



Assessment of the Diabetes Risk in the German Population

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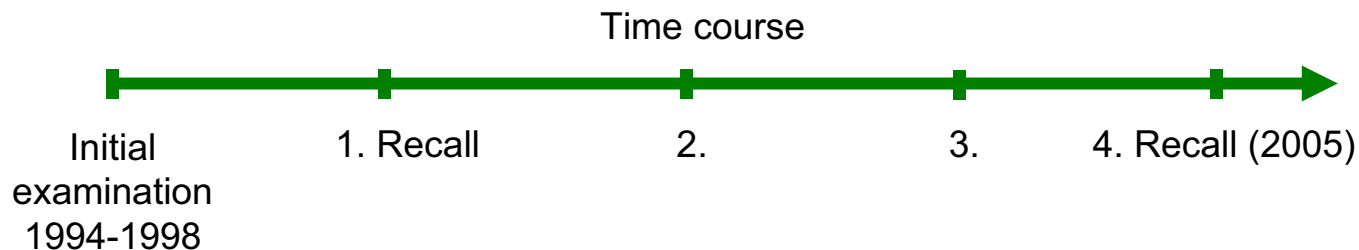


Identification of Risk Factors for Type 2 Diabetes in a Population-based, Prospective Cohort (EPIC-Potsdam)

D/E

- 27.548 Participants from Potsdam
- General population
- Age 35-65 years

- Prospective study design
- >90% Compliance
- precise, prospective monitoring of nutritional and lifestyle parameters



- **849 incident type 2 diabetics**
- **24318 healthy controls**

- Validation in EPIC Heidelberg:**
- **658 incident type 2 diabetics**
 - **23398 healthy controls**

Statistical concept of calculation

D/E-

Estimating the probability of incident type 2 diabetes in the next 5 years

Cox proportional hazard rate model

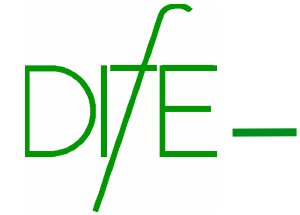
$$\lambda(t) = \lambda_0(t) \cdot \exp\{\beta_1 X_1 + \dots + \beta_m X_m\}$$

t = 5 years

risk factors

Allocated points for X_i : $\exp\{\beta_i\}$

Risk Factors for Incident Type 2 Diabetes in the EPIC-Potsdam Cohort



Risk factor	Relative risk (95% CI)	p-value	points
Waist circumference (cm)	1.076 (1.071-1.082)	<0.0001	7.4
Height (cm)	0.976 (0.967-0.984)	<0.0001	-2.4
Age (years)	1.044 (1.035-1.053)	<0.0001	4.3
Hypertension (self report)	1.587 (1.375-1.831)	<0.0001	46
Intake of whole grain bread (each 50 g/day)	0.918 (0.855-0.986)	0.0193	-9
Intake of red meat (each 150 g/day)	1.639 (1.228-2.187)	0.0008	49
Consumption of coffee (each 150 g/day)	0.958 (0.926-0.991)	0.0142	-4
Alcohol consumption (between 10 and 40 g/day)	0.821 (0.705-0.954)	0.0104	-20
Sports, biking, gardening (h/week)	0.984 (0.973-0.995)	0.0060	-2
Former smoker	1.267 (1.094-1.469)	0.0016	24
Current heavy smoker, (≥20 cigarettes/day)	1.901 (1.470-2.458)	<0.0001	64

Epidemiology/Health Services/Psychosocial Research
 COOPERATION PARTNERS

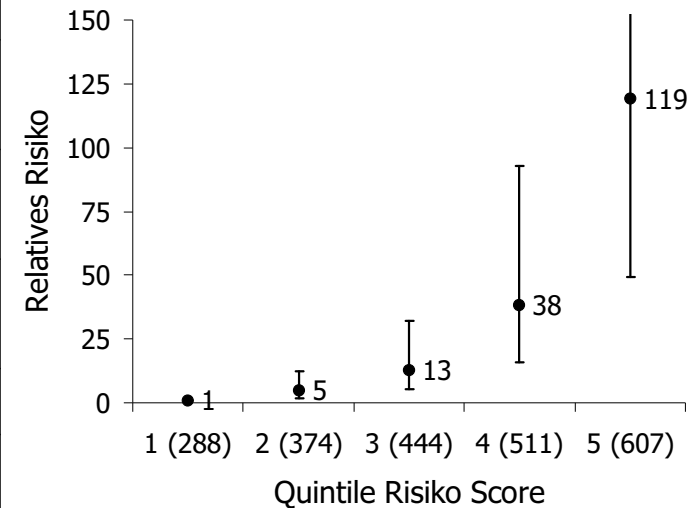
An Accurate Risk Score Based on Anthropometric, Dietary, and Lifestyle Factors to Predict the Development of Type 2 Diabetes

