Adipokines, C-reactive protein and Amyotrophic Lateral Sclerosis – results from a population- based ALS registry in Germany

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Design of the registry

Epidemiologic registry
registration of incident ALS cases within a defined region

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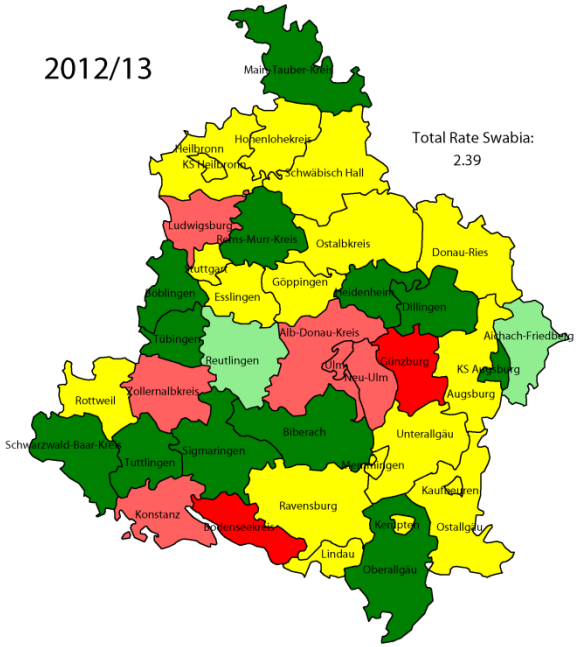

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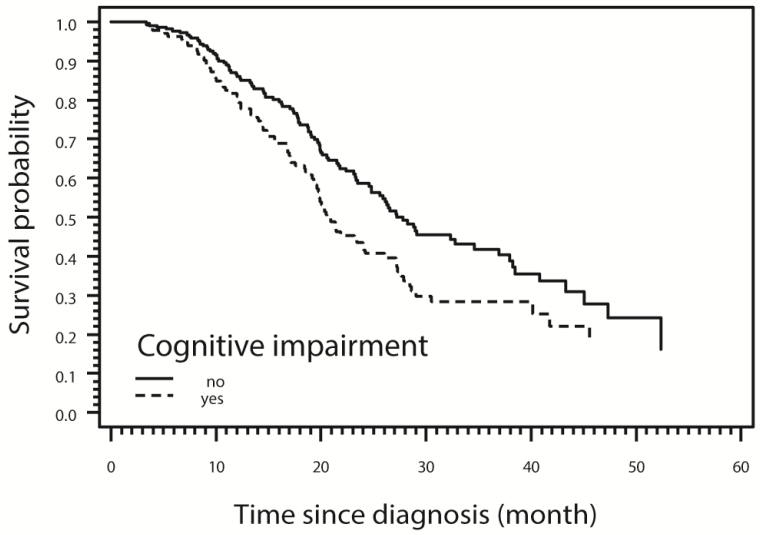

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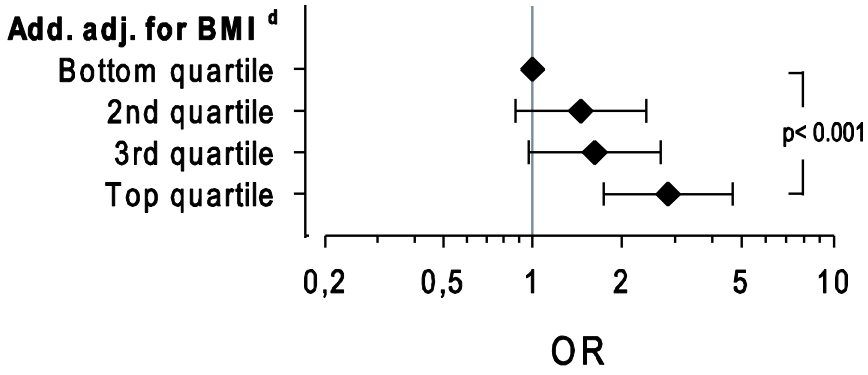

