

# Health Economics and Diabetes

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# Issues

- Economic burden of diabetes
  - Cost of illness studies
  - Components of burden of diabetes
  - Variations between populations and over time
- Cost of complications
  - Direct costs
  - Indirect costs
  - Loss of QALY
- How can we reduce the burden
  - Cost-effective interventions

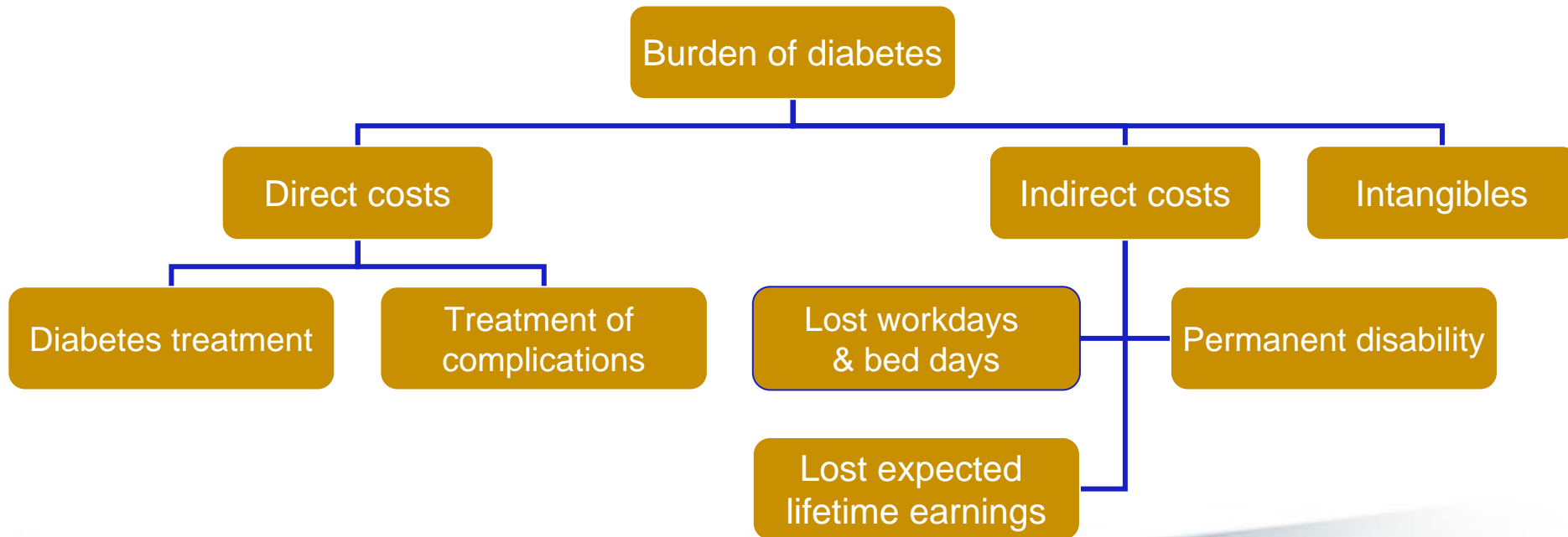
# Health burden of diabetes

# Rising prevalence of diabetes

- Global prevalence of diabetes in 2003: 5.1%
- 2003 worldwide prevalence of diabetes is lowest in Africa (2.4%) and highest in North Americas (7.9%)
- Diabetes prevalence expected to increase from 5.1% in 2003 to 6.3% in 2025
- Greater prevalence in elderly population

