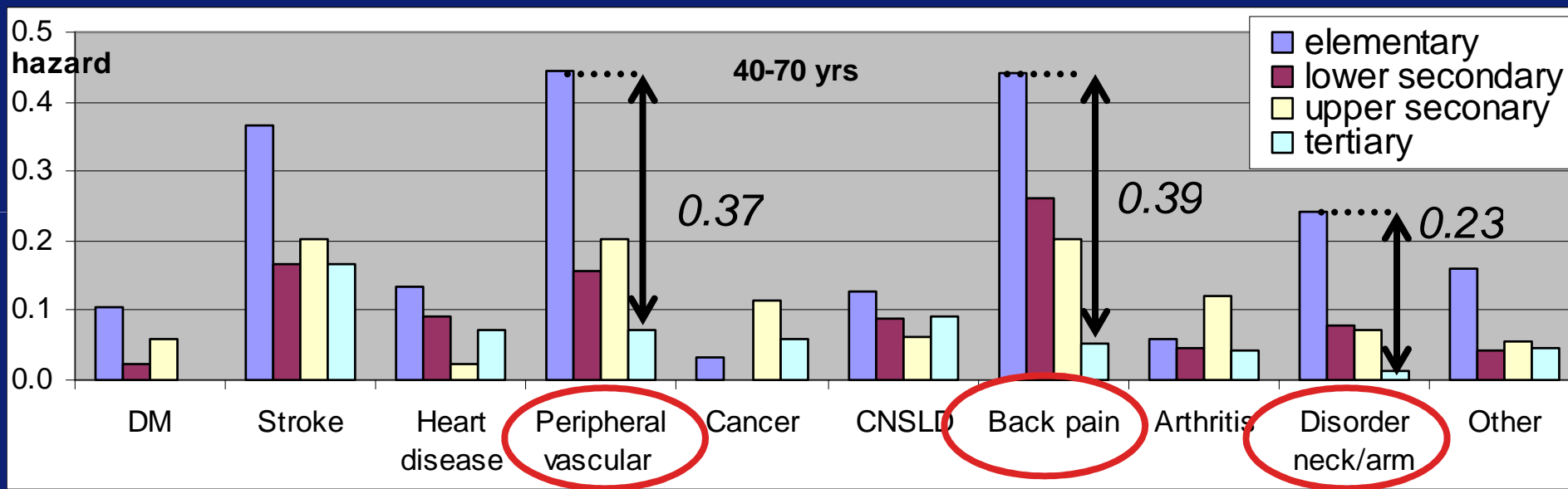
## Results: educational differences (elementary - tertiary) in disease prevalence (%) - males

	40-70 yrs	>70 yrs
DM	5.6	4.0
Stroke	3.2	2.5
Heart disease	7.8	3.7
Peripheral vascular	4.6	6.1
Cancer	0.3	0.1
CNSLD	5.3	6.6
Back pain	9.0	2.4
Arthritis	10.9	2.7
Disorder neck/arm	10.4	5.3
Other	4.7	-2.7