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Randomised clinical trials have demonstrated that type 2 diabetes can largely be prevented through diet and lifestyle modifications (1-4) or drug treatment (3,5). Personalized primary prevention among high-risk individuals to prevent the transition to overt diabetes

Schulze et al., Diabetes Care 30, 510-15 (2007)

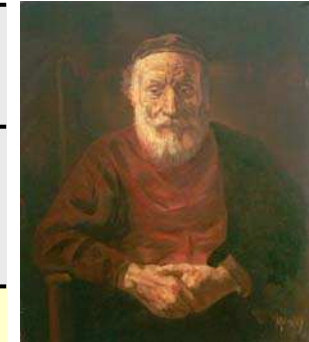


Estimated probability (in %) to develop diabetes mellitus in the next 5 years

D/E-

Schulze et al., Diabetologie und Stoffwechsel (2007)

Waist (cm)	Age			
	35	45	55	65
80	0.4	0.6	1.0	1.5
90	0.9	1.3	2.0	3.1
100	1.8	2.8	4.2	6.4
110	3.7	5.7	8.6	12.9
120	7.7	11.6	17.2	25.2



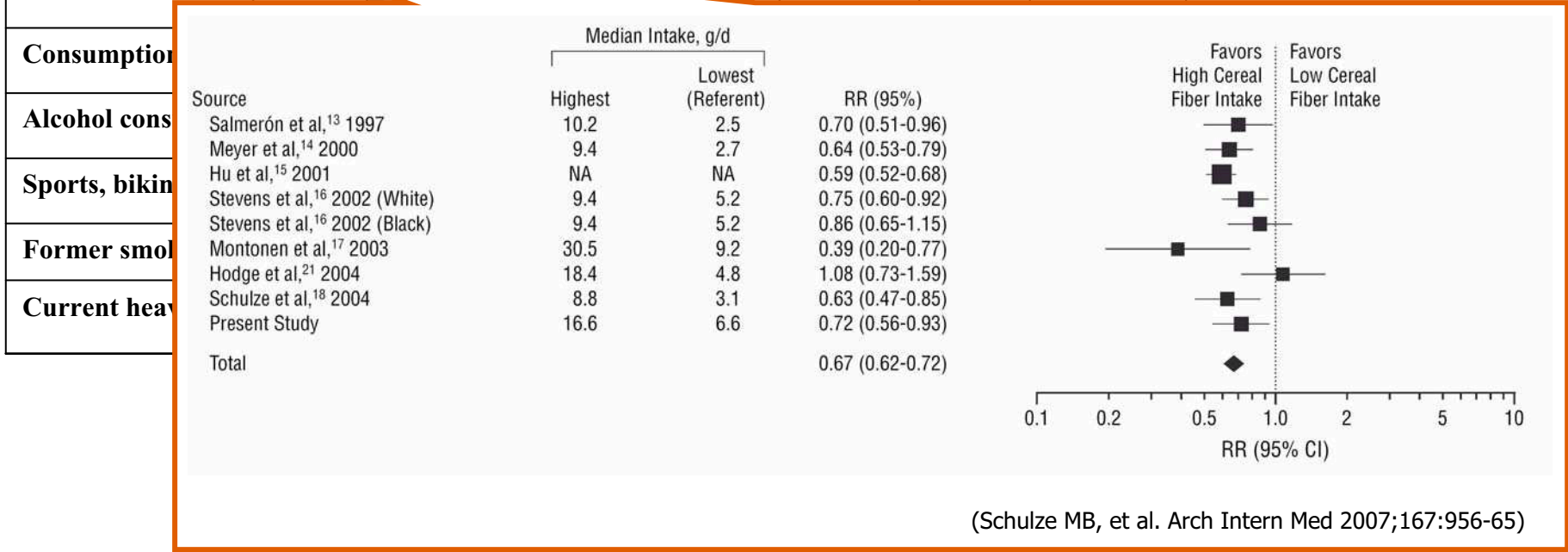
Person with height 170cm, never smoker, no alcohol consumption, no consumption of red meat, whole grain bread and coffee, no history of hypertension and no activity in sports, biking and gardening

Risk Factors for Incident Type 2 Diabetes in the EPIC-Potsdam Cohort

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Stimulation of GIp1 secretion?