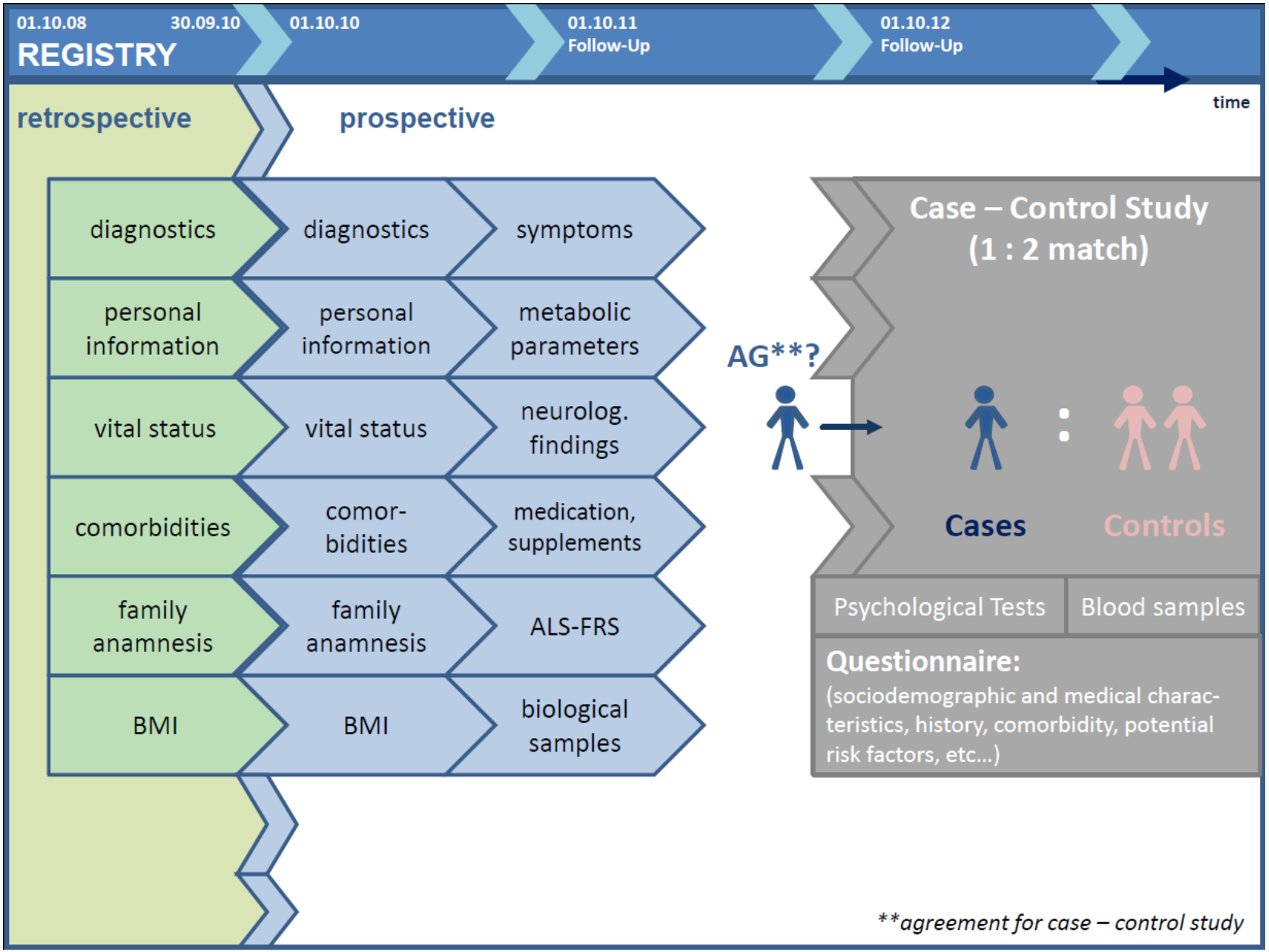
01.10.08
30.09.10
REGISTRY
01.10.10
01.10.11
Follow-Up
01.10.12
Follow-Up
time
retrospective
prospective
diagnostics
diagnostics
symptoms
personal information
personal information
metabolic parameters
vital status
vital status
neurolog. findings
comorbidities
comor-bidities
medication, supplements
family anamnesis
family anamnesis
ALS-FRS
BMI
BMI
biological samples
AG**?
Case – Control Study
(1 : 2 match)
Cases
Controls
Psychological Tests
Blood samples
Questionnaire:
(sociodemographic and medical characteristics, history, comorbidity, potential risk factors, etc...)
**agreement for case – control study

