

# Biomarkers in social studies: the examples of Whitehall II and the English Longitudinal Study of Ageing (ELSA)

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# What is a biomarker?

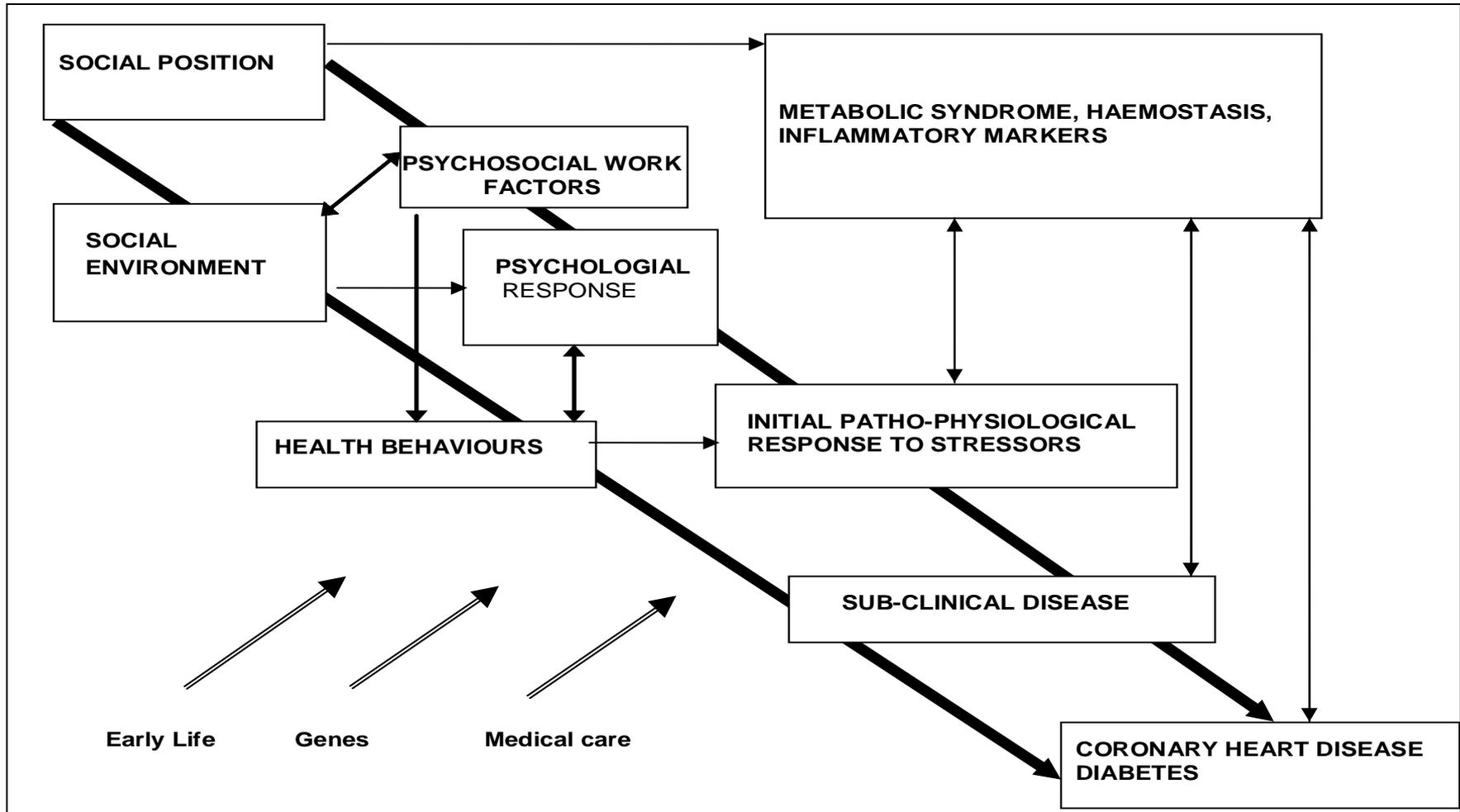
A biomarker is a characteristic that is objectively measured and evaluated as an indicator of normal biological processes, pathogenic processes and pharmacologic responses to a therapeutic intervention

