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Can utility scores using the EQ-5D be used to predict outcomes of patients with type 2 diabetes?

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Background

- Risk models are a widely used tool for predicting vascular risk in both the general population (e.g. Framingham equations) and in Diabetes (UKPDS Outcomes Model).
- Risk prediction models generally do not include subjective assessments of health by the patient.
- There is evidence that questions like “How would you rate you health” is a good predictor of mortality
- Less evidence about whether it is still predictive if you take other risk factors into account (e.g. Blood pressure)

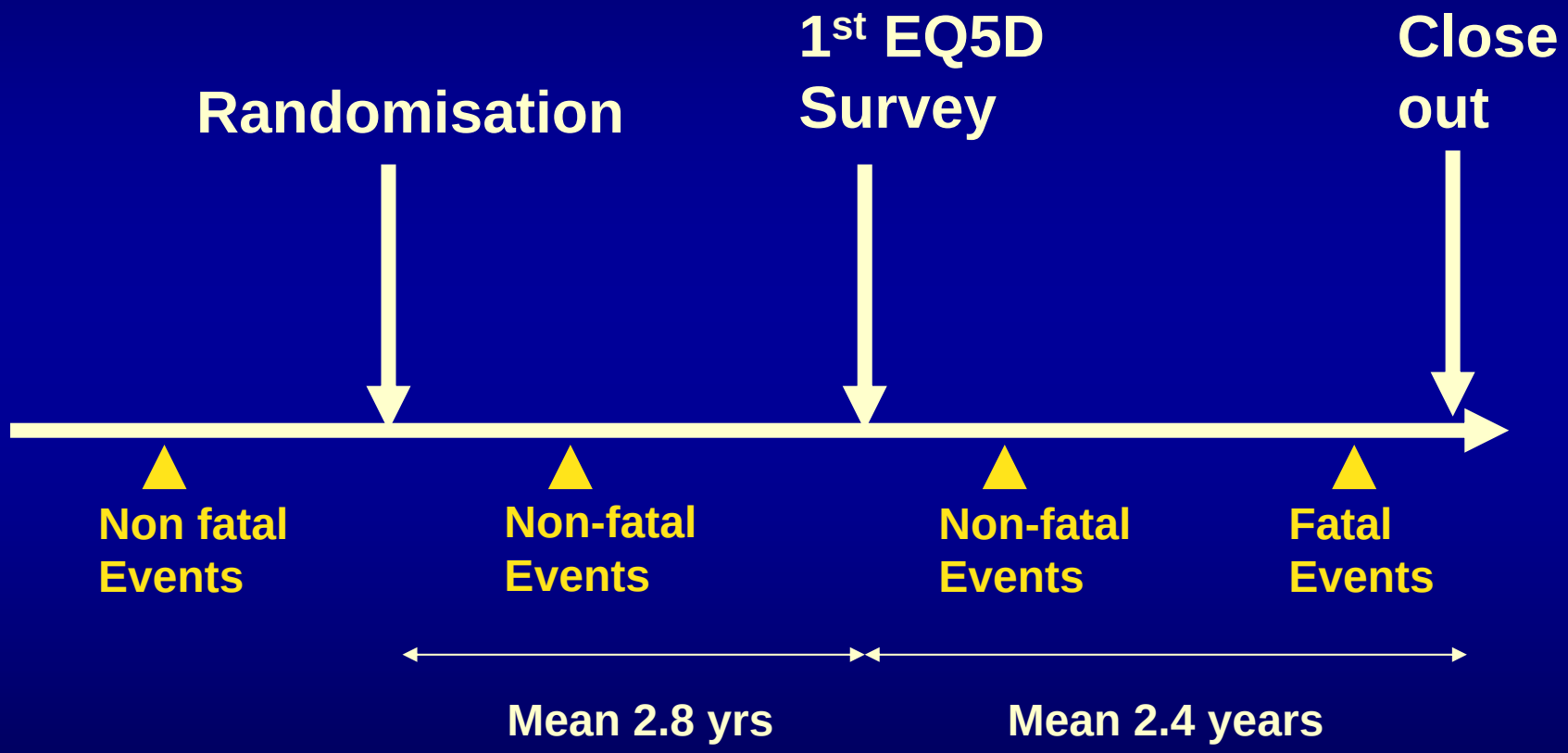
Objective

To examine whether health related quality of life using utility scores from the EQ-5D, is an independent predictor of mortality and morbidity in people with type 2 diabetes