Amyotrophic Lateral Sclerosis Background

- Is relatively rare 2.5 cases per 100 000 person years
- ALS leads to death within 3-4 years after diagnosis

- Higher BMI is associated with better prognosis
- Blood lipids may be associated with prognosis
- Incidence may be lower in diabetes patients
- Inflammation may play a role

Study population

	N_{Cases}	ALS-cases	$N_{Controls}$	Control subjects
Age (years), mean (SD)	289	65.7 (10.5)	506	66.3 (9.8)
Sex	289		506	
Male, N (%)		172 (59.5)		301 (59.5)
School education, N (%)				
< 10th grade	289	161 (55.7)	503	226 (44.9)
≥ 10th grade		128 (44.3)		277 (55.1)
Smoking	286		505	
Ever, N (%)		132 (46.2)		244 (48.3)
BMI (kg m^{-2}), mean (SD)	289	24.6 (4.1)	404	26.5 (4.0)
Overweight (≥ 25 kg m^{-2}), N (%)		115 (39.8)		303 (60.2)
Family history of ALS, N (%)	284		506	
Positive		11 (3.9)		2 (0.4)
Leptin (ng mL^{-1}) , median (Q1, Q3)	287	7.3 (3.7, 13.1)	504	9.7 (5.3, 19.9)
Adiponectin (µg mL^{-1}) , median (Q1, Q3)	289	9.6 (6.2, 15.0)	506	7.5 (5.2, 12.7)
hs-CRP (mg L^{-1}) , median (Q1, Q3)	289	1.29 (0.64, 3.22)	505	1.14 (0.65, 2.80)
Diagnostic delay (month), median (Q1, Q3)	288	5.0 (2.8, 9.0)		
Diagnosis to baseline visit (month), median (Q1, Q3)	289	3.6 (2.1, 5.9)		