Biomarkers working group, NIH. 2001

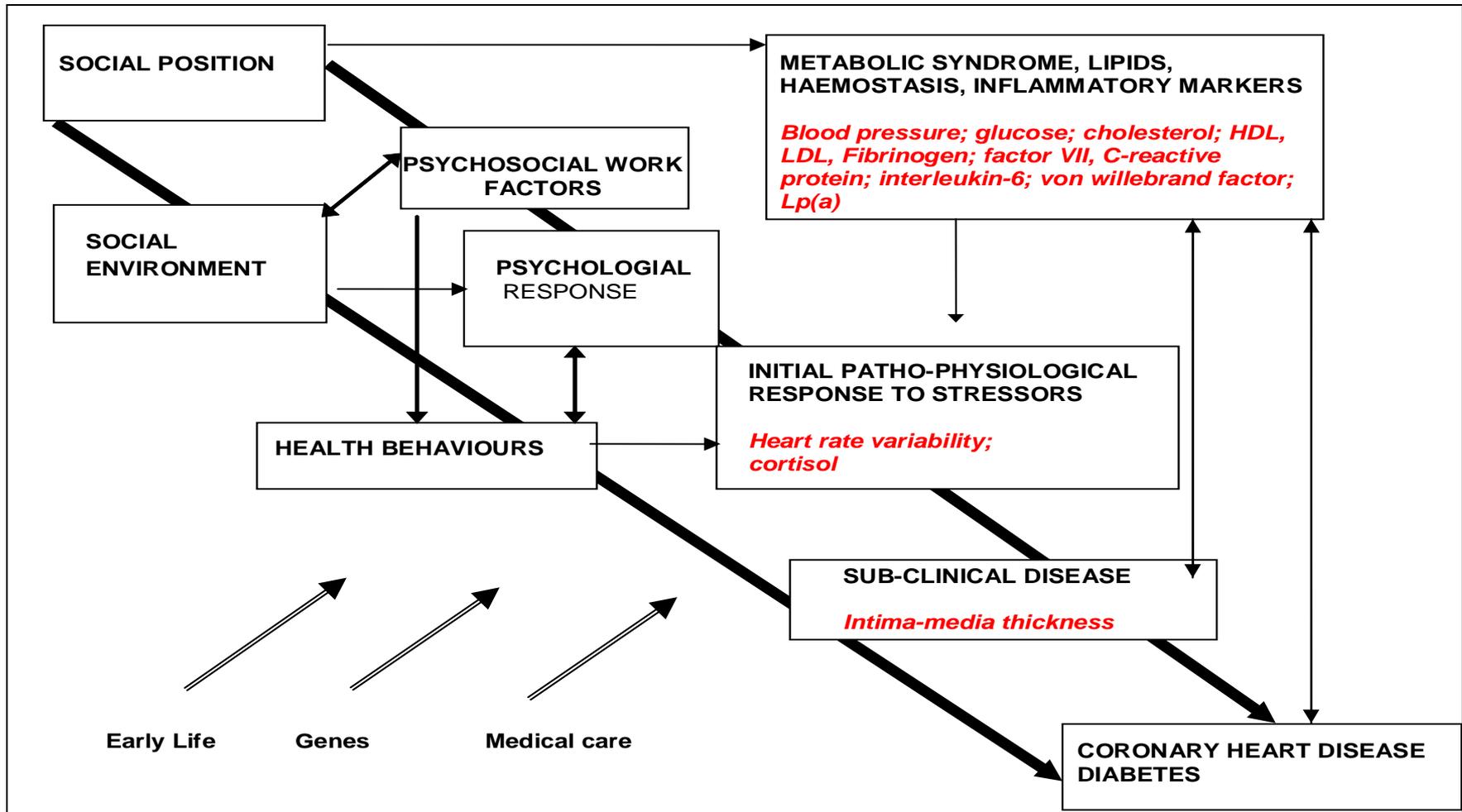
# Why collect biomarkers in social surveys?

- Understanding the pathways by which social circumstances influence health
  - Understanding causality
- Sub-clinical disease
  - Clinical ‘iceberg’
- Contribution to the research: data sharing and consortia