FIELD Study

- Fenofibrate Intervention and Event Lowering in Diabetes (FIELD) study
- Designed to assess the effect of fenofibrate on cardiovascular disease events in people with type 2 diabetes.
- QOL study involves patient from Australia & New Zealand:
  - 7348 people aged between 50-75 years
  - Completed at least one EQ5D questionnaire (~ 90%)

Study time-line



Censoring: From close out, or death

Risk factors

- Age at time of EQ-5D Survey
- Sex
- Body mass index*
- Smoking status
- Duration of diabetes
- Systolic blood pressure*
- HbA_{1c}*
- Total cholesterol : hdl ratio*
- Prior clinical history
- Utility scores from UK valuation of EQ5D

*Used average of available values between randomisation and EQ-5D questionnaire

Outcomes

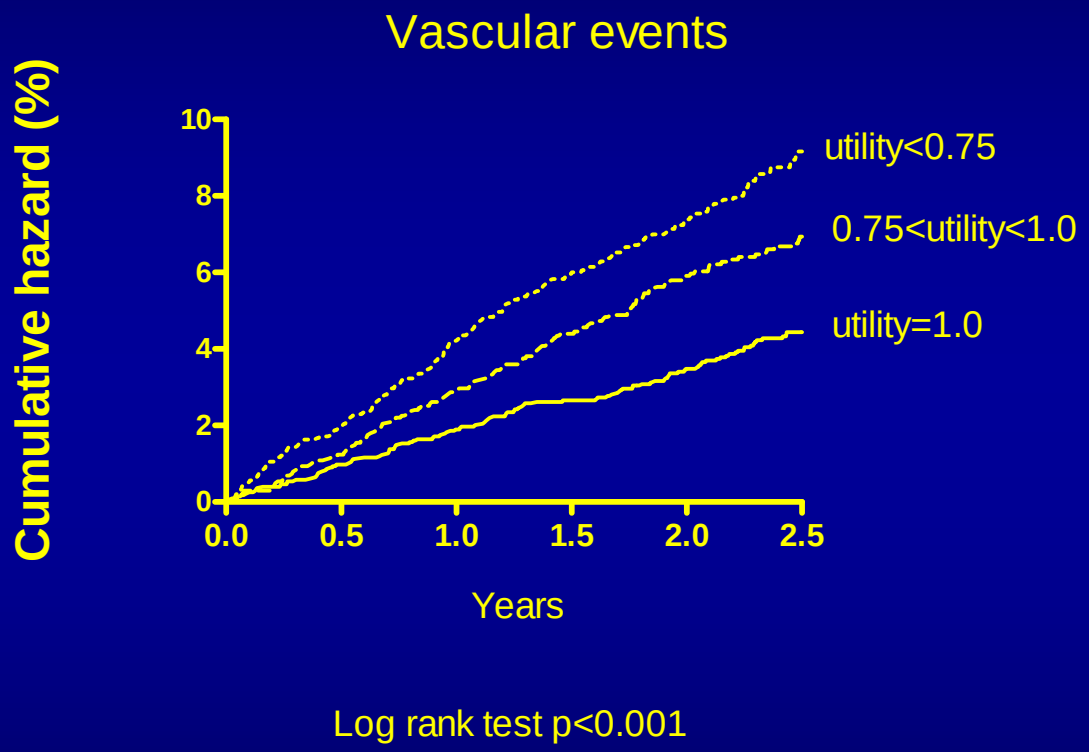
- Vascular events (first of)
  - MI, stroke, hospitalization for angina, or cardiovascular death
- Diabetic complications (first of):
  - Heart failure, amputation; renal dialysis, lower extremity ulcer
- All cause mortality

Methods

- Graphical analysis of the cumulative hazard of each outcome. Log-rank tests used to examine significant differences between Utility scores (less than 0.75, 0.75 -1,1)