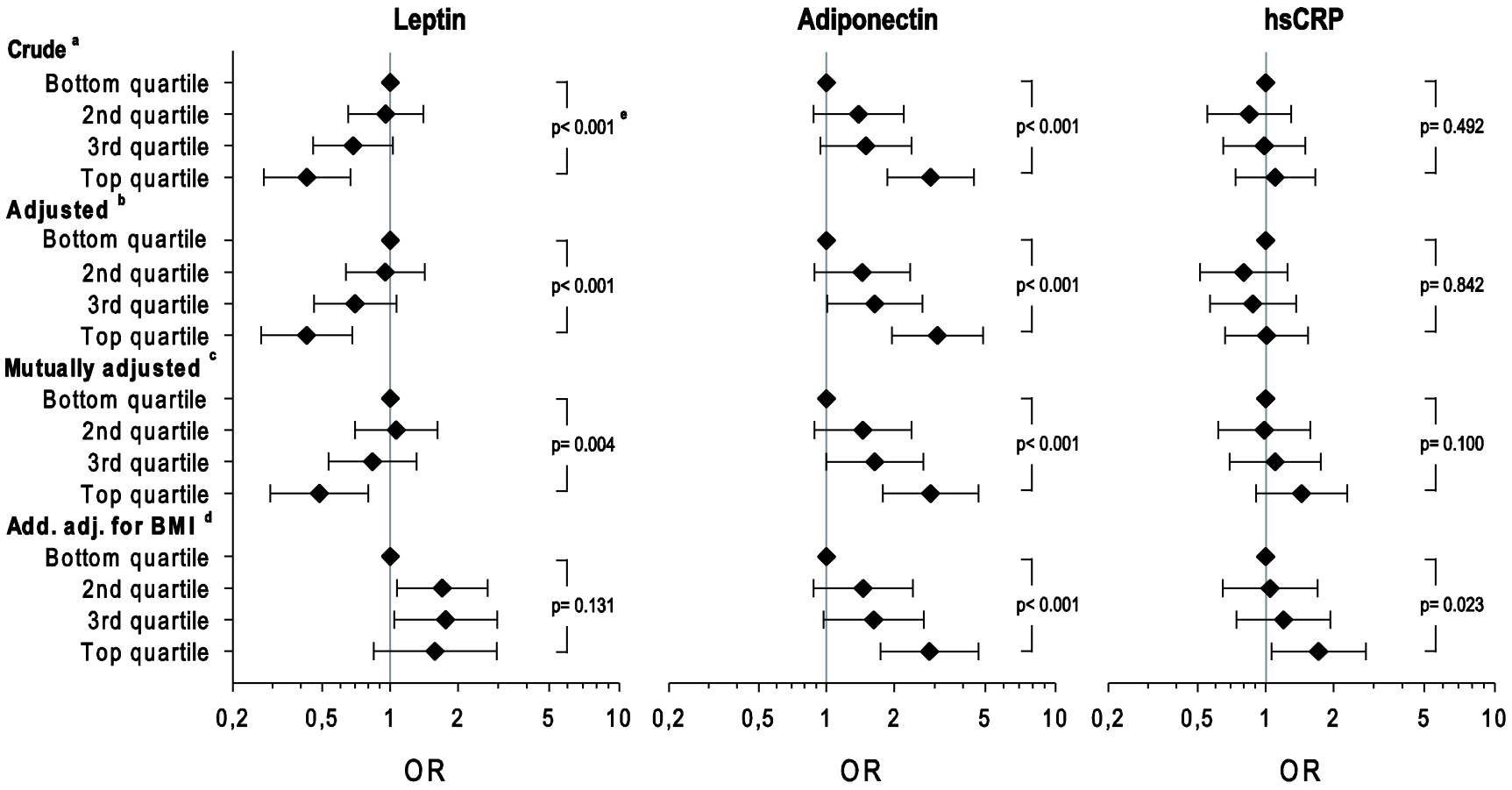

Figure 1. Adjusted Odds Ratios (ORs) for ALS with sex specific quartiles of leptin, adiponectin and CRP

[a] stratified for age and sex

[b] additionally adjusted for school education, occupational work intensity, smoking (ever), family history of ALS

[c] as [b] but mutually adjusted for leptin, adiponectin and hs-CRP

[d] as [c] but additionally adjusted for Body mass index (BMI)

[e] p-value for trend over quartiles

Patients by survival status

	$N_{Deceased}$	Deceased (N=104)	$N_{Survived}$	Survived (N=175)
Age (years), mean (SD)	104	68.9 (10.3)	175	63.9 (10.2)
Sex				
Male, N (%)	104	56 (53.9)	175	114 (65.1)
BMI (kg m^{-2}), mean (SD)	104	24.0 (4.2)	175	24.8 (4.0)
Leptin (ng mL^{-1}) , median (Q1, Q3)	104	7.2 (3.5, 13.3)	173	7.3 (3.8, 12.3)
Adiponectin (µg mL^{-1}) , median (Q1, Q3)	104	10.2(7.5, 15.2)	175	9.2 (5.8, 14.5)
Hs-CRP (mg L^{-1}) , median (Q1, Q3)	104	1.64 (0.70, 3.18)	175	1.17 (0.61, 3.29)
Diagnostic delay (month), median (Q1, Q3)	104	3.0 (2.0, 6.0)	175	6.0 (3.0, 9.0)
ALS-FRS, median (Q1, Q3)	103	36 (32, 41)	175	41 (37, 43)