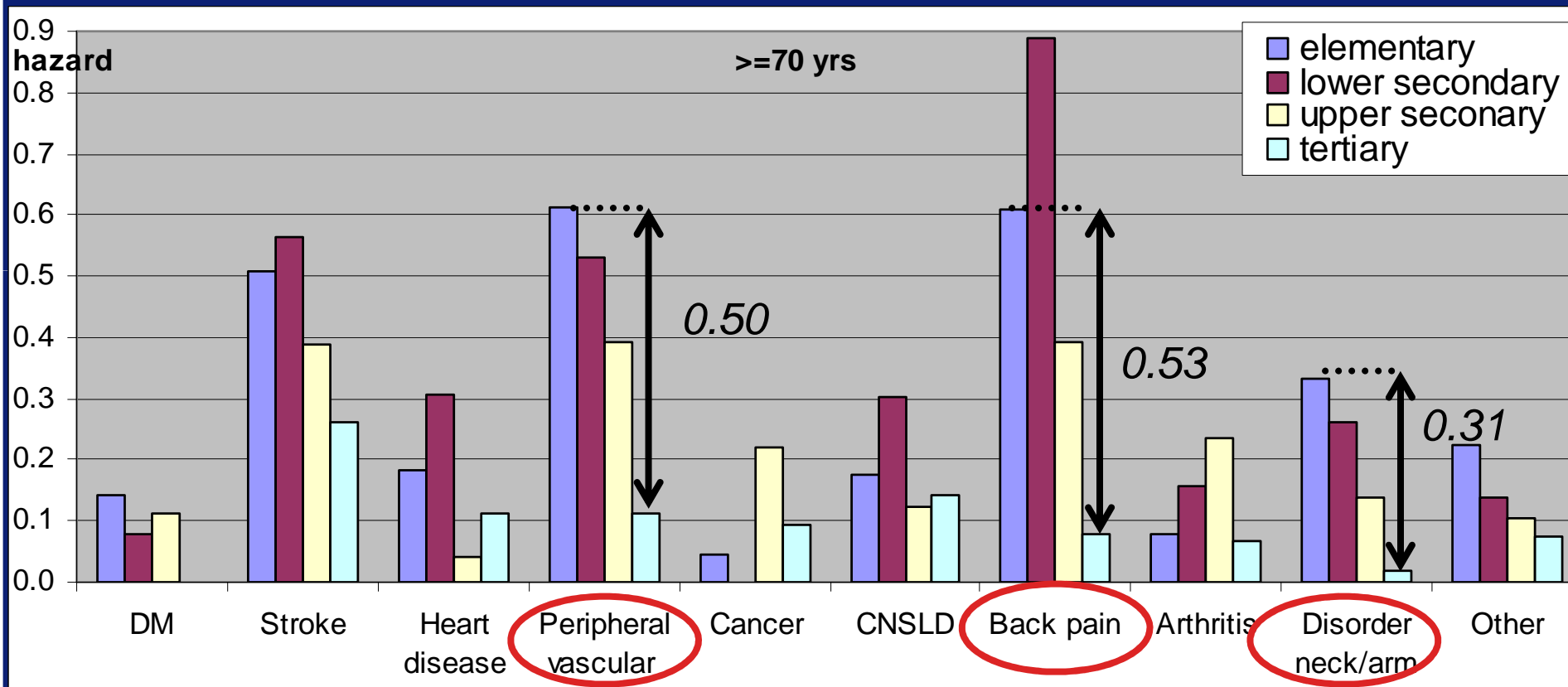
## Results: educational differences (elementary - tertiary) in disease prevalence (%) - females

	40-70 yrs	>70 yrs
DM	6.8	11.6
Stroke	2.8	1.7
Heart disease	4.2	1.8
Peripheral vascular	3.0	-6.9
Cancer	0.7	-0.9
CNSLD	4.5	2.6
Back pain	4.9	3.1
Arthritis	13.0	-1.1
Disorder neck/arm	7.5	4.9
Other	6.1	4.5

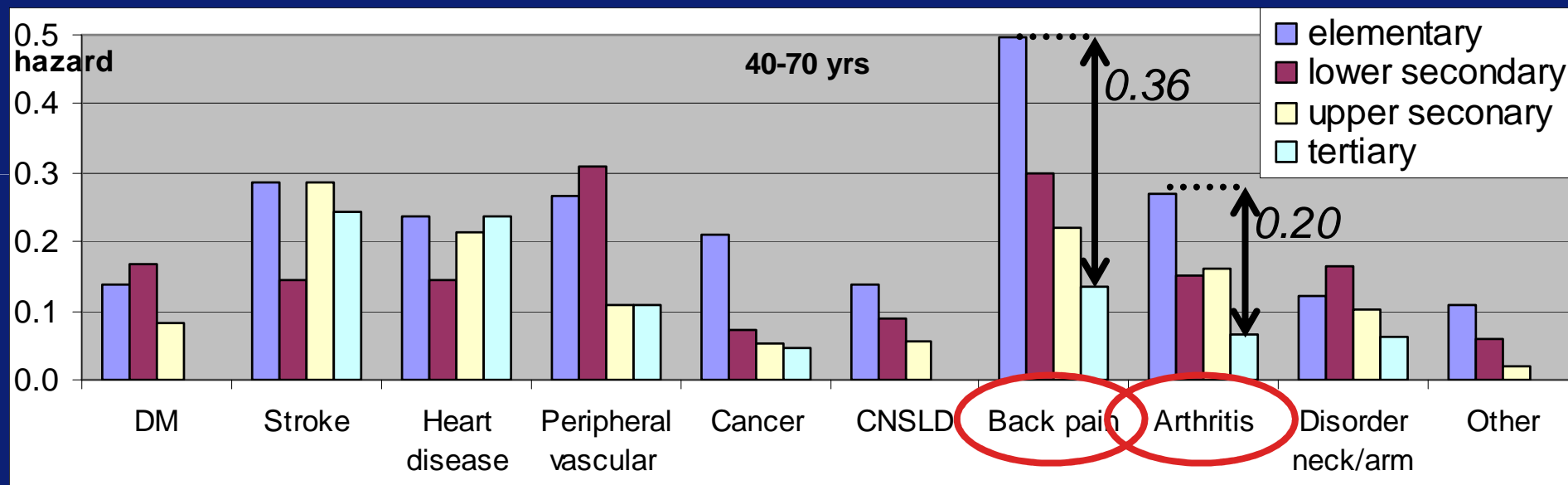
# Results: disabling impact by education - males