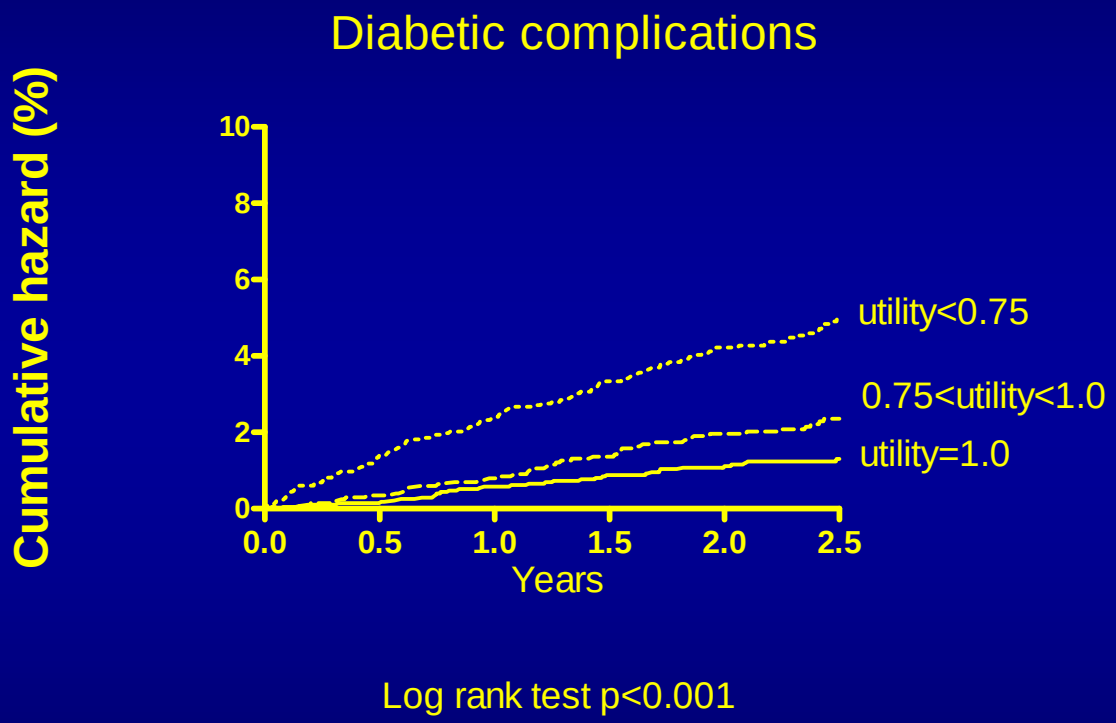
- Multivariate Cox proportional hazards modelling. Hazard-ratios associated with utility scores were determined after controlling for covariates age, sex, smoking, duration of diabetes, blood pressure, lipid levels, HbA_{1C} and prior clinical history.

Cumulative hazard by utility scores



Log rank test p<0.001

Cumulative hazard by utility scores



Log rank test p<0.001

Proportional Hazards Model Vascular events (453 events)

Variable	HR	P value
EQ5D utility per 0.1 point increase	0.93	<0.001
Female	0.75	0.007
BMI	-	-
Hba1c per %	1.19	<0.001
Age per 10 years	1.47	<0.001
Diabetes duration per 10 years	-	-
Current smoker	1.57	0.002
Systolic blood pressure/10mm Hg	1.17	<0.001
Total/ HDL cholesterol ratio %	1.13	0.006
Prior vascular events	2.85	<0.001
Prior diabetic complications	2.6	<0.001

Cox PH model for diabetes complications

Variable	HR	P value
EQ5D utility per 0.1 point increase	0.87	<0.001
Female	0.54	<0.001
BMI	1.04	<0.001
Hba1c per %	1.42	<0.001
Age per 10 years	1.7	<0.001
Diabetes duration per 10 years	1.39	0.002
Current smoker	2.32	<0.001
Systolic blood pressure/10mm Hg	1.13	0.026
Total/ HDL cholesterol ratio %	-	-
Prior vascular events	1.86	<0.001
Prior diabetic complications	10.69	<0.001

EQ-5D dimensions

Mobility

- I have no problems in walking about
- I have some problems in walking about
- I am confined to bed

Self Care

- I have no problems with self-care
- I have some problems with self-care
- I am unable to wash or dress myself

Usual activities

- I have no problems with performing my usual
- I have some problems with performing my usual activities
- I am unable to perform my usual activities

