

# Pharmacoeconomics and Cardiovascular Drugs

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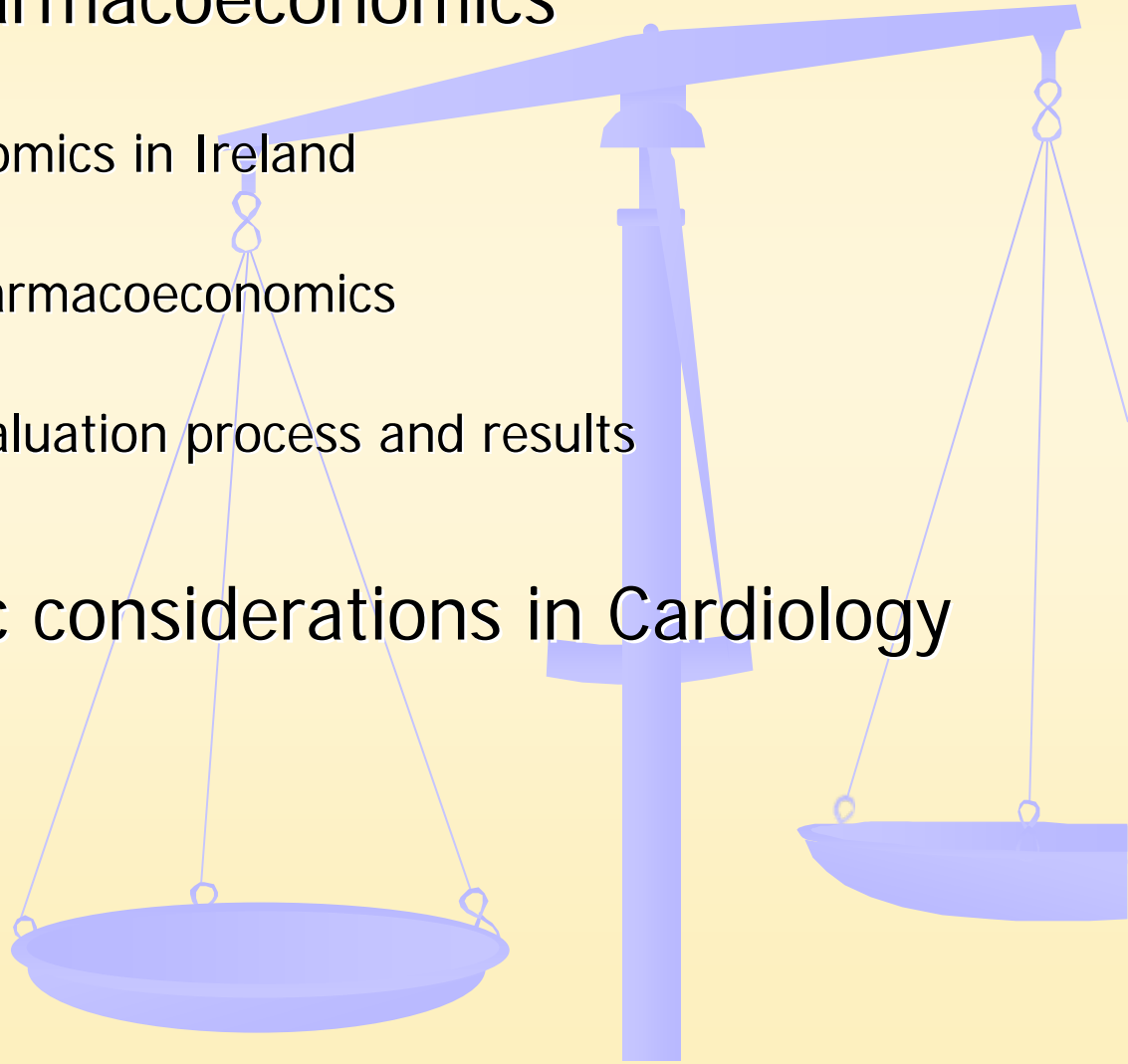


**IRISH ASSOCIATION OF CARDIAC REHABILITATION**  
*Annual Scientific Conference and AGM 5<sup>th</sup> November 2011*

## ■ Introduction to Pharmacoeconomics

- Role of Pharmacoeconomics in Ireland
- National Centre for Pharmacoeconomics
- Pharmacoeconomic evaluation process and results

## ■ Pharmacoeconomic considerations in Cardiology



# What is pharmacoeconomics?

..the **comparative** analysis of alternative courses of action in terms of **BOTH** their **costs** and **consequences**...

...**evidence based** systematic study of benefits, costs and harms of a health technology



# Cost-effectiveness - The fourth hurdle

Demonstrating a product's quality, safety, efficacy (the first three hurdles) is no longer sufficient