(Schulze MB, et al. Arch Intern Med 2007;167:956-65)

(Schulze MB et al. Diabetes Care 2007;30:510-5)

Risk Factors for Incident Type 2 Diabetes in the EPIC-Potsdam Cohort

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Former smoker			
Current heavy smoker (≥20 cigarettes/day)			

Health Professionals Follow-up Study:
van Dam R., et al. Diabetes Care 2002;25:417-24

Nurses' Health Study 2:
Schulze M.B., et al. Diabetologia 2003;46:1465-73

Nurses' Health Study:
Fung T.T. et al. Arch Intern Med 2004;164:2235-40

Women's Health Study:
Song Y., et al. Diabetes Care 2004;27:2108-15

Shanghai Women's Health Study:
Villegas R., et al. Int J Med Sci. 2006;3:152-9

(Schulze MB et al. Diabetes Care 2007;30:510-5)

Risk Factors for Incident Type 2 Diabetes in the EPIC-Potsdam Cohort

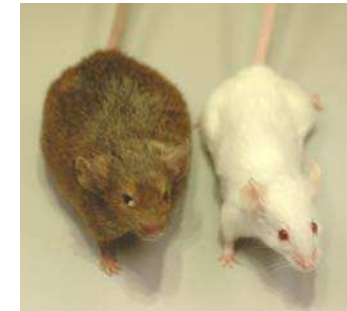
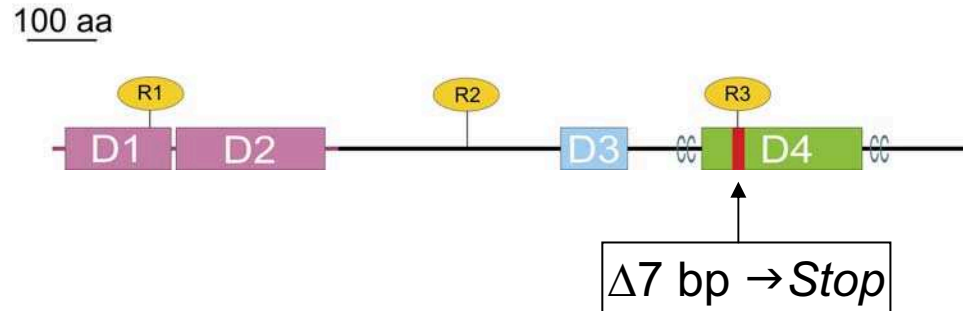