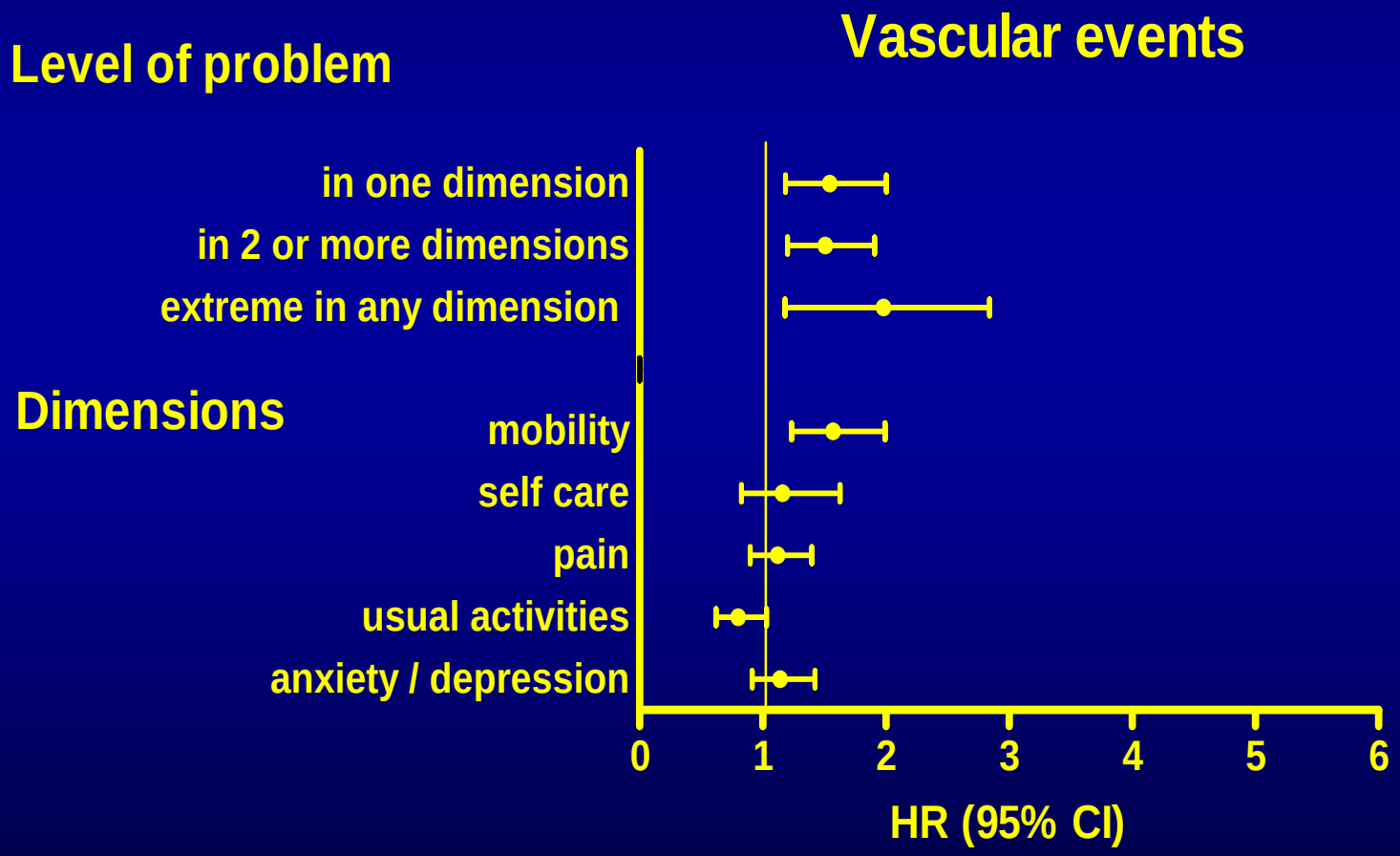
Pain/Discomfort

- I have no pain or discomfort
- I have moderate pain or discomfort
- have extreme pain or discomfort