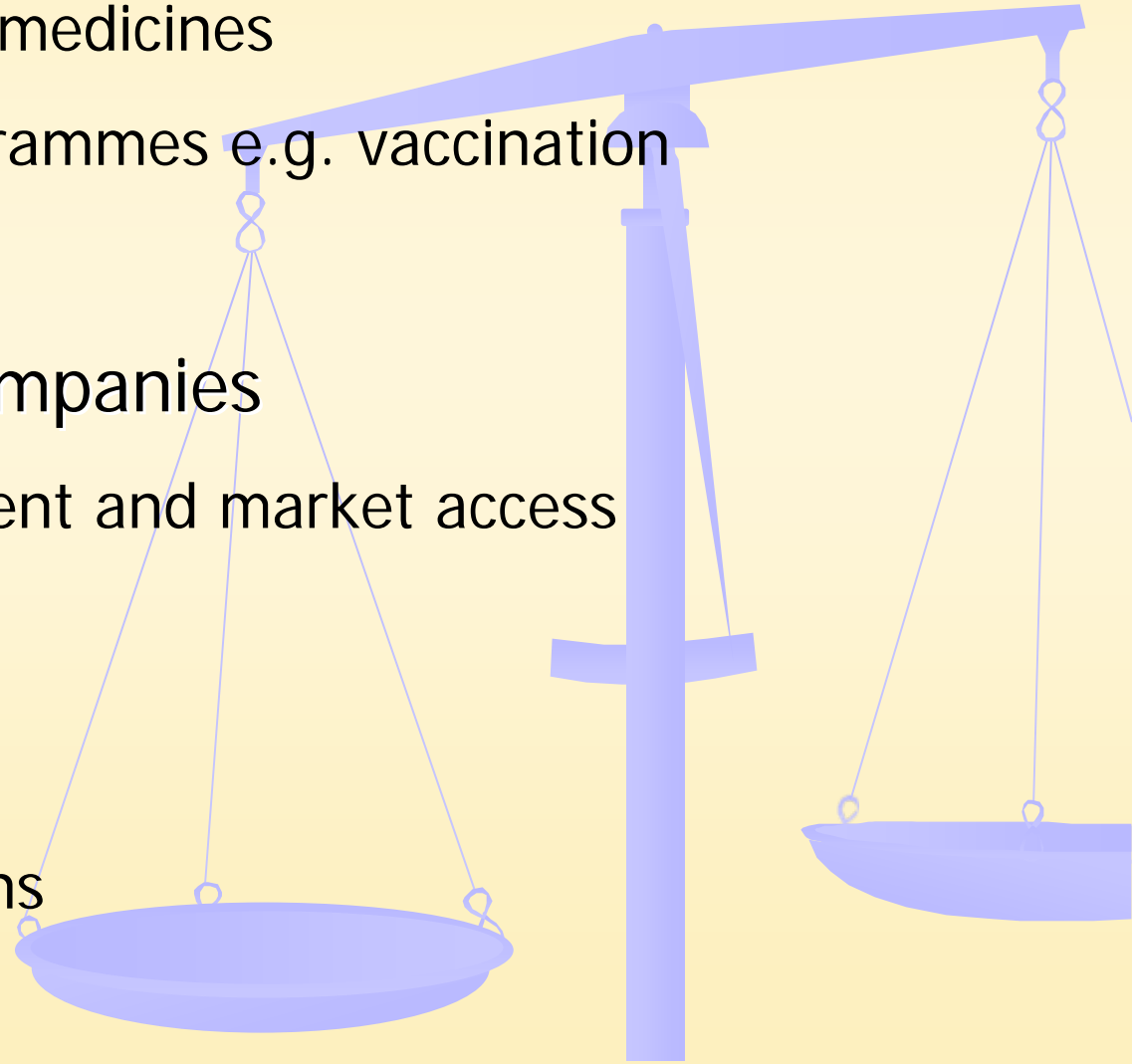
4<sup>th</sup> hurdle...cost-effectiveness...

and 5<sup>th</sup> hurdle...affordability!

# Role of Pharmacoeconomics in Ireland



- Inform HSE decision-making
  - ✦ reimbursement of medicines
  - ✦ public health programmes e.g. vaccination
- Pharmaceutical companies
  - ✦ product development and market access
- Hospitals
  - ✦ formulary decisions





- Aim:

To promote practice, research and education in pharmacoeconomics

- Multidisciplinary team:

Clinical director, pharmacists, research scientist, health economist, statistician

- NCPE Activities include:

- Pharmacoeconomic evaluations of medicines for the HSE
- Health Technology Assessment (HTAs) commissioned by HIQA and NIAC
- Independent research: Cost-effectiveness of high cost medicines e.g. MS & rheumatology drugs
- Drug utilisation research including pharmaceutical pricing and reimbursement policy



Examples of technologies recently assessed by NCPE

Ticagrelor ( <i>Brilique</i> ®)	<b>Acute Coronary Syndrome</b>
Fingolimod ( <i>Gilenya</i> ®)	<b>Multiple Sclerosis</b>
Aztreonam ( <i>Cayston</i> ®)	<b>Cystic Fibrosis</b>
Ipilimumab ( <i>Yervoy</i> ®)	<b>Advanced melanoma</b>
Dabigatran etexilate ( <i>Pradaxa</i> ®) in AF	<b>Atrial Fibrillation</b>
<i>Oncotype DX</i> ®	<b>Multigene assay for risk of breast cancer recurrence</b>
Vernakalant ( <i>Brinavess</i> ®)	<b>Atrial Fibrillation</b>
Tapentadol ( <i>Palexia</i> ®)	<b>Severe pain</b>
Gefitinib ( <i>Iressa</i> ®)	<b>Non-small cell lung cancer</b>
Eltrombopag ( <i>Revolade</i> ®)	<b>Chronic immune thrombocytopenic purpura (ITP)</b>

# Pharmacoeconomic Evaluation

## Issues to consider when evaluating cost-effectiveness

*e.g. ticagrelor (Brilique®) for the prevention of atherothrombotic events in Acute Coronary Syndrome (ACS)*

<b>Perspective</b> of the evaluation	<i>Healthcare payer (HSE)</i>
Choice of <b>comparator</b>	<i>Standard of care in Ireland (Clopidogrel or Prasugrel)</i>
Target <b>population</b> for the drug	<i>Adult patients with ACS in Ireland</i>
<b>Time horizon</b> of the evaluation	<i>Lifetime</i>
<b>Efficacy</b> and effectiveness	<i>Based on systematic review</i>
<b>Safety</b>	<i>Adverse effects e.g. major bleeding</i>
Measurement of resources and <b>Costs</b>	<i>Cost of drug, MI, stroke, bleed etc.</i>
Valuing <b>outcomes</b>	<i>Quality Adjusted Life Years (QALYs)</i>
<b>Uncertainty</b>	<i>in efficacy measures, costs etc.</i>
<b>Budget</b> Impact	<i>Annual drug acquisition costs</i>