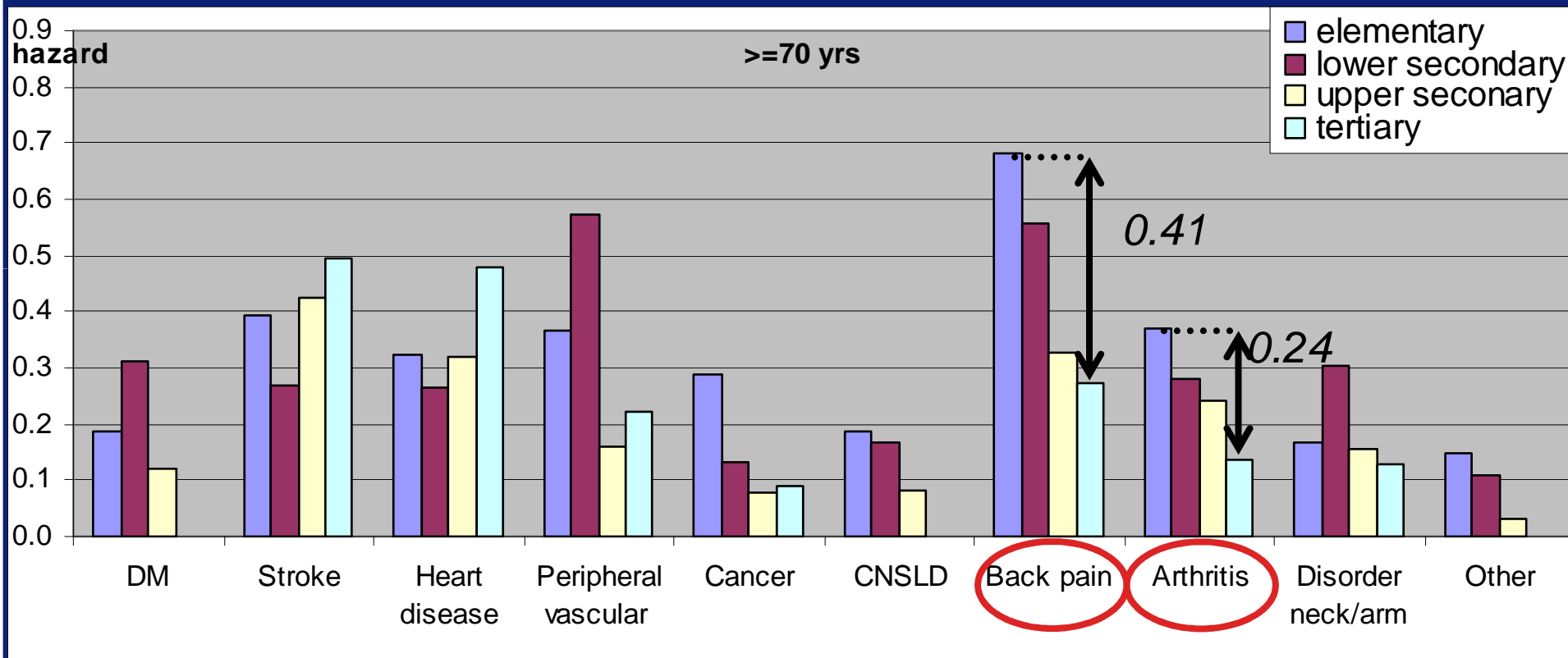
# Results: disabling impact by education - males