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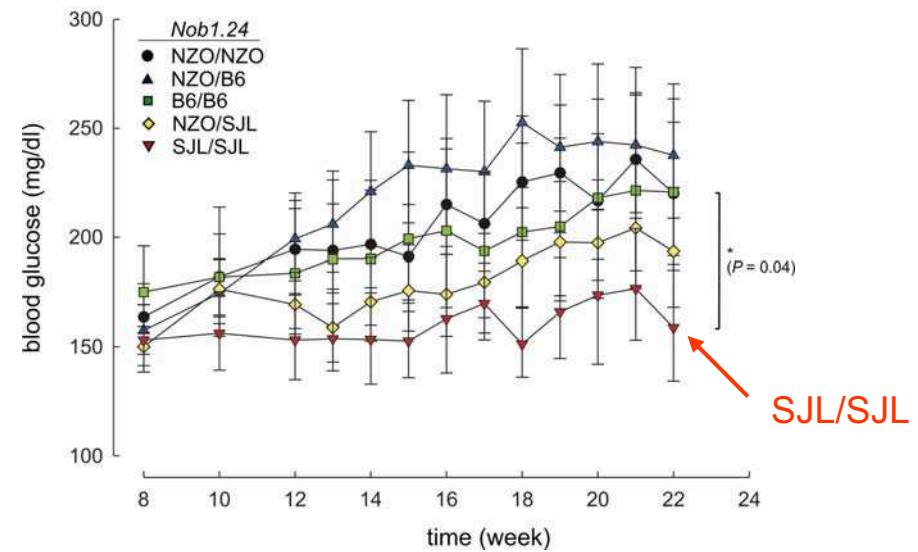
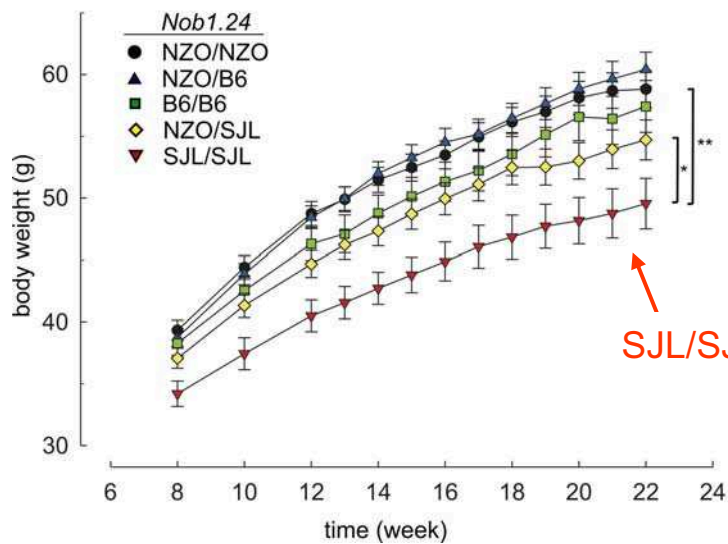
Enhanced fatty acid oxidation?

Loss-of-function Mutation of Tbc1d1 in SJL is a Suppressor of Obesity and Diabetes in Obese Mice

D/E-



NZO SJL

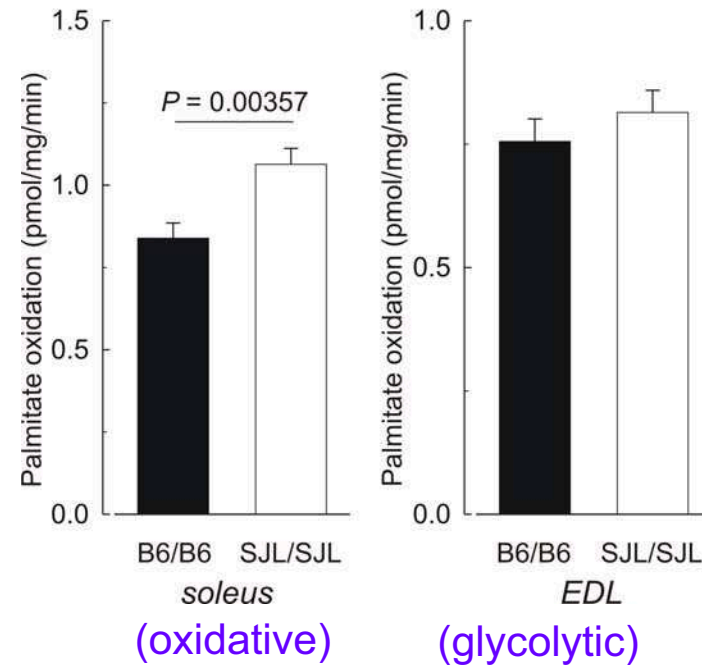
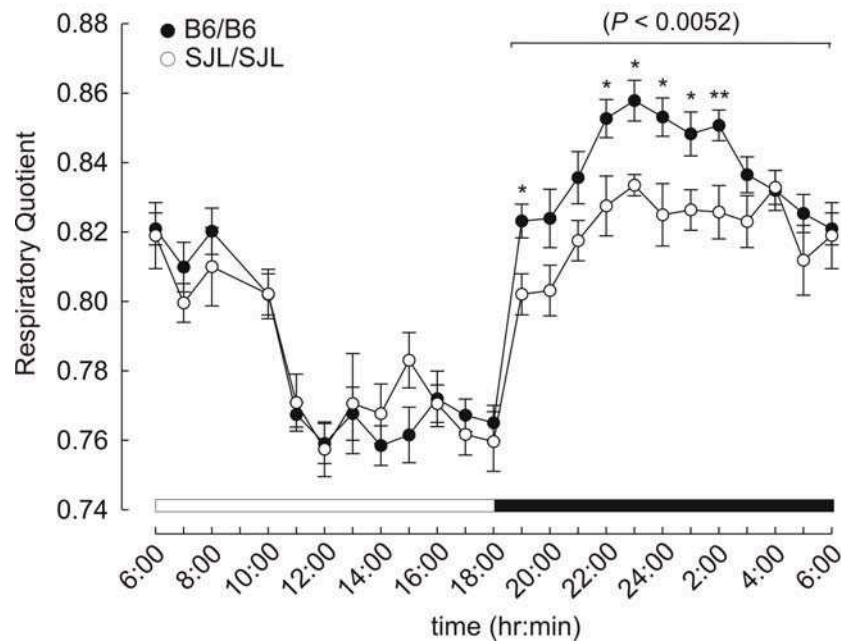