# Some examples of NCPE Evaluations



Results of NCPE evaluations are presented using the Incremental Cost-effectiveness ratio (ICER)

Medicine	Indication	ICER	Budget impact in year 5
Ticagrelor (Brilique <sup>®</sup> )	ACS	Dominant (i.e. more effective, less costly)	€ 3.5m
Gefitinib (Iressa) <sup>®</sup>	NSCLC (1 <sup>st</sup> line treatment)	€110,564/QALY	€0.88m
Natalizumab (Tysabri <sup>®</sup> )	MS (2 <sup>nd</sup> line treatment)	€27,100-€39,800	€16m
Sunitinib (Sutent <sup>®</sup> )	GIST & mRCC	€57,280/QALY	€ 2.3m
HPV Screening	Reducing risk of cervical cancer	€17,383/LYG	€9.7m

- Costs include:
  - Resources needed to provide treatment (drugs, administration, monitoring, follow-up, cost of adverse effects, equipment, staff, buildings etc.)
  - Resources involved in the disease process itself both during and after treatment i.e. long-term costs, hospitalisation, GP visits etc.
- Consequences include:
  - QALYs (alternative consequence could include life years gained, events avoided etc.)

# What is a QALY?

- QALY – Quality Adjusted Life Year

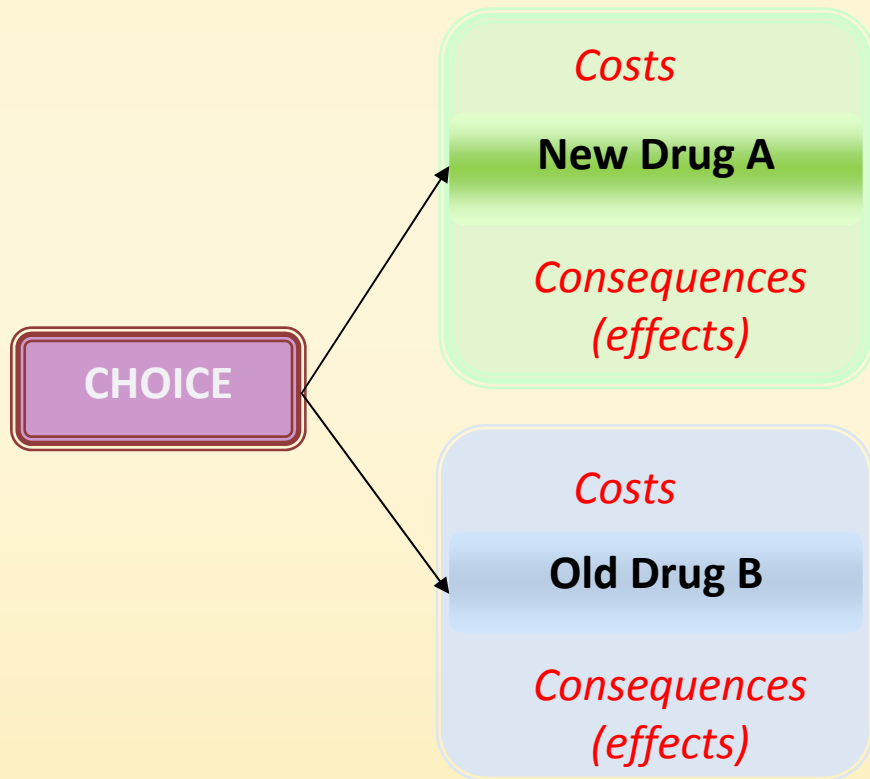
*combines* clinical efficacy measures with measures of Health-related Quality of Life (QoL) (*i.e.* quantity and quality of life)

- Quality can be measured using QoL questionnaires

- Generic: SF-36, EQ-5D
- Disease-specific: Quality of Life in Severe Heart Failure Questionnaire (QLQ-SHF) the Chronic Heart Failure Questionnaire (CHQ)