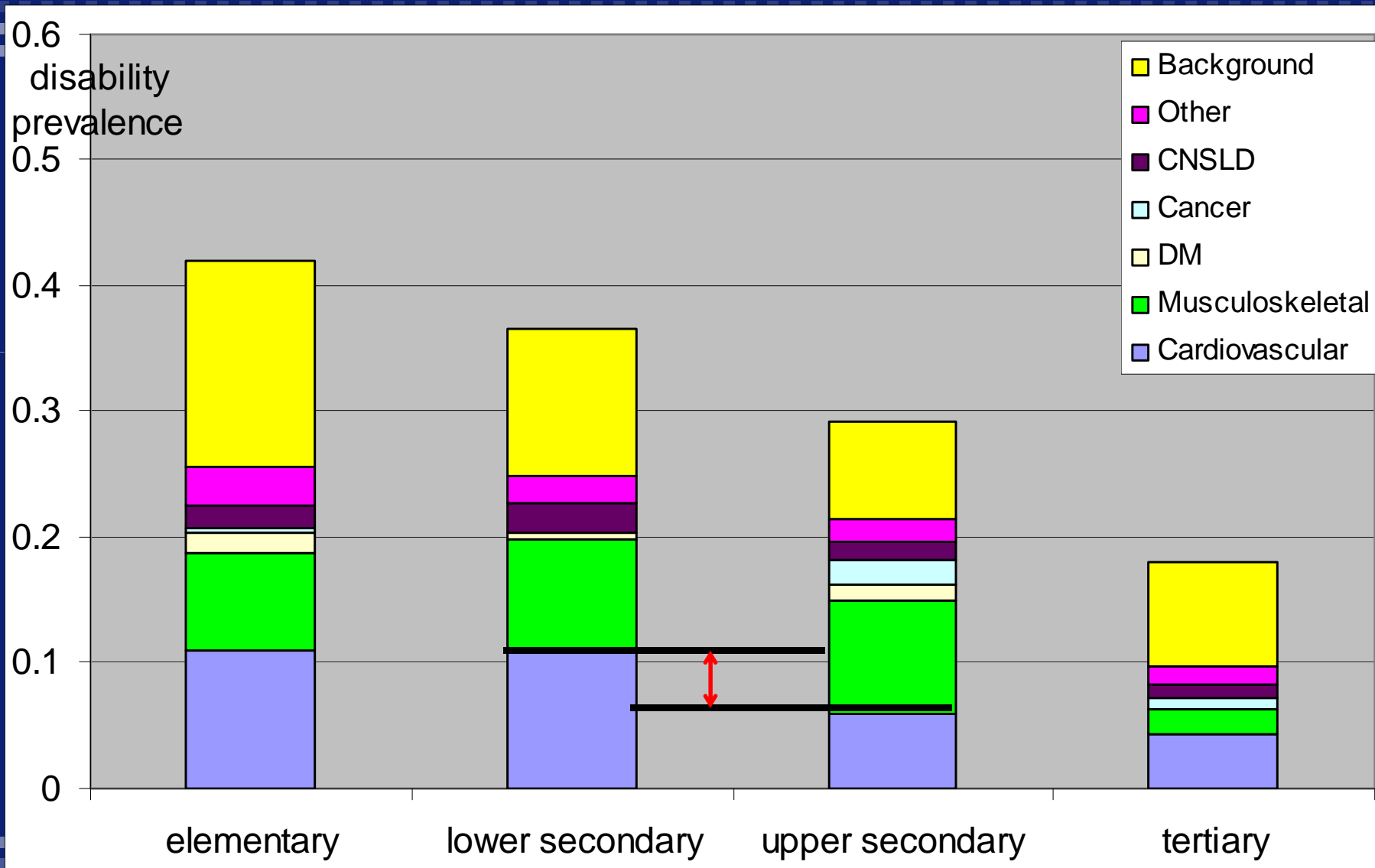
# Results: disabling impact by education - females