# Pathways between social position and health: the example of Whitehall II



# Pathways between social position and health: the example of Whitehall II: biomarkers

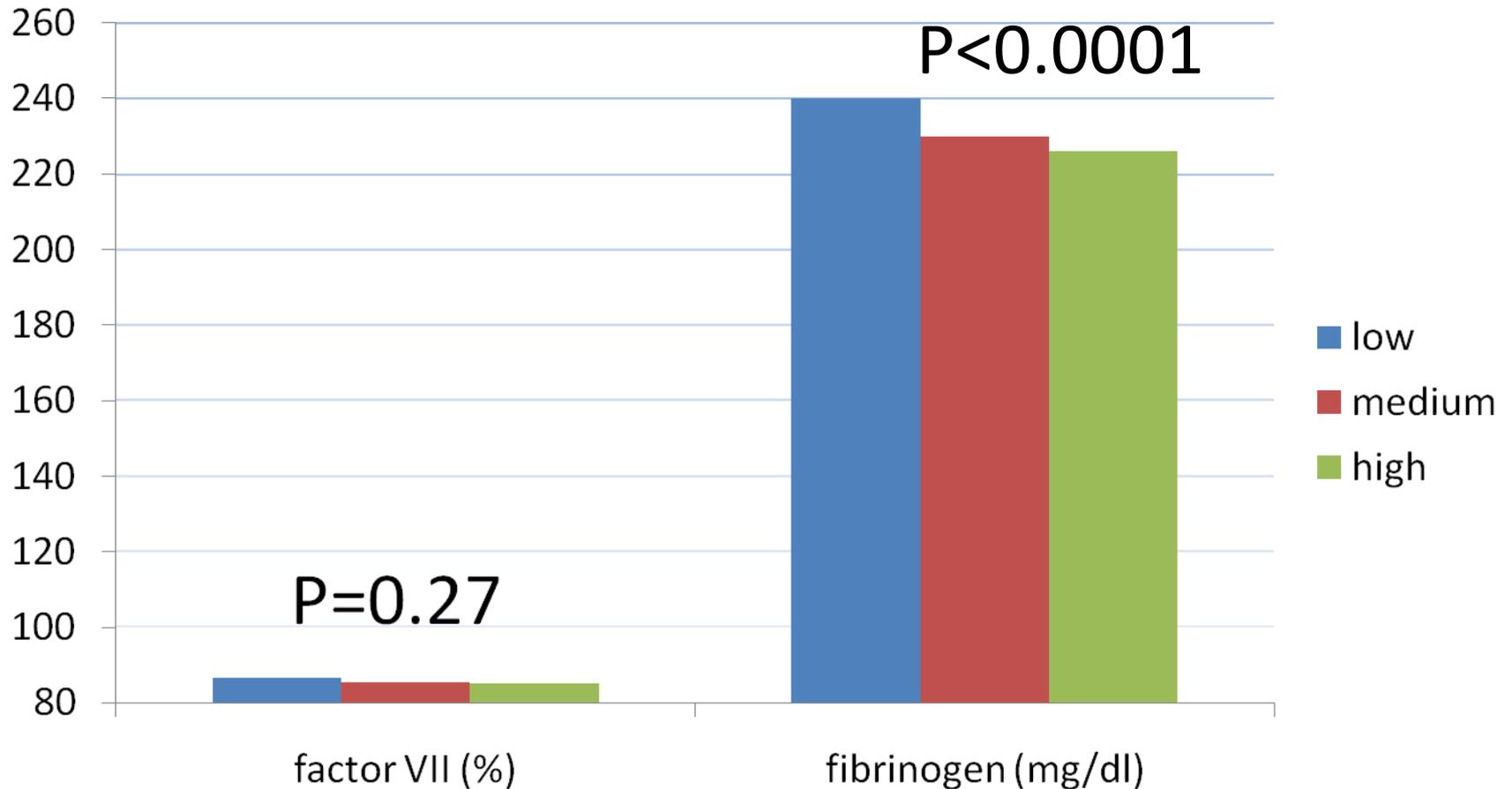


Biomaker	Associated with social position in Whitehall II?
<b>Metabolic markers</b>	
Waist circumference	yes
Body mass index	Yes (in women)
Blood pressure	Yes
Glucose	No
<b>Lipids</b>	
Triglycerides	Yes
HDL-cholesterol	Yes
LDL-cholesterol	No
Total cholesterol	No
<b>Inflammatory markers</b>	
C-reactive protein	Yes
Interleukin-6	Yes
<b>Haemostatic markers</b>	
fibrinogen	Yes
Factor VII	No

# Pathways between social position and health: example of haemostasis

- Haemostasis: clotting
  - Fibrinogen
    - Made in the liver
    - Acute phase protein, activated by inflammatory markers – associated with adiposity thro' these markers
    - Associated with smoking behaviour
  - Factor VII
    - Made in liver
    - body mass index (direct association), plasma lipids (especially triglycerides ) and diabetes
    - Associated with dietary fat intake