# Pharmacoeconomic Evaluation

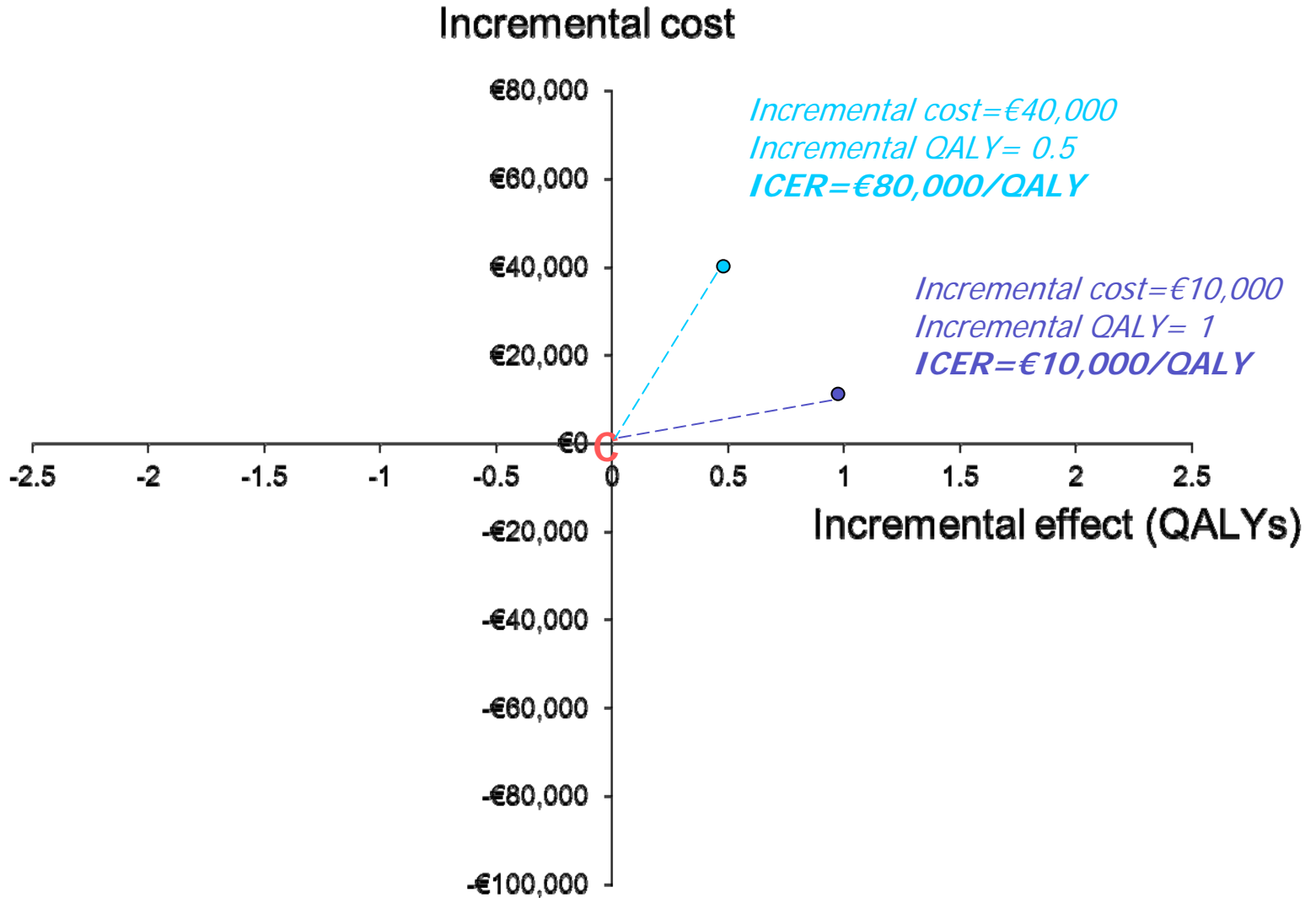
Results of NCPE evaluations are presented using the Incremental Cost-effectiveness ratio (ICER)



$$\text{ICER} = \frac{\text{Cost A} - \text{Cost B}}{\text{Effect A} - \text{Effect B}}$$

What are the additional benefits to be gained from the new therapeutic intervention and at how much greater cost?

# The incremental cost-effectiveness plane



C = comparator

# Some examples of NCPE Evaluations



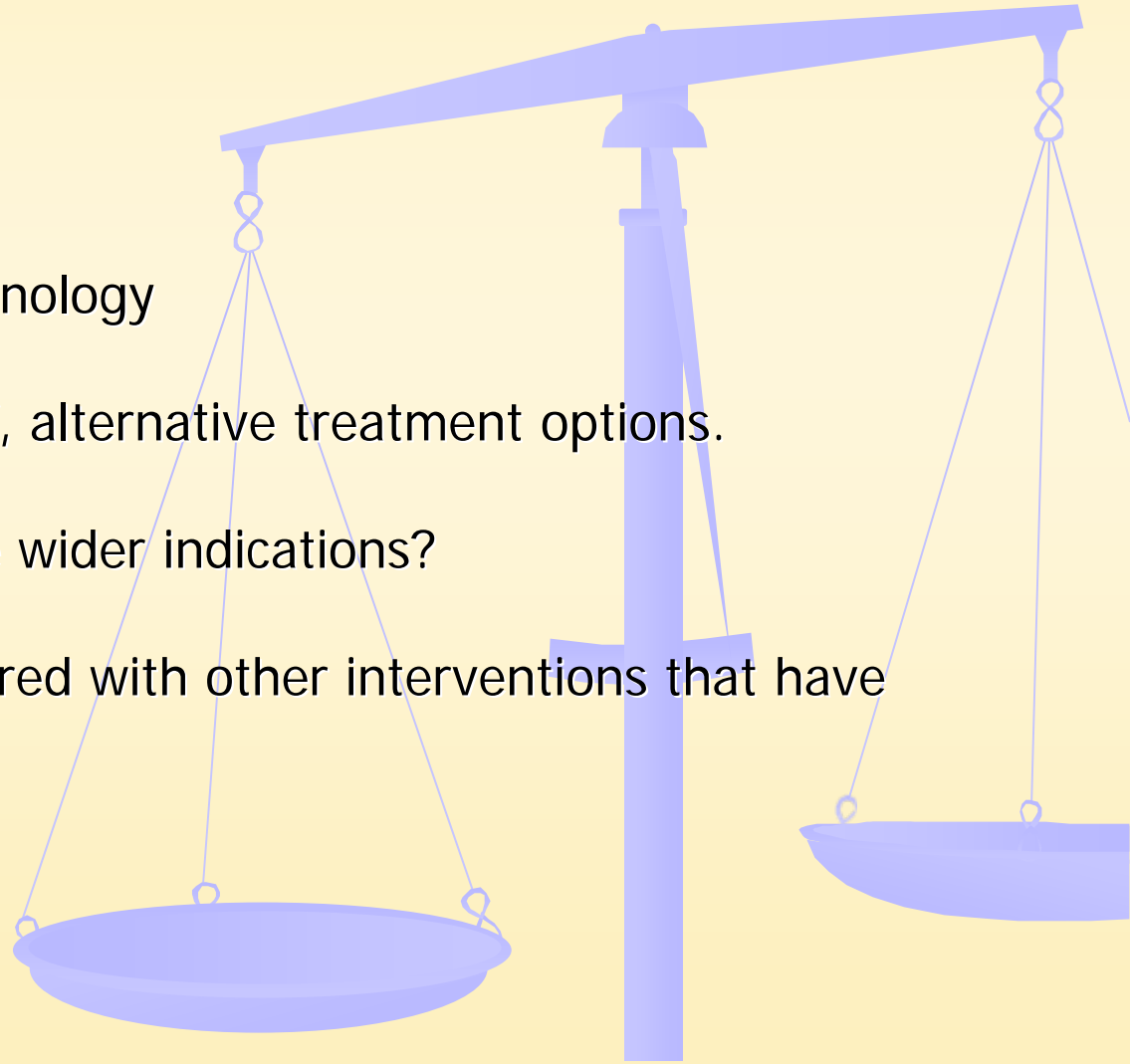
Medicine	Indication	ICER	Budget impact in year 5
Ticagrelor (Brilique®)	ACS	Dominant (i.e. more effective, less costly)*	€ 3.5m
<i>Recommended for reimbursement</i>			
Gefitinib (Iressa)®	NSCLC (1 <sup>st</sup> line treatment)	€110,564/QALY	€0.88m
<i>Not recommended for reimbursement</i>			
Natalizumab (Tysabri®)	MS (2 <sup>nd</sup> line treatment)	€27,100-€39,800	€16m
<i>Recommended for reimbursement (follow-up review recommended once evidence base grows)</i>			
Sunitinib (Sutent®)	GIST & mRCC	€57,280/QALY	€ 2.3m
<i>Recommended for reimbursement (high ICER, recommended as an innovative product)</i>			
HPV Screening	Reducing risk of cervical cancer	€17,383/LYG	€9.7m
<i>Recommended for reimbursement (not reimbursed initially due to high budget impact)</i>			