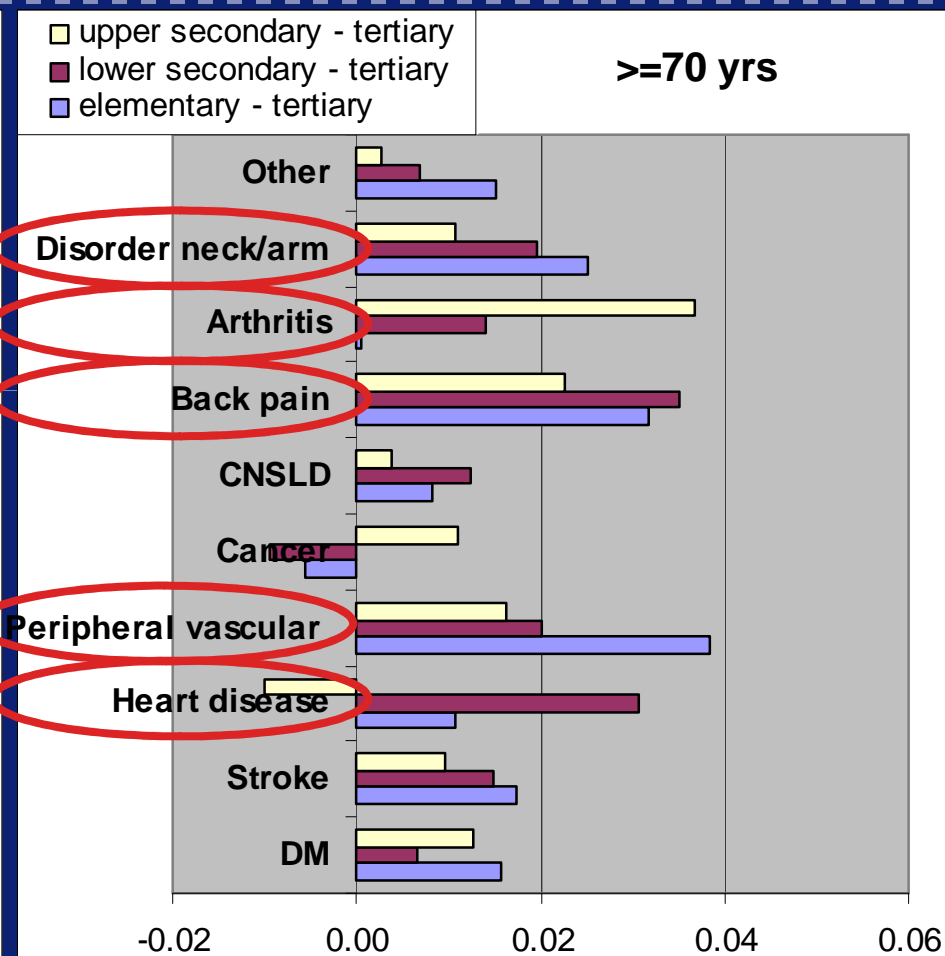
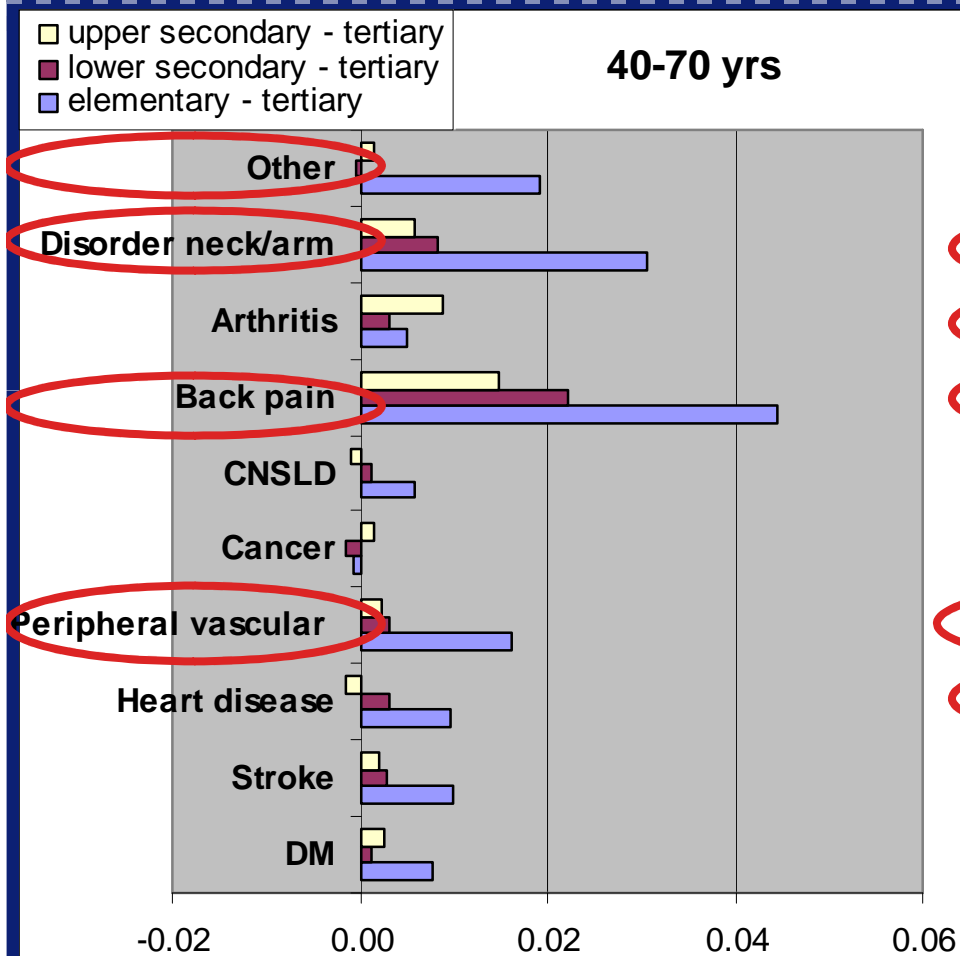
# Results: disabling impact by education - females