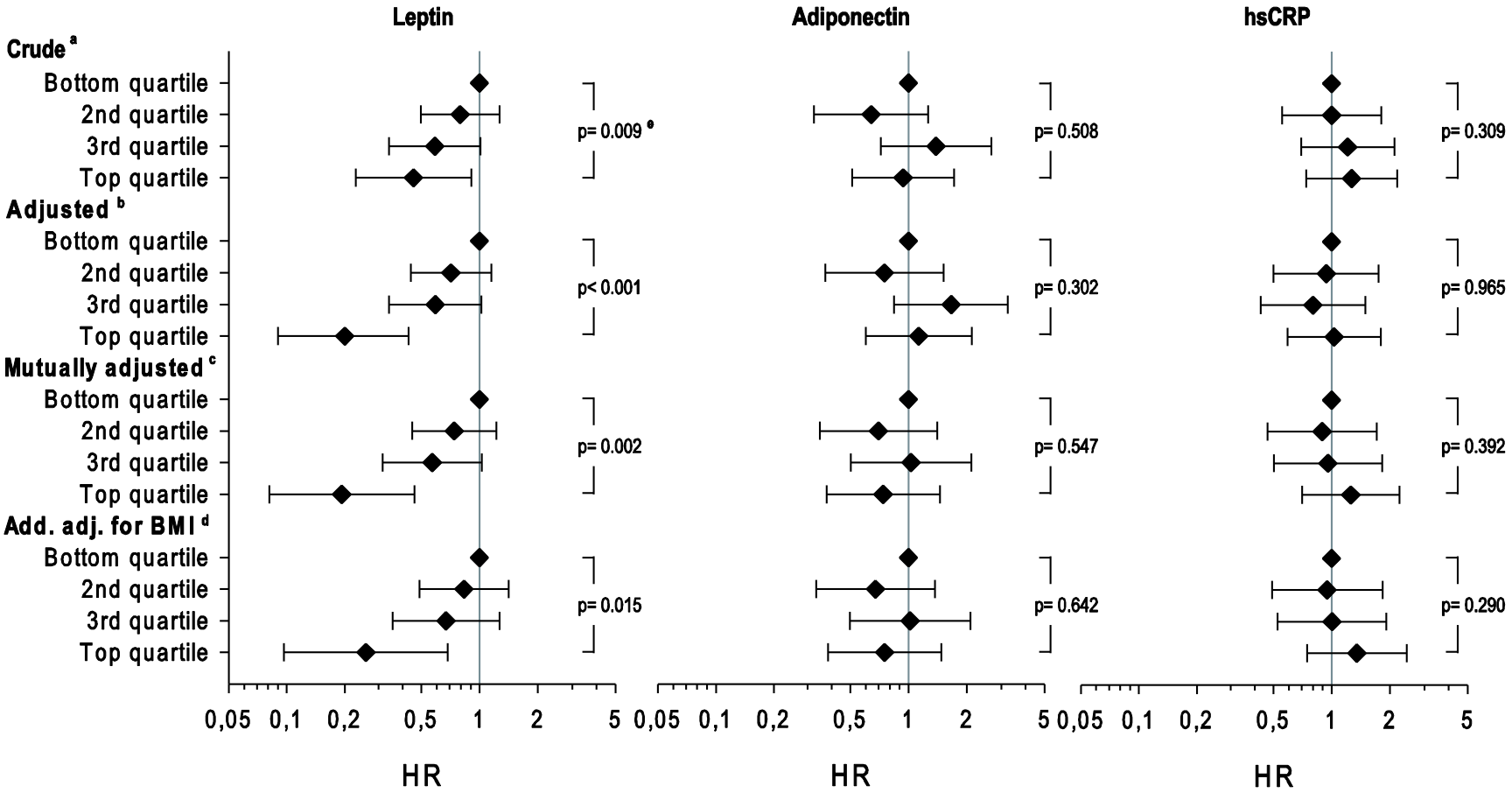

Figure 2. Hazard ratio for mortality by sex specific quartiles of leptin, adiponectin and hs-CRP among ALS patients

[a] Stratified for sex

[b] additionally adjusted for age, diagnostic delay, site of onset and ALS-FRS

[c] as [b] but mutually adjusted for leptin, adiponectin and hsCRP

[d] as [c] but additionally adjusted for Body mass index (BMI)