\*Base case analysis

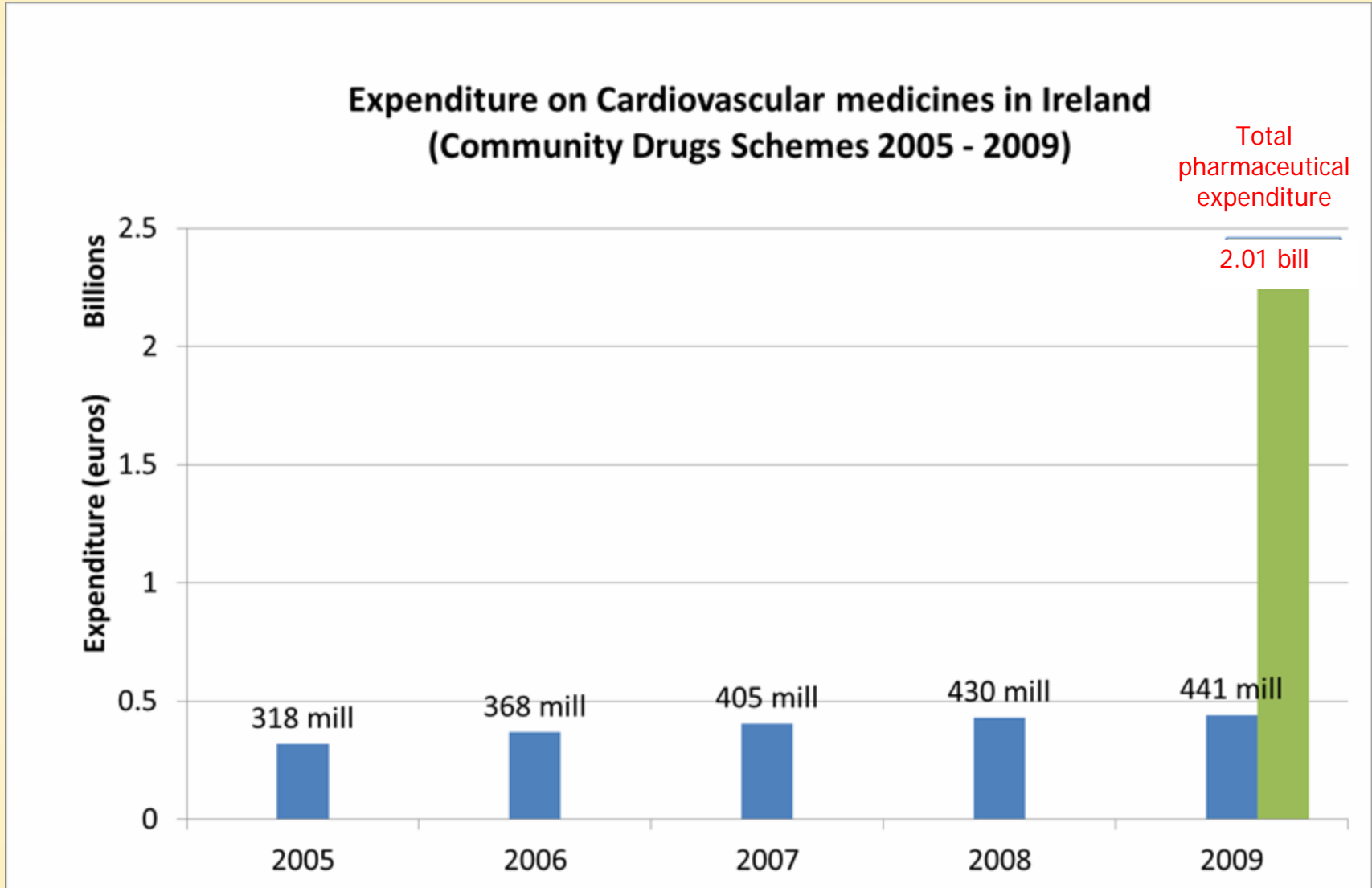
# Other factors to consider in decision-making



- Uncertainty associated with the clinical and cost-effectiveness information
- Budget impact
- Innovative nature of technology
- Lack of, or inadequacy of, alternative treatment options.
- Are there potential future wider indications?
- Is it cost-effective compared with other interventions that have been funded?