## Results: Contribution disease to educational difference in disability prevalence – males $\geq 70$ yrs

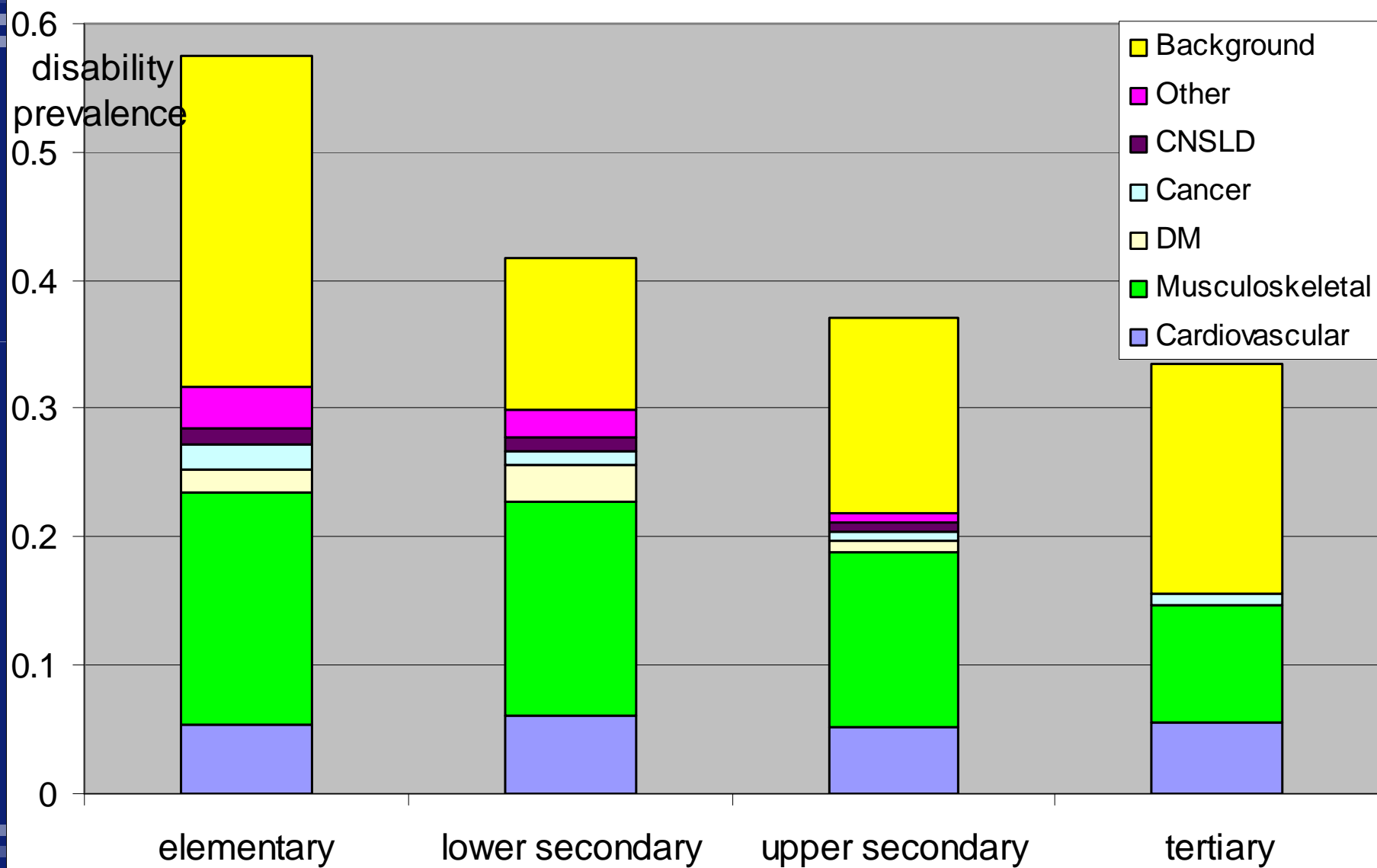


# Results: Contribution disease to educational difference in disability prevalence - males

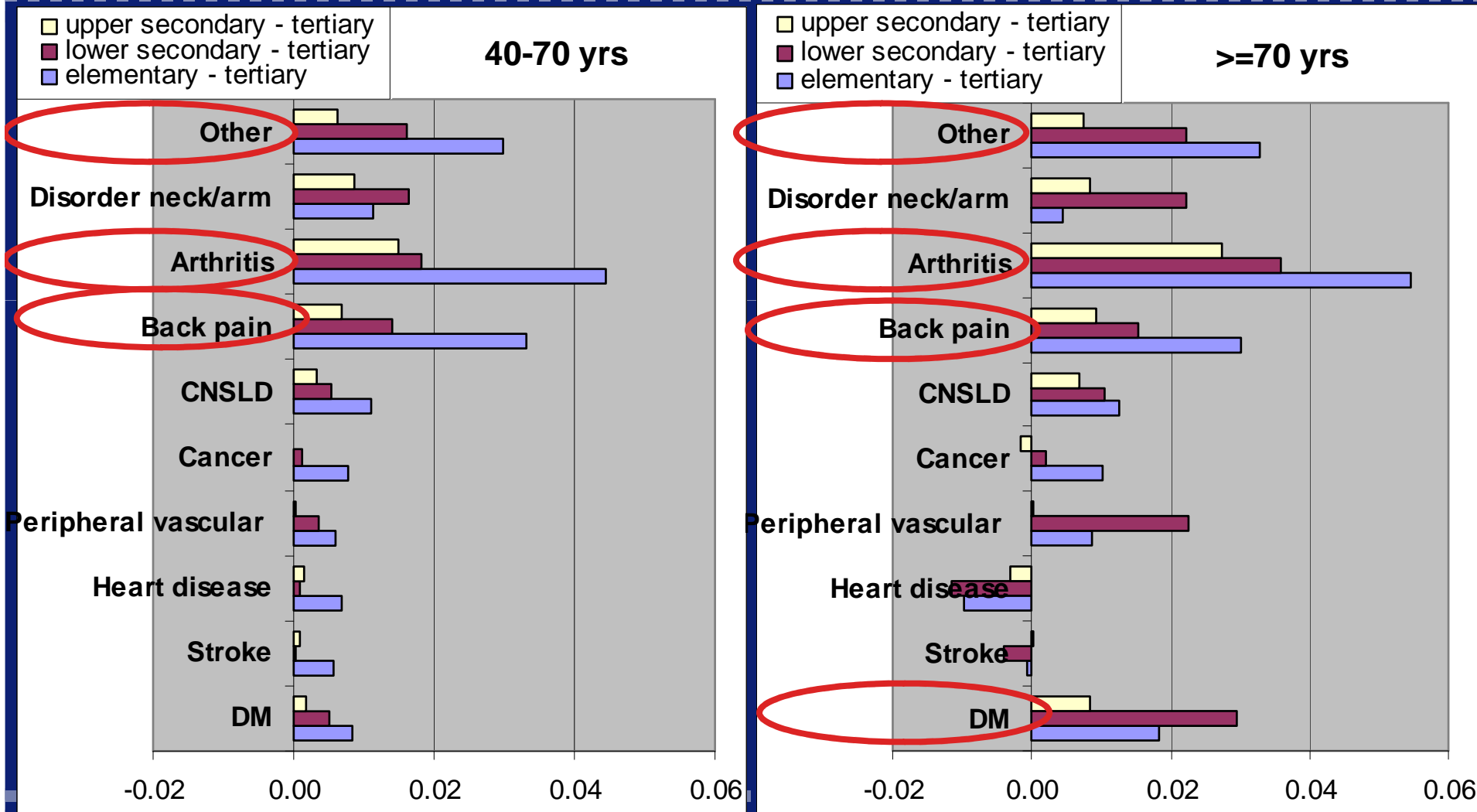




## Results: Contribution disease to educational difference in disability prevalence – females $\geq 70$ yrs



# Results: Contribution disease to educational difference in disability prevalence - females



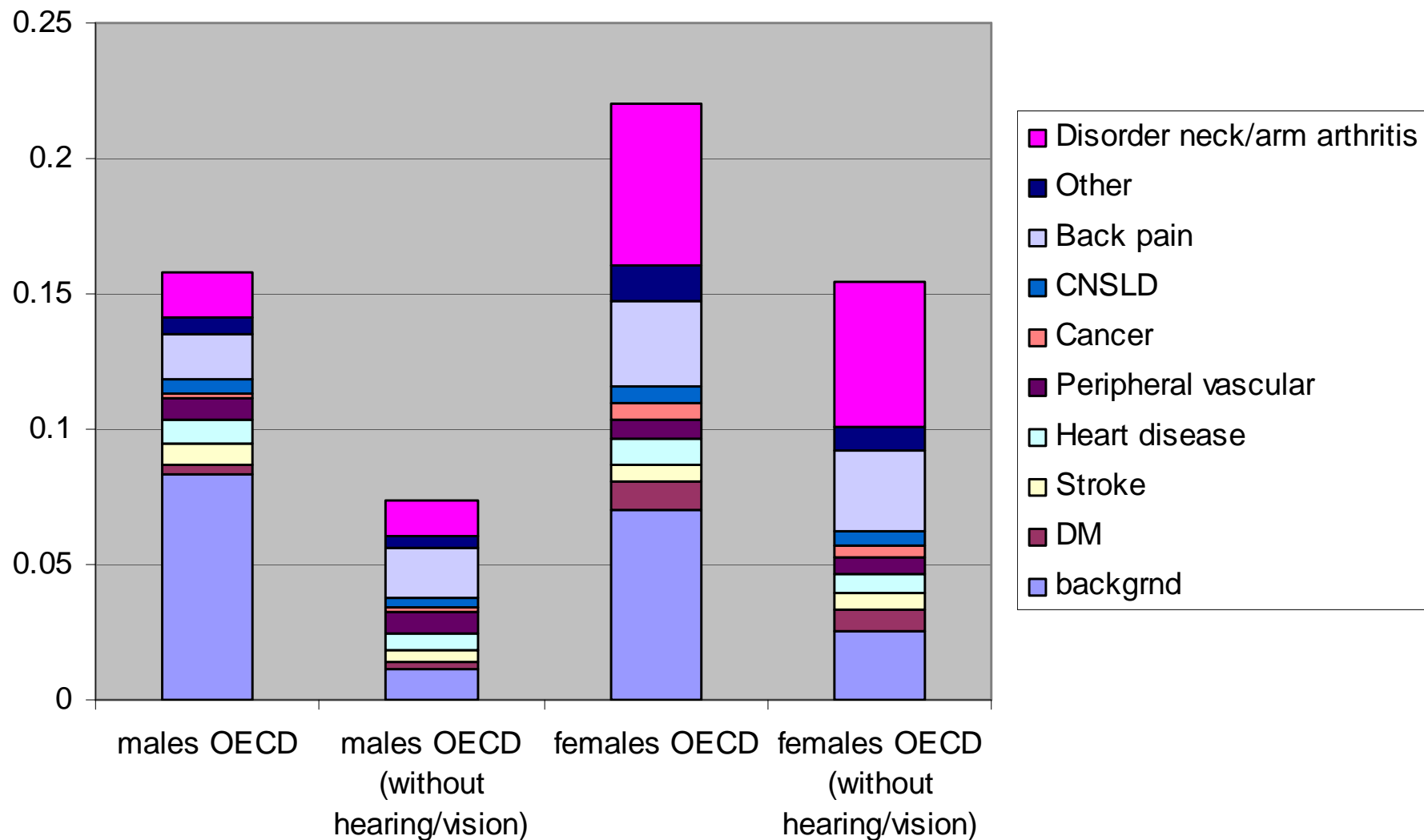
## Conclusion: diseases that contribute most to educational differences in disability

	Main contributor to educational difference in disability	Disease Prevalence	Disabling impact
Younger males	Back pain	+	+
	Disorder neck/arm	+	+
	PVD	+/-	+
	Other	+/-	+/-
Older males	Also: Arthritis and	+/-	+/-
	Heart disease	+/-	+/-
Younger females	Arthritis	+	+
	Back pain	+/-	+
	Other	+	+/-
Older females	Also DM	+	+/-

THANK YOU!

	<b>DISEASE GROUPS</b>	<b>ORIGINAL QUESTIONS</b>
	diabetes mellitus (DM)	1. Do you have diabetes?