Deletion of *Tbc1d1* Increases Lipid Oxidation in Muscle



B6.SJL.RCS.Nob1.10

B6/B6: wildtype
 SJL/SJL: *Tbc1d1* knockout



Increased respiratory quotient (RQ = CO₂ produced / O₂ consumed)
 -> altered substrate partitioning: glucose -> fat

Increased fatty acid oxidation



DEUTSCHER DIABETES- RISIKO-SCORE FRAGEBOGEN

Testen Sie Ihr Risiko, innerhalb der nächsten 5 Jahre an einem Typ-2-Diabetes (Altersdiabetes) zu erkranken.

Ein Typ-2-Diabetes tritt nicht plötzlich auf, sondern entwickelt sich schleichend über Jahre, wobei Gefäße und Augen bereits frühzeitig geschädigt werden können. Schwere Folgeschäden sind Herz-Kreislauf-Erkrankungen, Blindheit oder Nierenversagen. Wenn Sie Ihr Typ-2-Diabetes-Risiko rechtzeitig erkennen, können Sie durch einfache Maßnahmen der Erkrankung vorbeugen.

Der von Wissenschaftlern des Deutschen Instituts für Ernährungsforschung Potsdam-Rehbrücke (DIFE) entwickelte Fragebogen informiert Sie über Ihr Typ-2-Diabetes-Risiko und über Faktoren, die es beeinflussen.

Nutzen Sie auch die Online-Version des Deutschen Diabetes-Risiko-Scores. Sie finden den Online-Test unter www.dife.de. Er informiert Sie umfassend und gibt Ihnen individuell zugeschnittene Empfehlungen zur Risikosenkung.

Achtung:

Der Test ist **nicht anwendbar**, wenn bei Ihnen bereits ein Typ-1- oder Typ-2-Diabetes bekannt ist oder Sie schon einmal erhöhte Blutzuckerwerte hatten. Sollte Letzteres der Fall sein, sprechen Sie bitte mit Ihrem Arzt über Ihr Erkrankungsrisiko.



Fotos: ARNE-Design, Photocase.com, Pixquelle.de

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Deutscher Diabetes-Risiko-Score



Bitte füllen Sie alle Felder aus und folgen Sie dem Pfeil 'Weiter' zum nächsten Abschnitt

Allgemein | Bewegung | Ernährung | Lebensstil | Übersicht

Ihr **Geschlecht** männlich weiblich

Ihr **Alter** in Jahren

Ihre **Körpergröße** in cm

Ihr **Taillenumfang** in cm

Zur Vergrößerung der Messanleitung führen Sie den Mauszeiger über das Bild.

Taillenumfang nicht bekannt?
 Klicken Sie hier, um den Taillenumfang mit Hilfe Ihrer Gewichtsangabe zu schätzen.

Hatten Sie jemals oder haben Sie zurzeit **erhöhten Blutdruck?** Nein Ja

← Zurück **Weiter →**

Willkommen | Test | Hintergrund | Risikofaktoren | Berechnung

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 Version: 1.2, zuletzt geändert am 07. Mar 2007
 erstellt mit: [Catalyst](#), ein [Perl](#) basiertes Applikations-System