# Economic burden of diabetes

# Components of economic burden of diabetes



# Methods used to assess economic burden of diabetes

- Different methods used to assess economic burden of diabetes

Top-down approach using etiologic fractions

- Used by ADA in 2002<sup>1</sup>

Bottom-up approach

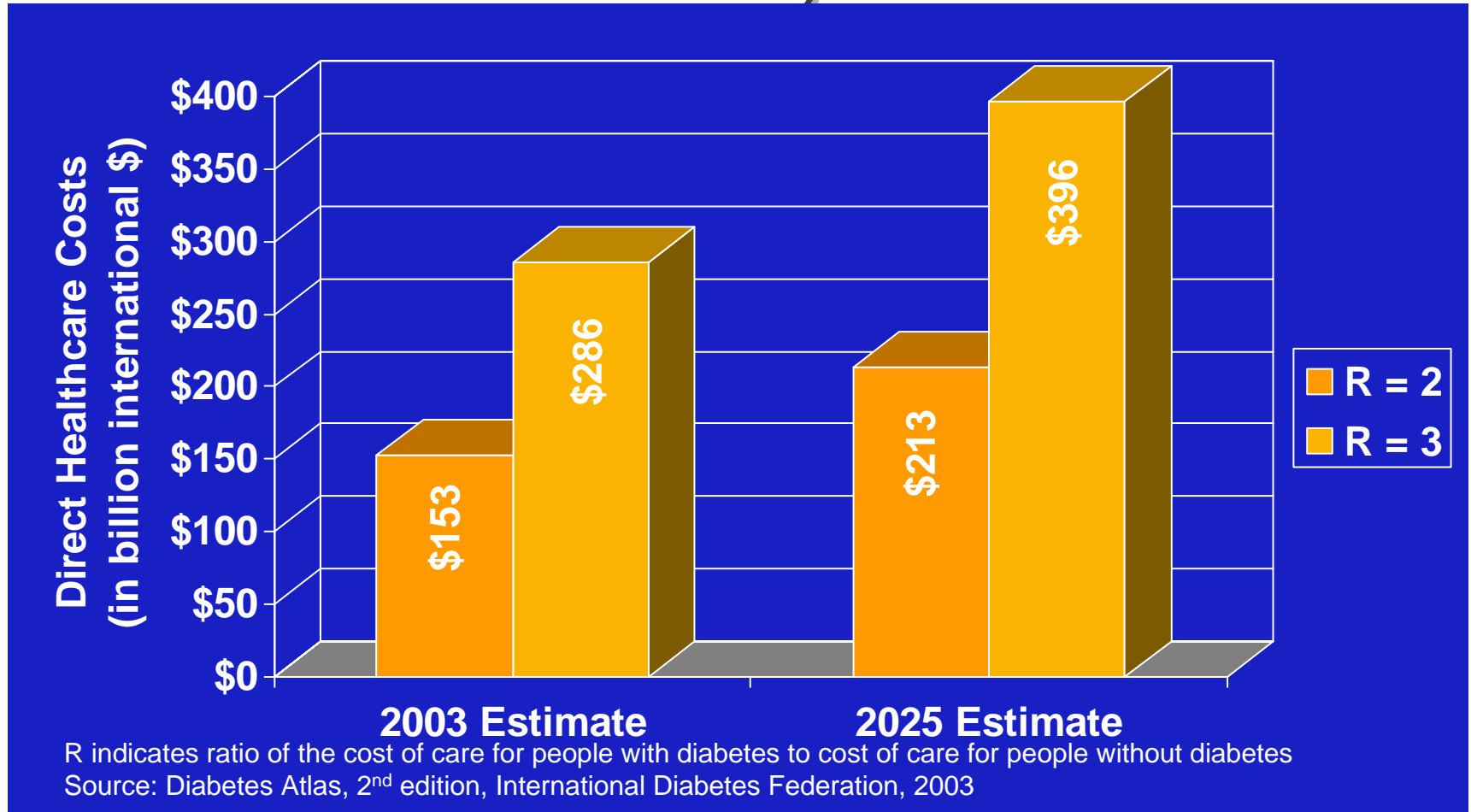
- Used in CODE 2<sup>2</sup>