[e] p-value for trend over quartiles

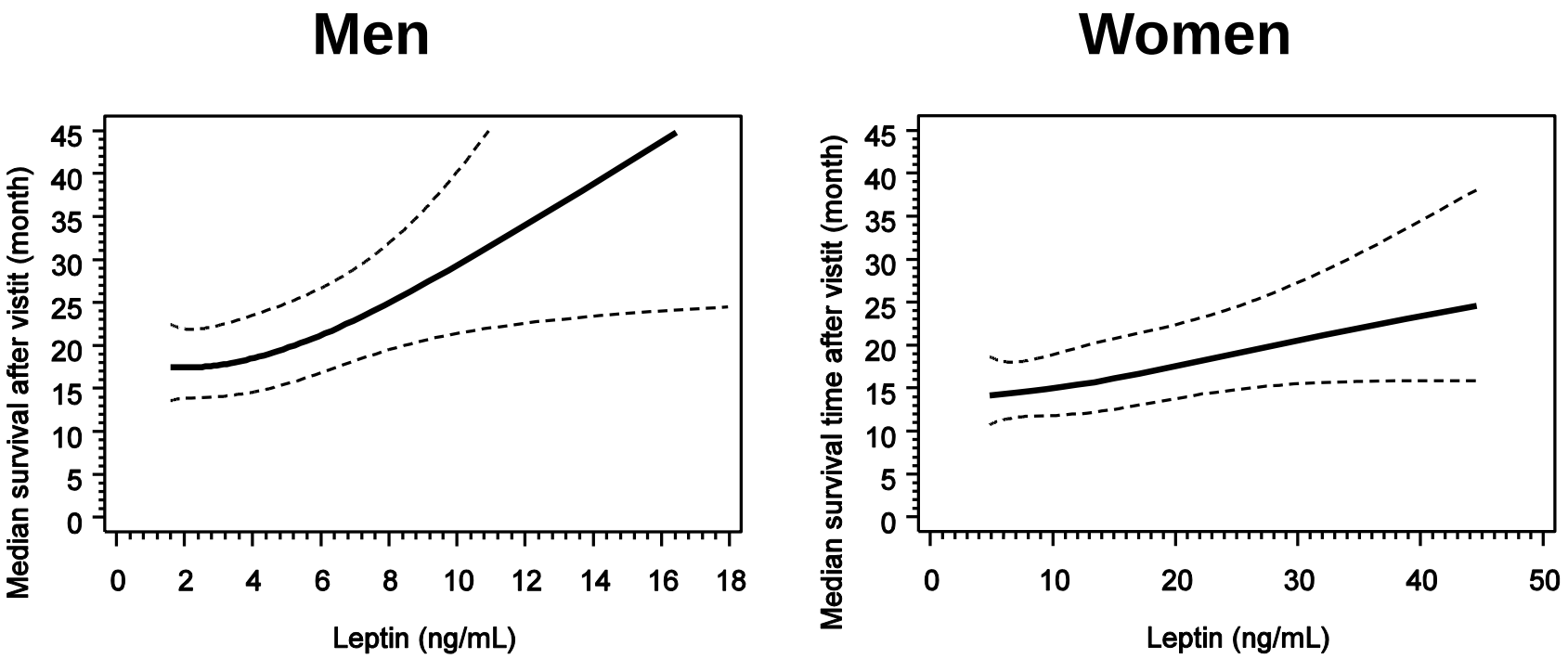

Figure 2. Median survival time (95% confidence band) of ALS patents after baseline visit in month by leptin level. Adjusted for age and sex, diagnostic delay, site of onset and ALS-FRS.