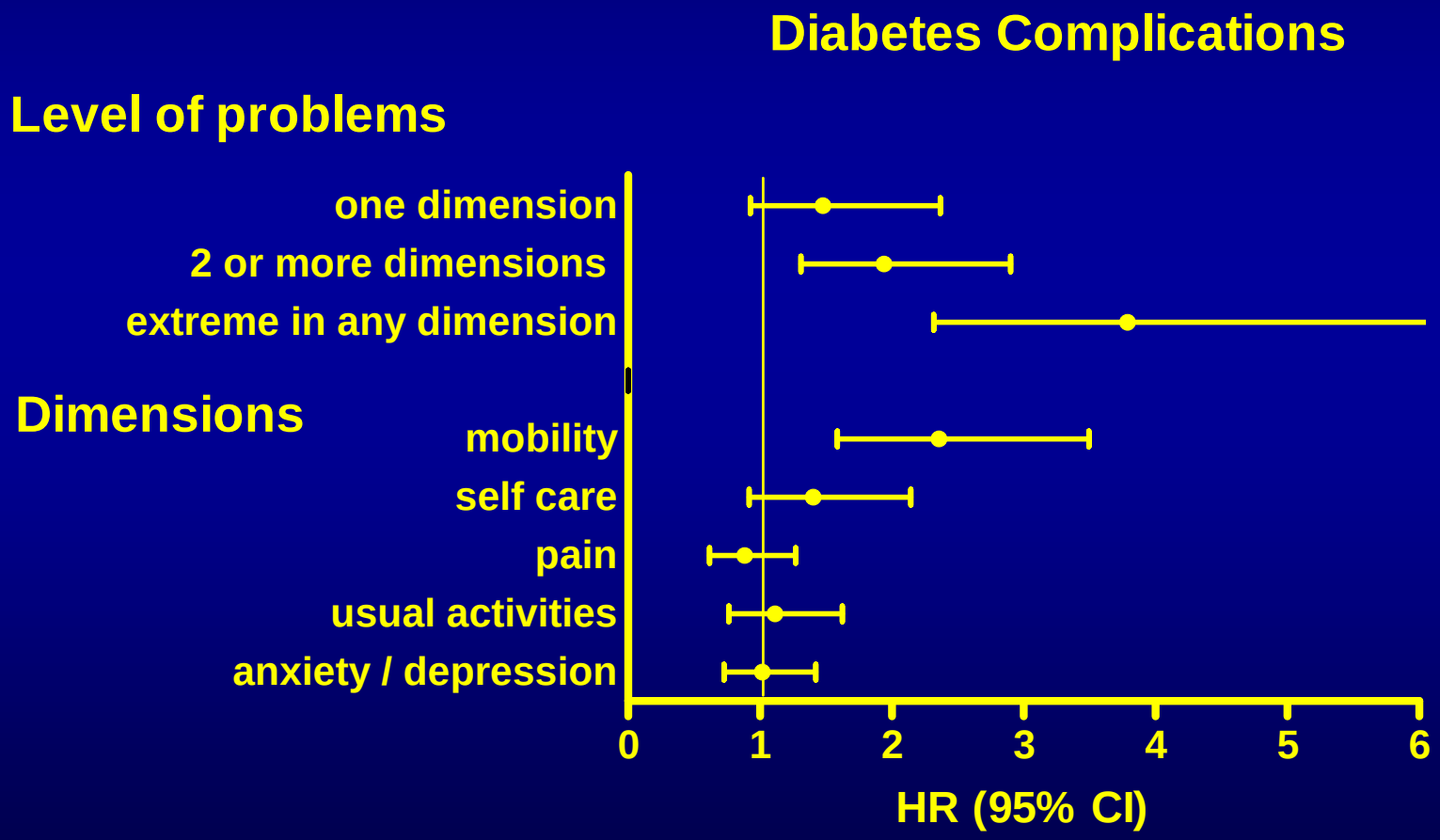
Anxiety/Depression

- I am not anxious or depressed
- I am moderately anxious or depressed
- I am extremely anxious or depressed

Hazard ratios by 5 dimensions and level of problem



Hazard ratios by 5 dimensions and level of problem



Conclusions

- Utility scores determined from the EQ-5D appear useful in assessing risk of vascular events, all cause mortality and complications in people with type 2 diabetes.
- may be a proxy for other risk factors or a measure of the severity of the state
- It may be useful to collect this type of information when assessing risk in a clinical context.
- has implications for health economic modelling as people with lower utility may experience a different profile of QALYs over time.

Where we want to go

- Most health economic disease models have Markov structure and assume states are homogeneous
- This study has established that “utility” values affect probability of transitions between states
- Currently developing a model that will take this into account