# Cardiac Pharmaceutical Expenditure



**Source:** Primary Care Reimbursement Service (PCRS)

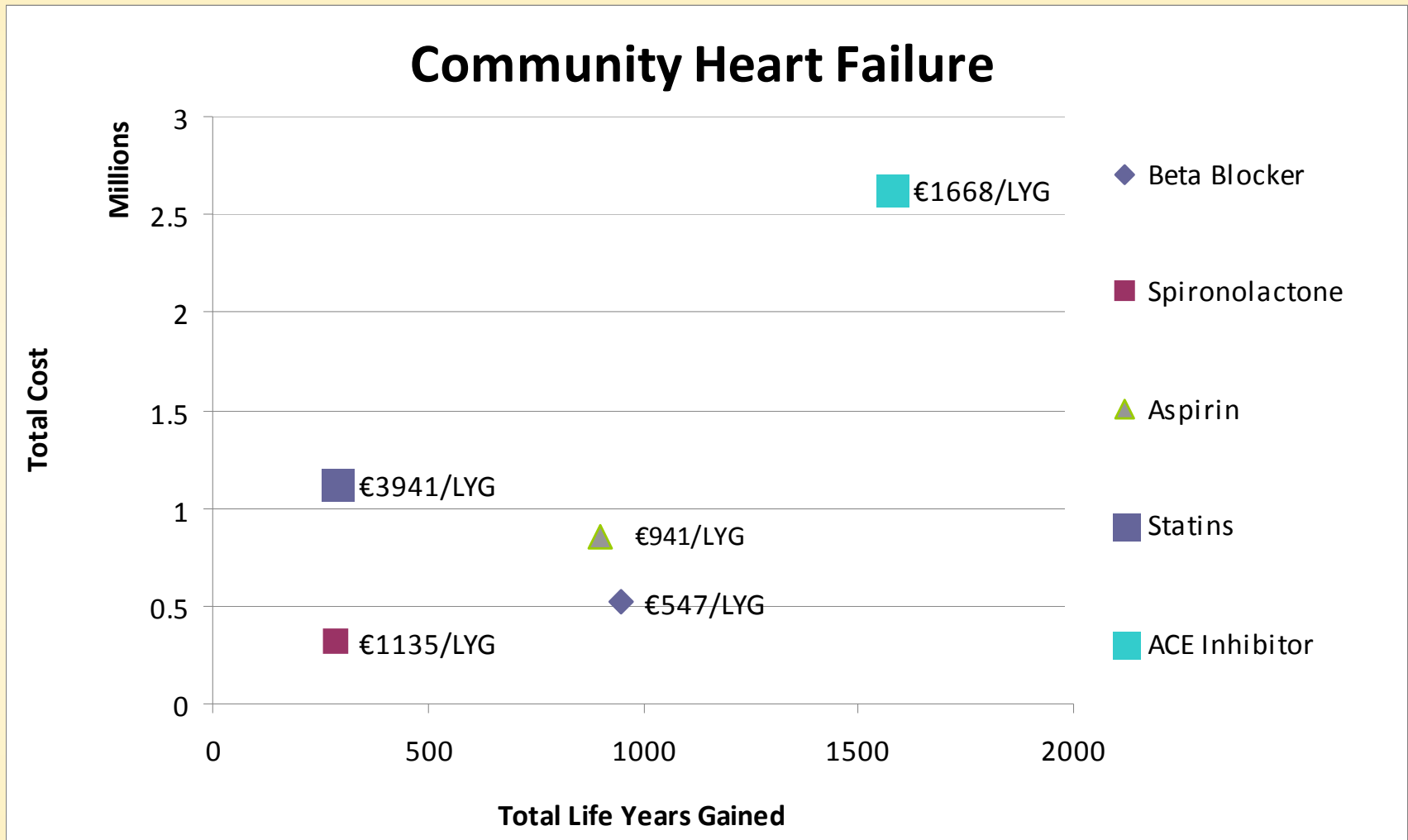
\*Pharmaceutical expenditure includes payment to pharmacies for the cost of medicines, dispensing fees and payment to wholesalers under the High Tech Drug Scheme

# Cost-effectiveness of cardiovascular drugs



*"Cost effectiveness of treatments reducing coronary heart disease mortality in Ireland, 2000 to 2010"* Value in Health 2009;12(1):10-15

- Compared the cost-effectiveness of CHD treatments (incl. statins, ACEIs, cardiac rehab etc.) to analyse the efficiency of cost allocation in the Irish healthcare setting
- Data included Irish patient numbers, uptake of specific treatments, patient compliance, median survival with(out) treatment, costs of intervention etc.
- In general, "all the cardiac interventions...could be considered cost-effective"
- Aspirin, Beta-blockers, ACEIs, spironolactone and warfarin offered best value for money (<€3000/LYG)





## *HSE Working Group on Reference Pricing and Generic Substitution*

*“The group recommends the introduction of legislation to enable interchangeability of medicines which will establish appropriate systems and structures and define roles and responsibilities relating to interchangeability of medicines”*