Precision of the Risk Score



Epidemiology/Health Services/Psychosocial Research
ORIGINAL PAPER

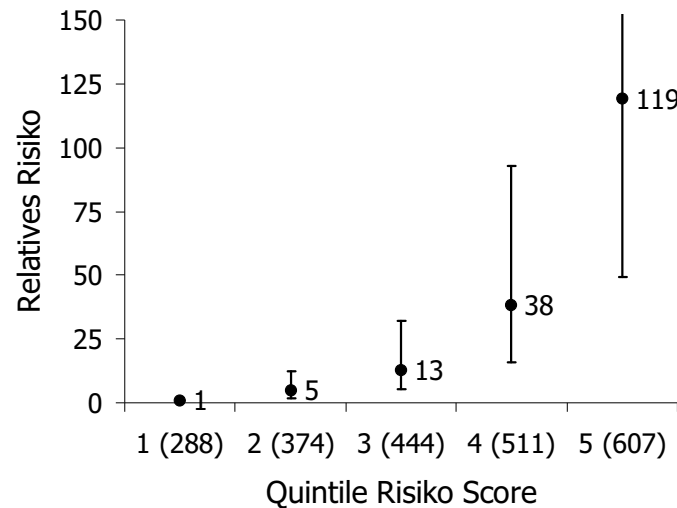
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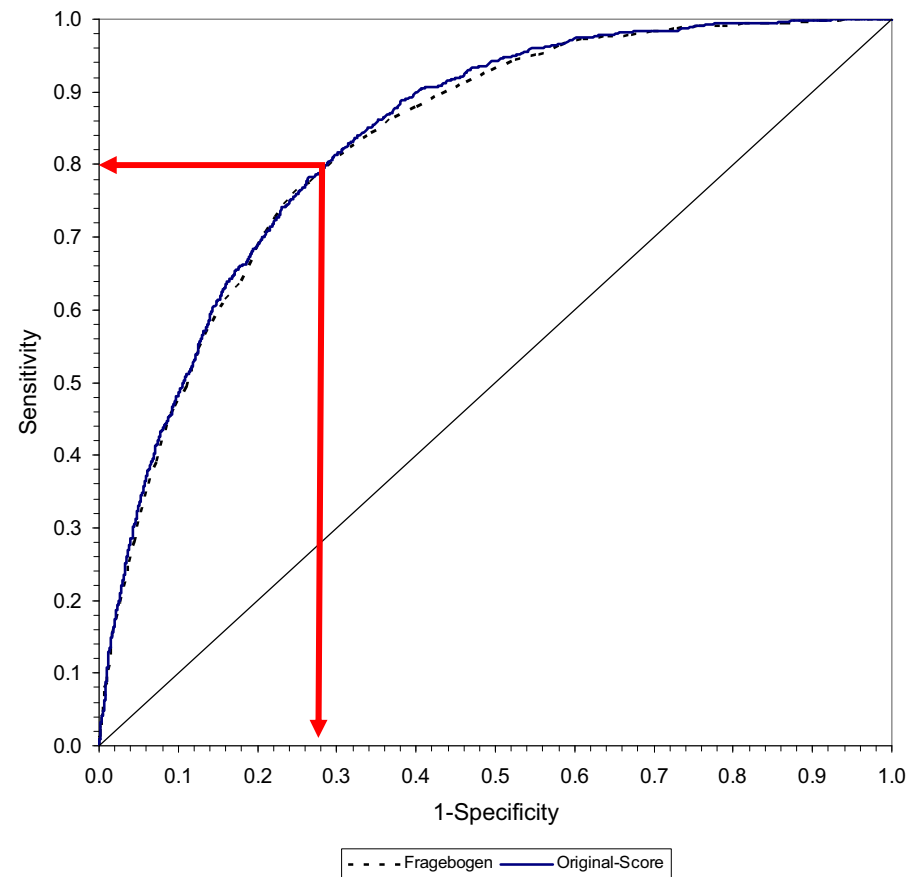
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Sensitivity and specificity of prediction