Incremental approach comparing diabetics to non-diabetics

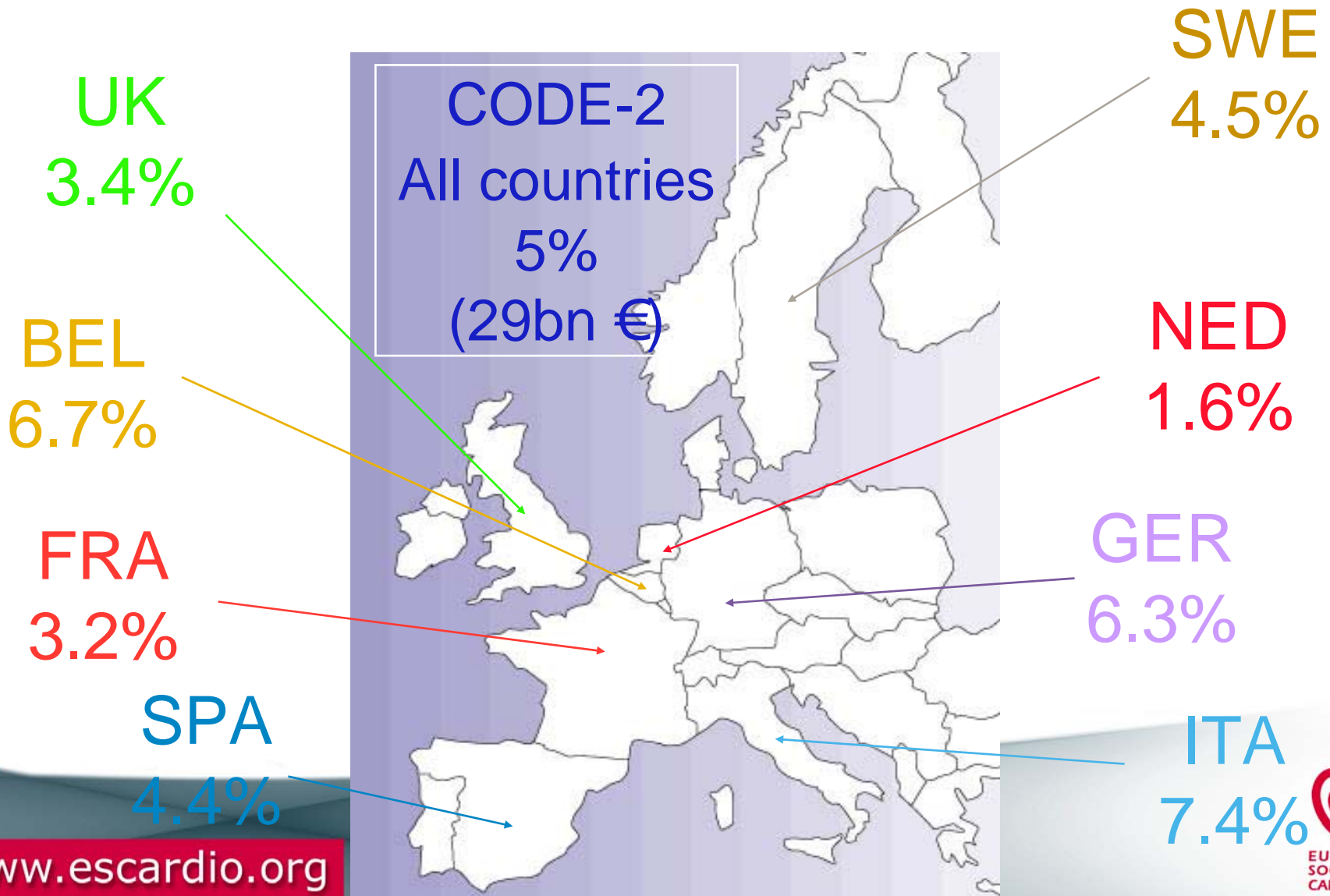
- Used in the UK<sup>3</sup>, Sweden<sup>4</sup> and by International Diabetes Federation<sup>5</sup>

<sup>1</sup> (ADA, 2003); <sup>2</sup> (Jönsson et al, 2002); <sup>3</sup> (Bagust et al, 2001); <sup>4</sup> (Norlund et al, 2001); <sup>5</sup> (IDF, 2003)