Main findings

- Leptin and adiponectin were independently associated with odds of ALS
- Higher leptin levels were further associated with longer survival of ALS patients

Limitations

- Cross sectional association in case-control study (samples taken after diagnosis)

- Participation rate lower in controls (19% vs. 65% in cases)

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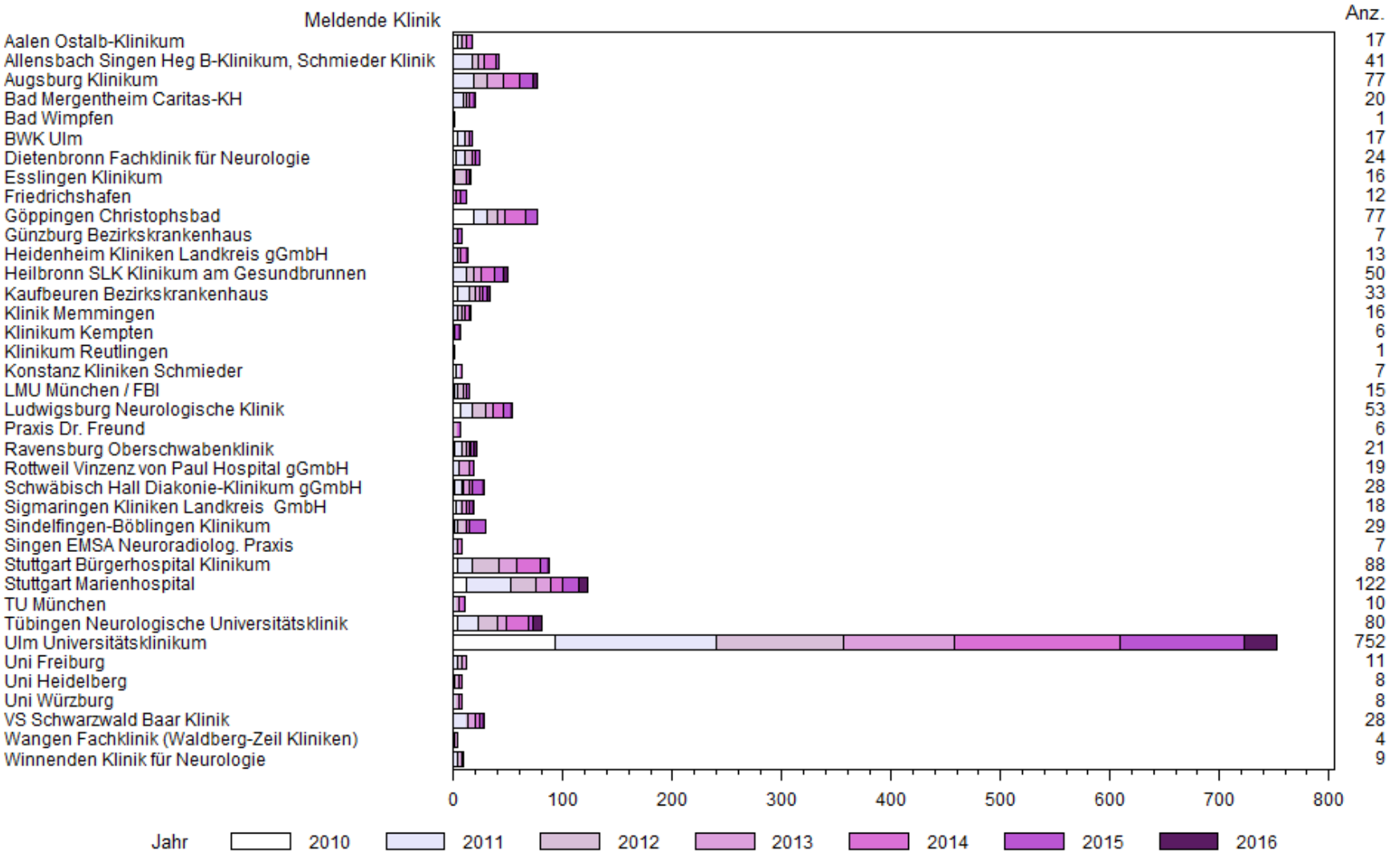
S Enderle

Neuropsychologie:
Dr. D. Lule

http://www.als-register.net/

ALS - Meldungen pro Klinik

N = 1751 ALS-Meldungen (enthält Mehrfachmeldungen)