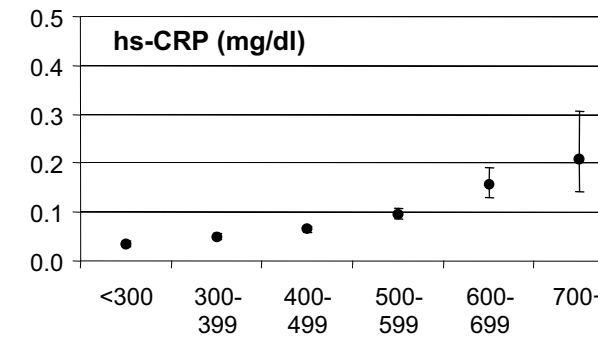
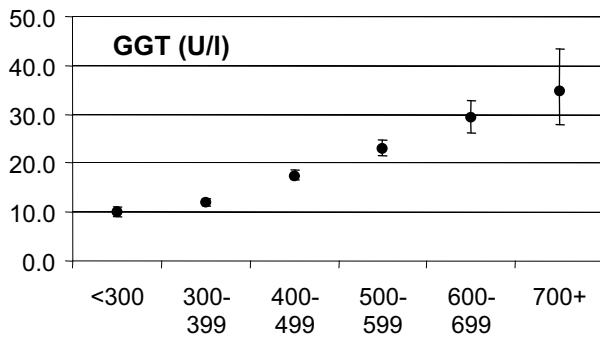
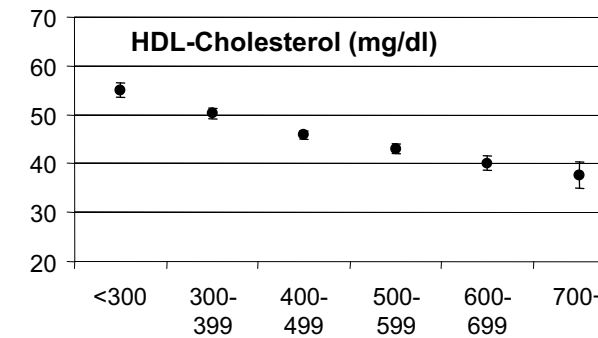
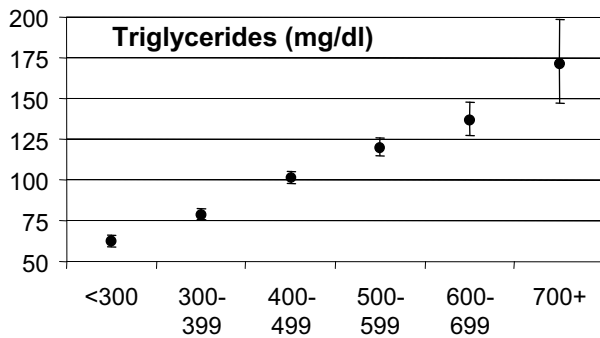
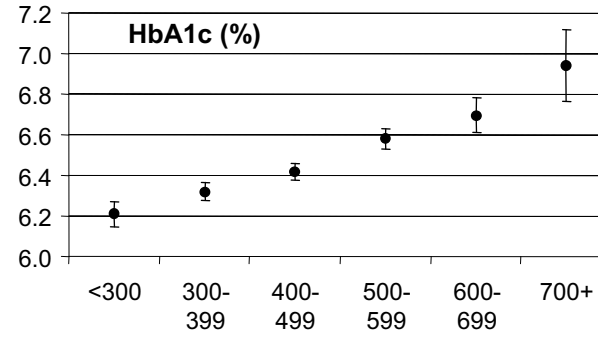
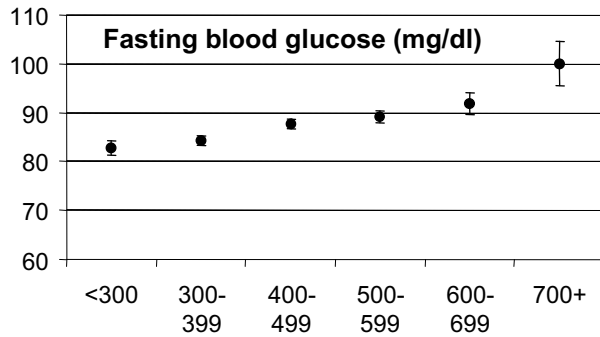
Diabetes Risk Score - ROC Curve Fragebogen und Original-Score



Spearman Correlation Original Score und Questionnaire: 0.981

ROC AUC Fragebogen: 0.830

DRS Predicts an Unfavourable Profile of Biomarkers and Detects Prediabetes



Risk score points

Risk score points

Summary: Prediction of Type 2 Diabetes in the German Population



- 1. The German Diabetes Score is based on a prospective cohort (N=25,548) which is representative for the German general population.**
- 2. The score allows identification of 80% of all cases expected within the next five years (sensitivity) with approximately 25% false positives (specificity).**
- 3. Sensitivity and specificity can be increased by inclusion of serum parameters such as fasting plasma glucose.**
- 4. At present, genetic testing does not enhance the sensitivity and specificity of the score.**



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