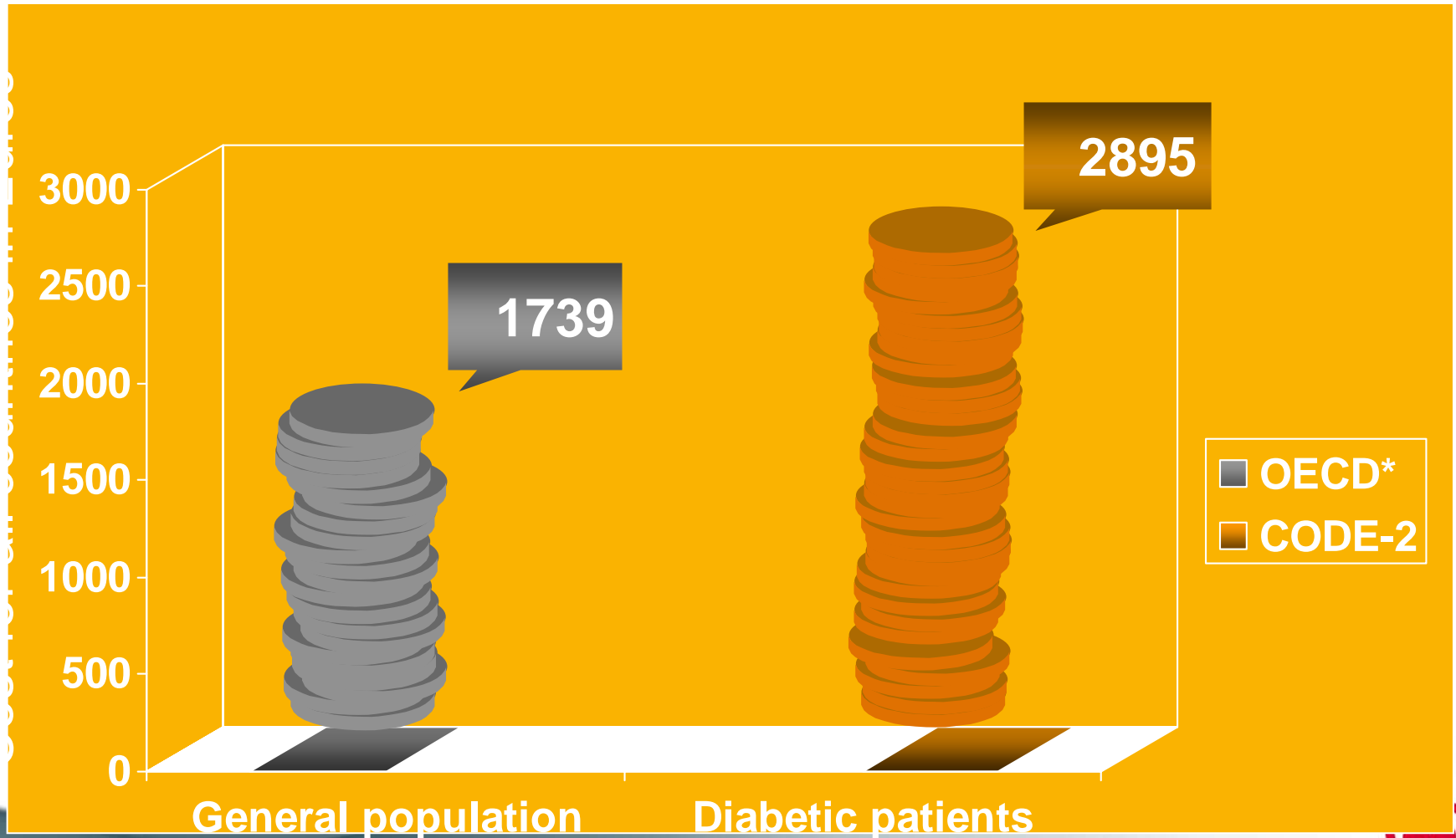
# Estimated worldwide increase in direct healthcare costs associated with diabetes by 2025