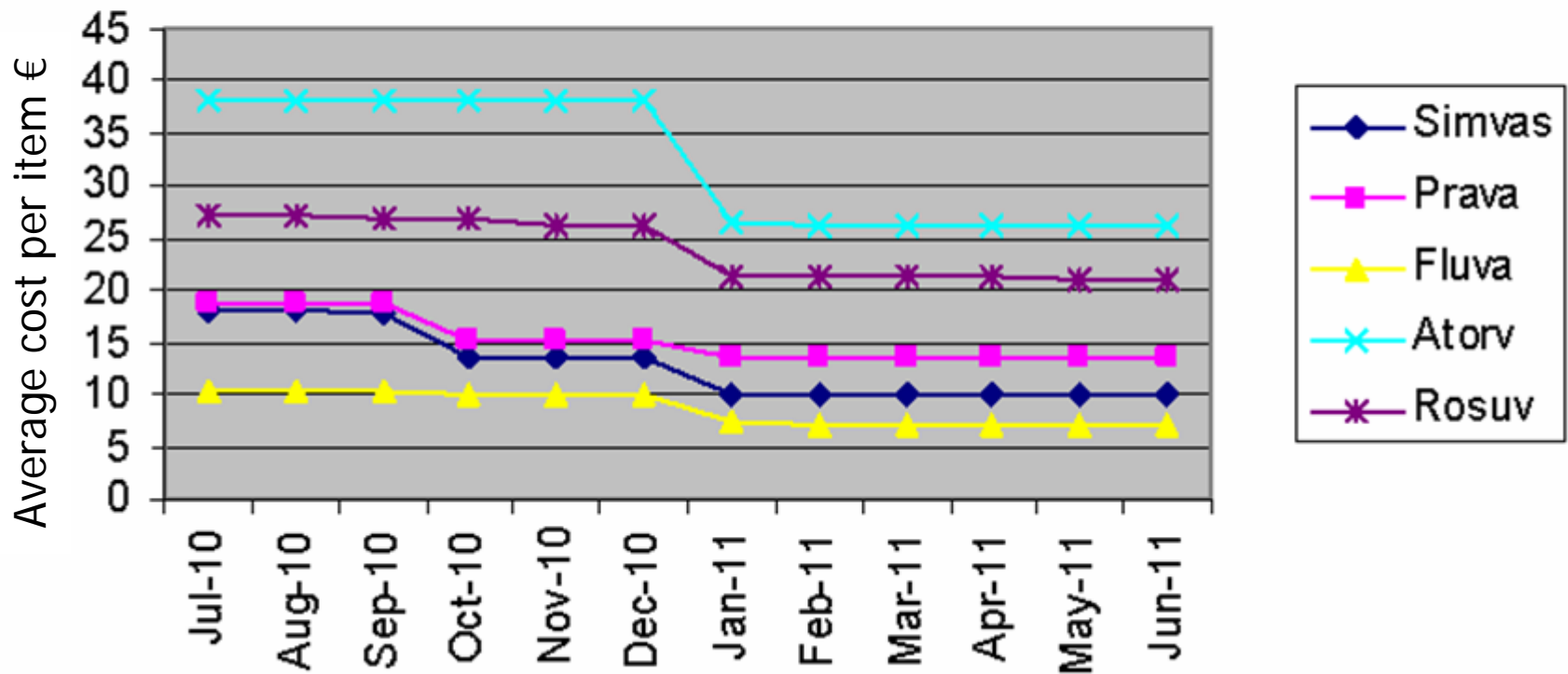
## Potential Future Savings from Generic Substitution

- NCPE study estimated annual savings if 100% generic substitution occurred in 2009:
  - €71m by substituting the least expensive generic.
  - €96m if generic price set 40% below the originator price.
  - €146m if generic price set 60% below originator price.