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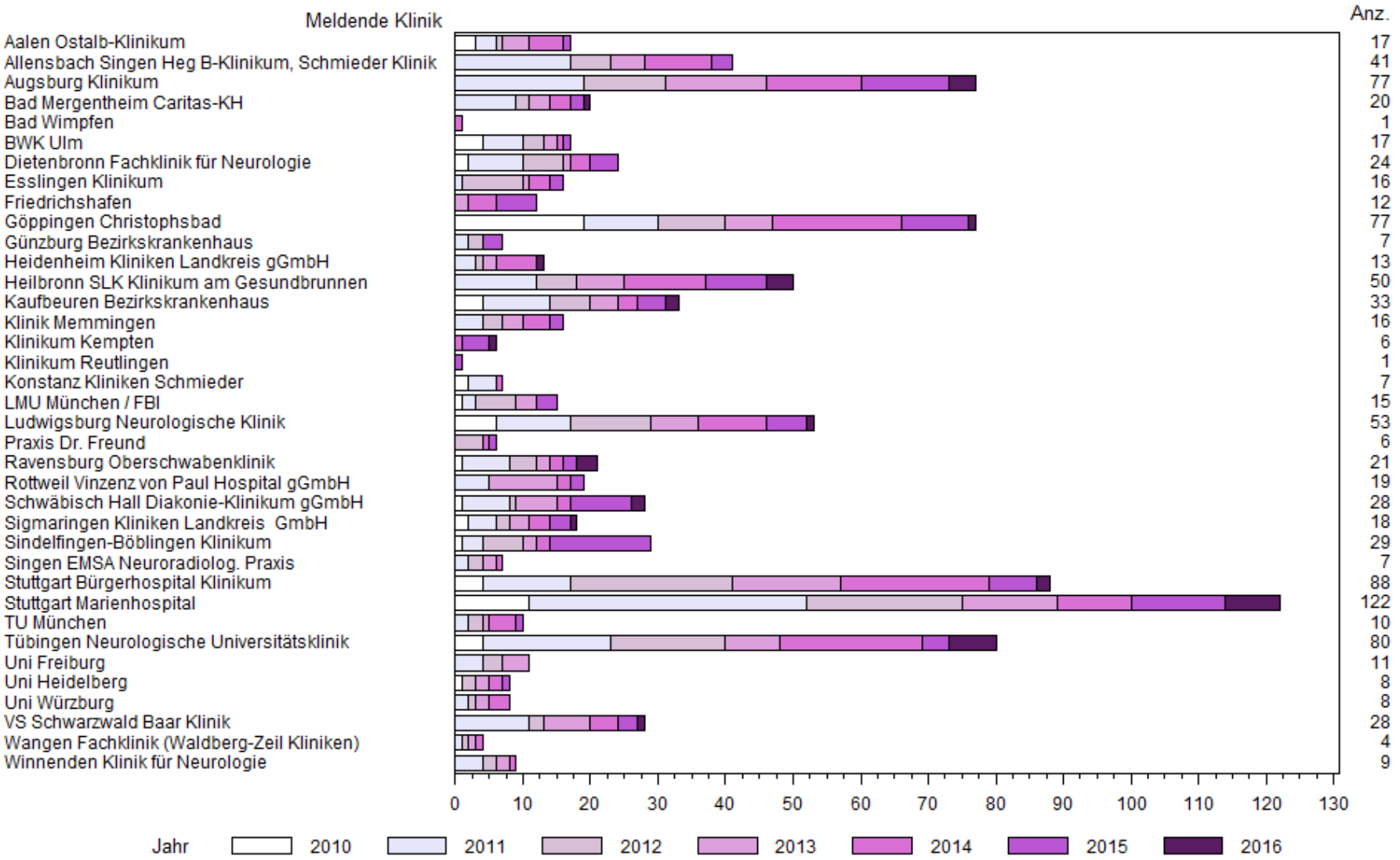
ALS - Meldungen pro Klinik (ohne Ulm-Uni)

N = 999 ALS-Meldungen (enthält Mehrfachmeldungen)



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