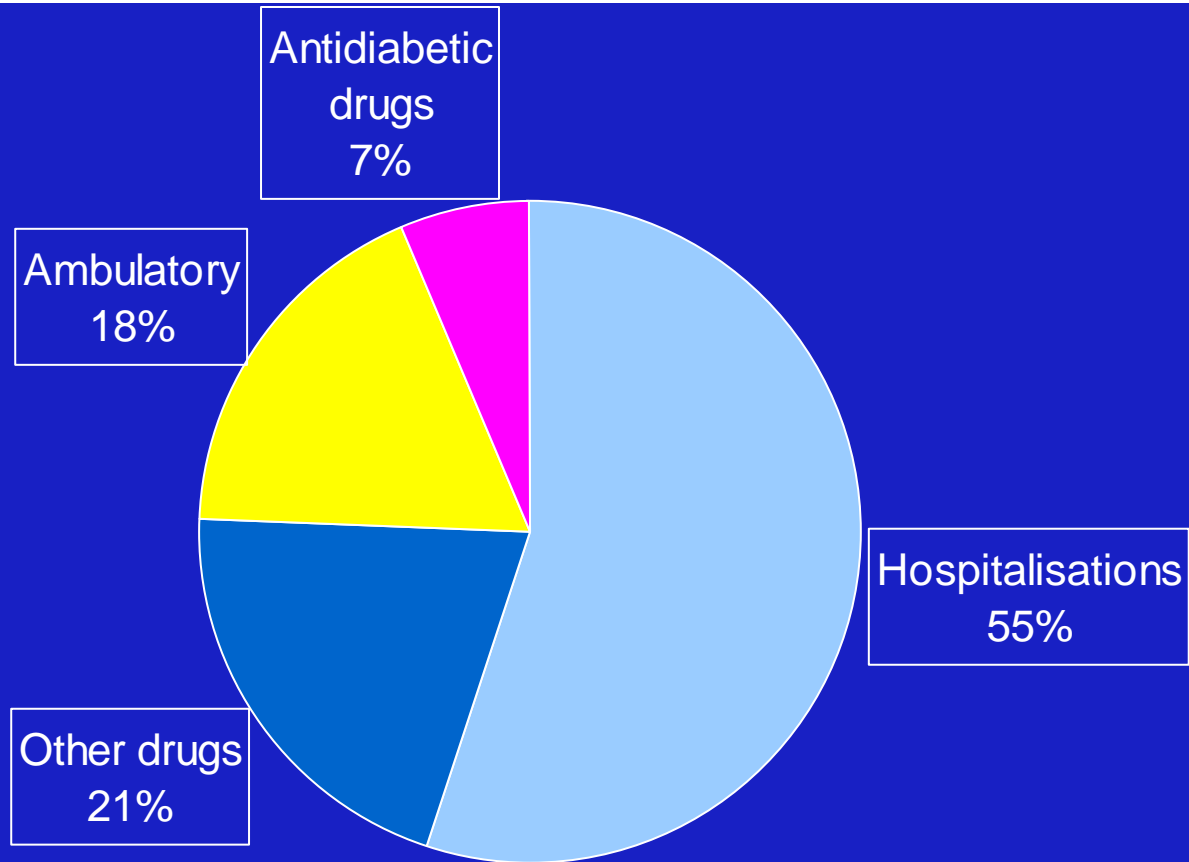
# Type 2 Expenditure as % of Overall Expenditure



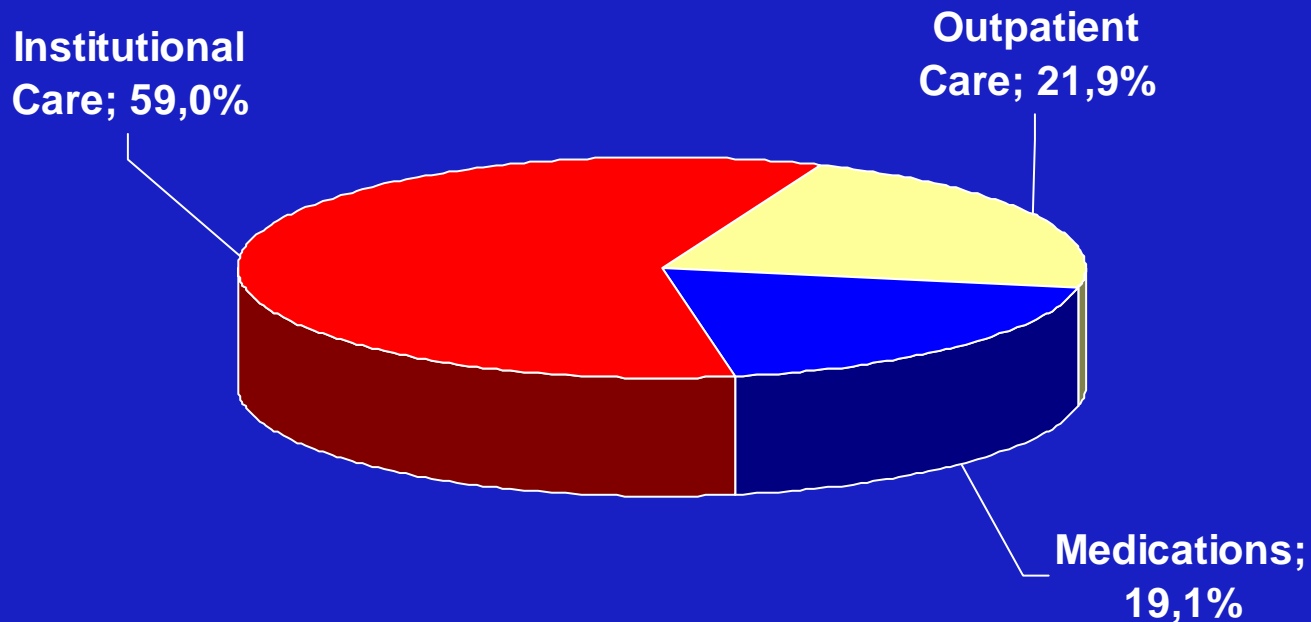
# Per Capita Expenditure on Type 2 Diabetes