# CVD drug utilisation in Ireland

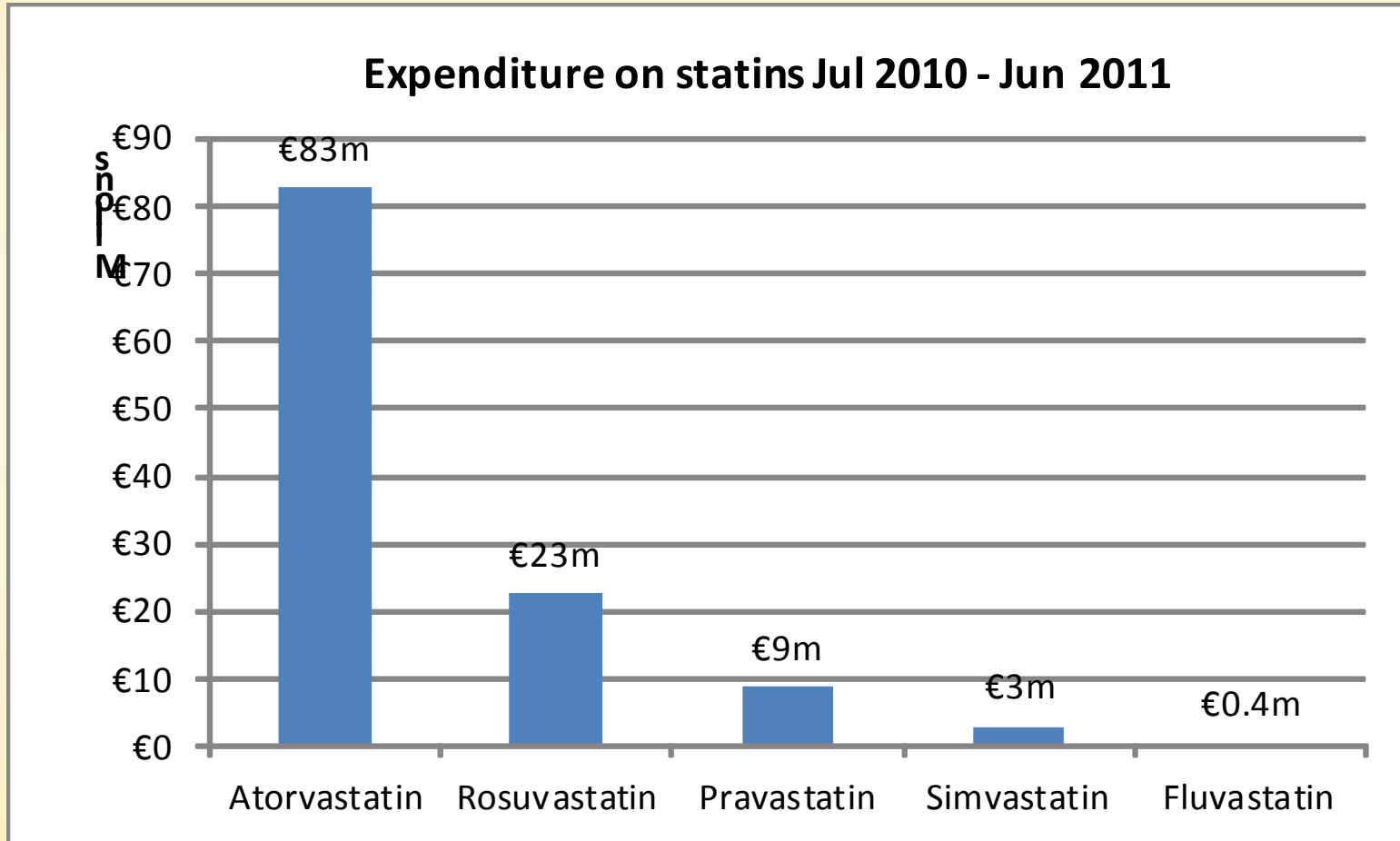


## Average cost per item for Statins



# CVD drug utilisation in Ireland

The example of statins...

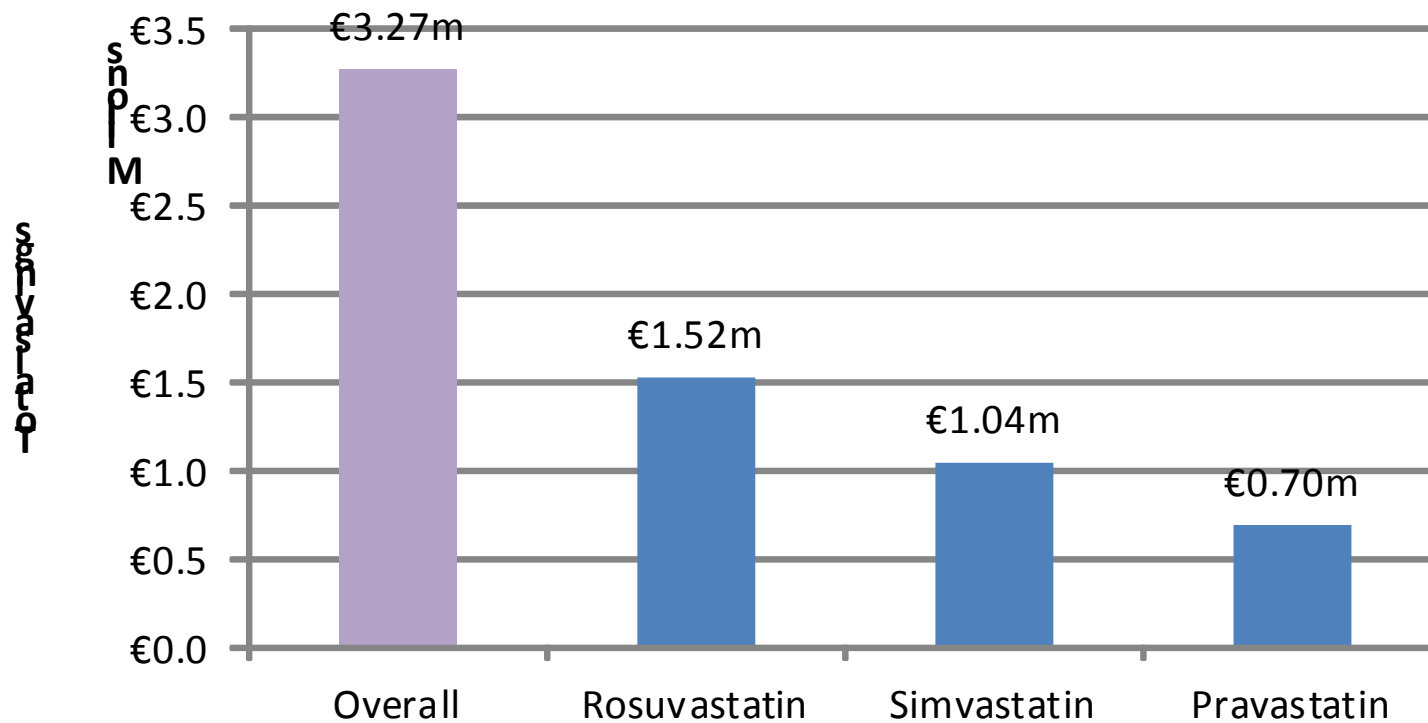


**Source:** Primary Care Reimbursement Service (PCRS) [http://www.hse.ie/eng/staff/PCRS/PCRS\\_Publications/](http://www.hse.ie/eng/staff/PCRS/PCRS_Publications/)

# CVD drug utilisation in Ireland



## Potential savings from substitution with cheapest generic equivalent



# Conclusion

- Increased scrutiny of expenditure on medicines by decision makers
- Pharmacoeconomics plays important role informing decision making and health policy in Ireland
- All new products reviewed and considered for full pharmacoeconomic assessment
- Many CV interventions have favourable cost-effectiveness, but further scope for strategies which enhance value for money