<b>C V D</b>	stroke	2. Have you ever had stroke, cerebral bleeding or cerebral infarction?
	heart disease	4. Have you ever had a myocardial infarction? 5. Have you suffered from any severe myocardial disorder (e.g. cardiac failure or angina pectoris)
	peripheral vascular disease (PVD)	6. Have you suffered from narrow arteries in legs or abdomen during past twelve months?
	cancer	7. Have you ever had any form of cancer?
	chronic non-specific lung disease (CNSLD)	9. Have you suffered from asthma, chronic bronchitis, emphysema of lung or CNSLD during past twelve months?
<b>Mu scul o- skel etal</b>	back pain	10. Have you suffered from severe or persistent back disorder during past twelve months? -Are you still suffering from this disorder?
	arthritis	11. Have you suffered from joint degeneration during past twelve months? 12. Have you suffered from chronic joint inflammation during past twelve months?
	disorder neck/arm	13. Have you suffered from any disorder of neck or shoulder during past twelve months? -Are you still suffering from this disorder? 14. Have you suffered from any disorder of elbow, wrist or hand during past twelve months? -Are you still suffering from this disorder?
	other	15. Have you suffered from migraine or frequent severe headache during past twelve months? 16. Have you suffered from dizziness with falling during past twelve months? 17. Have you suffered from severe or persistent disorder of intestine for more than three months during past twelve months? 18. Have you suffered from involuntary loss of urine (incontinence) during past twelve months? 19. Have you suffered from psoriasis during past twelve months? 20. Have you suffered from chronic eczema during past twelve months?

# Contribution diseases to prevalence of disability with and without 'hearing and vision'.



## Methods: highest completed level of education

- Set of questions:
  - Are you currently receiving any education or training?
  - Which education/training?
  - What type of education (level)?
  - Have you received a diploma?

Elementary	Lager onderwijs
Lower secondary	LBO, MAVO, VWO3
Upper secondary	HAVO, VWO, MBO
Tertiary	HBO, universiteit