# Cost per Type of Resource

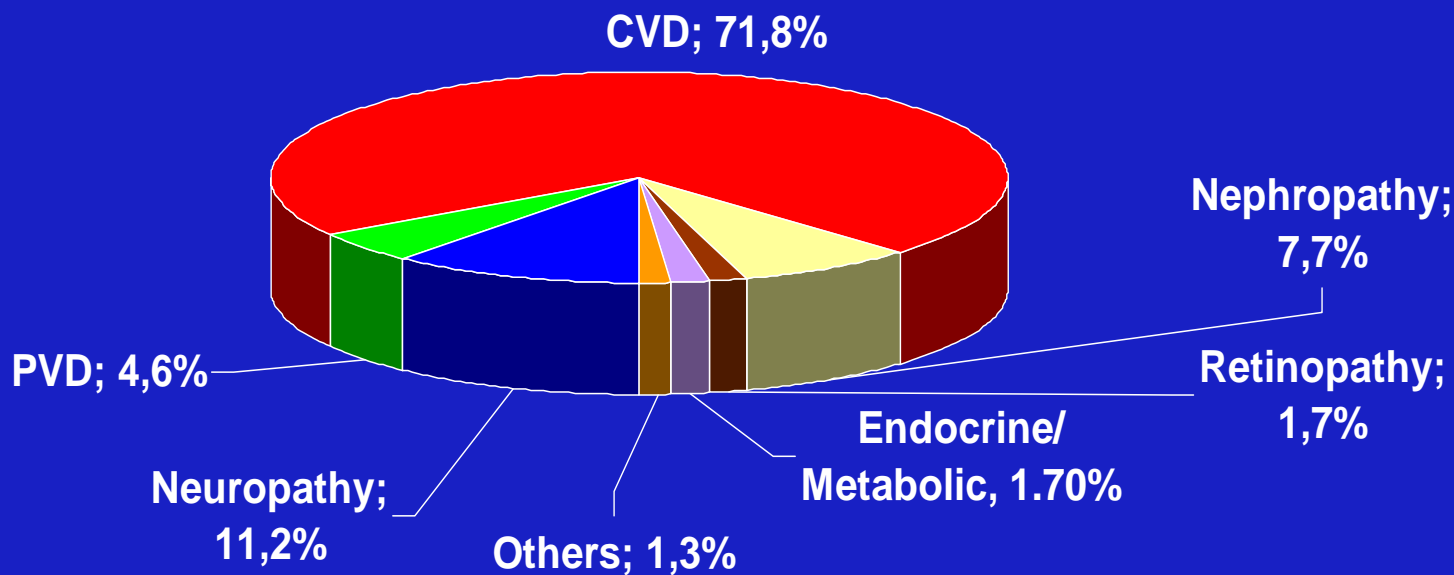


# Direct healthcare costs associated with diabetes in the US, 2002



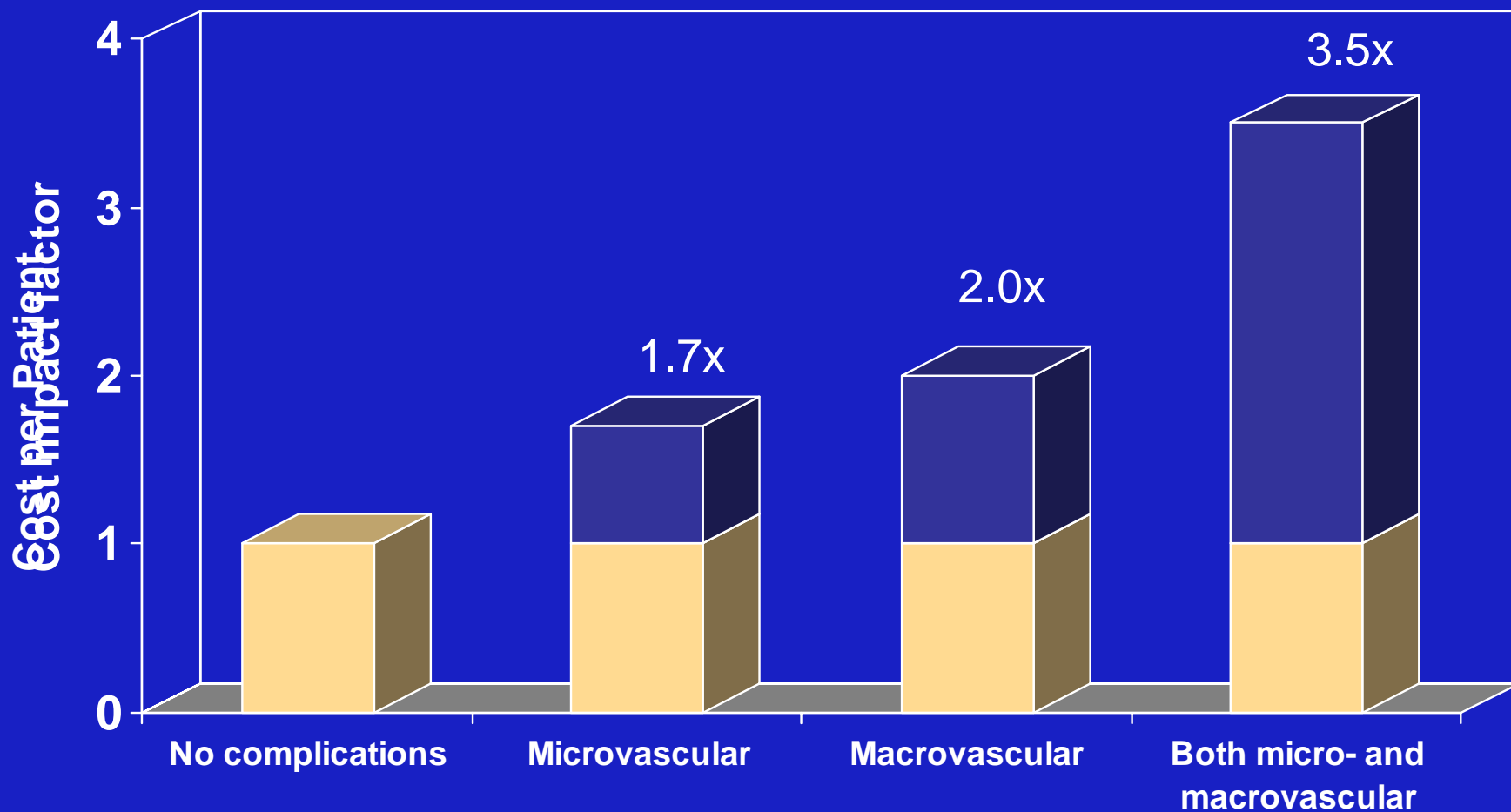
Aggregate: \$91.8 Billion

# Healthcare expenditure attributable to complications associated with diabetes in the US, 2002



Diabetes-related complications: \$ 24 billion or 26% of the aggregate estimate

# Effect of Complications on Costs



# Costs of complications reported by the Cost of Diabetes in Europe-2 (CODE-2) study (in 2002 US dollars)

	Prevalence	Impact on average cost	Impact on hospitalization cost	Avg. direct medical cost
No complications	28%	-	-	\$ 1,514
Only microvascular complication	19%	1.7	2.1	\$ 2,578
Only macrovascular complication	9.6%	2.0	3.1	\$ 3,167
Microvascular & macrovascular complications	24%	3.5	5.5	\$ 5,257

Used a July, 2002 conversion rate of 1.006 to convert estimates in Euro to US dollars  
 Source: Jonsson et al, 2002; Williams et al; 2002