# Association of Factor VII and fibrinogen with Civil service employment grade in the Whitehall II study

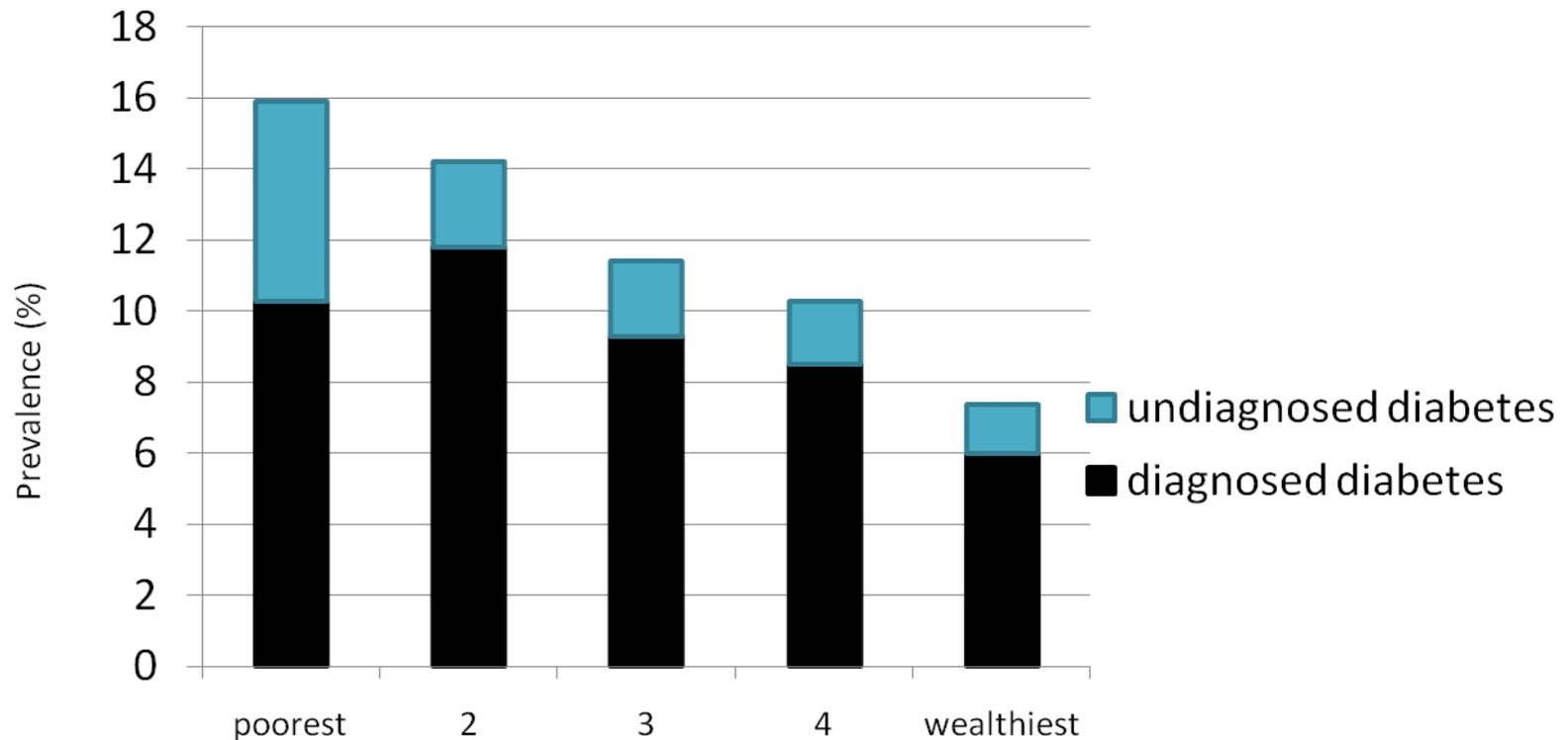


- Fibrinogen associated with social position, factor VII not associated.
  - Haemostasis not important per se
  - Other pathways might be important
- inflammatory markers
  - Further supported when examining additional inflammatory markers; C-reactive protein and interleukins

# Sub-clinical disease

- Clinical 'iceberg'
  - Contribution of undiagnosed disease to public health burden
  - Variations in the association of social factors with diagnosed vs undiagnosed disease

# Sub-clinical disease: association of diagnosed and undiagnosed diabetes with wealth in ELSA



# Measures common across Whitehall II and ELSA

'reported'	'objective'
<b>Cardiovascular</b>	
Doctor diagnosed disease	Blood pressure, Anthropometry Lipids, glucose/ HBA1c, CRP, fibrinogen,
Rose Angina	
Edinburgh Claudication	
<b>Non cardiovascular</b>	
Diagnosed disease	
MRC respiratory questionnaire	Lung function
<b>Functioning</b>	
Activities of daily living	Hand grip strength, balance, walking speed
Instrumental ADLs	

# Utility of objective data: contribution of 'our studies' to meta-analyses

- Biomarkers: Whitehall II and ELSA currently contributing to 5 meta-analyses to look at cardiovascular outcomes (fibrinogen, CRP, vWF, triglycerides, Lp(a))
- Genetic studies: Whitehall II and ELSA currently contributing to 30 consortia. Examples include Vitamin D, glucose, hand grip strength

# conclusions

- Metabolic and inflammatory markers mediate social differences in cardiovascular disease
- Emerging public health concerns also point to the importance of measurement of these biomarkers
- New risk factors are addressed through both biomarker and genetic studies