# Indirect costs associated with diabetes

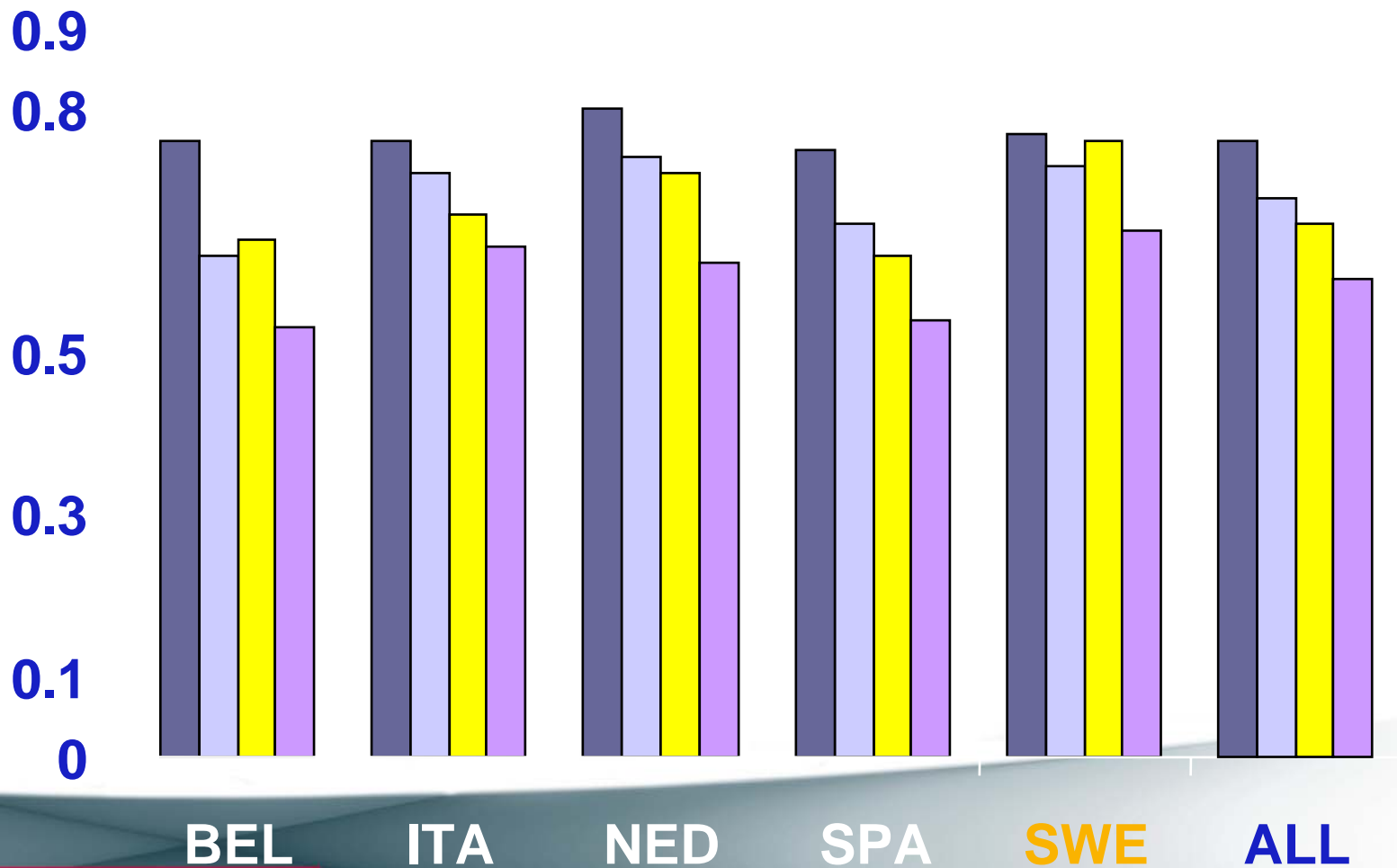
Mainly related to complications; 25-60% of total cost of diabetes

- Main components of indirect cost<sup>1,2</sup>
  - Lost work days
  - Restricted activity days
  - Permanent disability
  - Mortality
- 1.7 to 2.2 times greater mean annual work loss costs in US diabetics as compared to non-diabetics<sup>2</sup>
- 2.4 times greater indirect costs through sick-days and early retirement in Swedish diabetics as compared to average Swedish population<sup>3</sup>

<sup>1</sup> (Ramsey et al, 2002); <sup>2</sup> (ADA, 2003); <sup>3</sup> (Norlund et al, 2001)

# Effect of Complications on QoL

■ None ■ Macrovascular ■ Microvascular ■ Both



BEL

ITA

NED

SPA

SWE

ALL

# How can we reduce the burden?

- Primary prevention
  - Incentives for changes in life style
    - Diet and exercise
    - Reducing incidence and prevalence
- Secondary prevention
  - Improved management of diabetes
    - Including hypertension and lipids
    - Prevention of long term complications
- The challenges
  - Identification of cost-effective alternatives
  - Long term perspective on costs and benefits
  - Requires modelling on uncertain data adapted to local conditions