
R&D Portfolio Management in Large and Small Companies

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Portfolio Management in pharmaceutical R&D

The objective of portfolio management is

- to promote project and portfolio related decisions that are in line with the company's strategy,
- to allocate available resources to individual projects such that overall portfolio value is maximized.

Portfolio Management in pharmaceutical R&D

R&D portfolios are more difficult to manage than financial portfolios because ...

- projects cannot be traded as freely as financial assets
- project value is strongly driven by project risk
- project risk is influenced by the chosen development strategy
- there is no unanimous project value as assumptions are uncertain

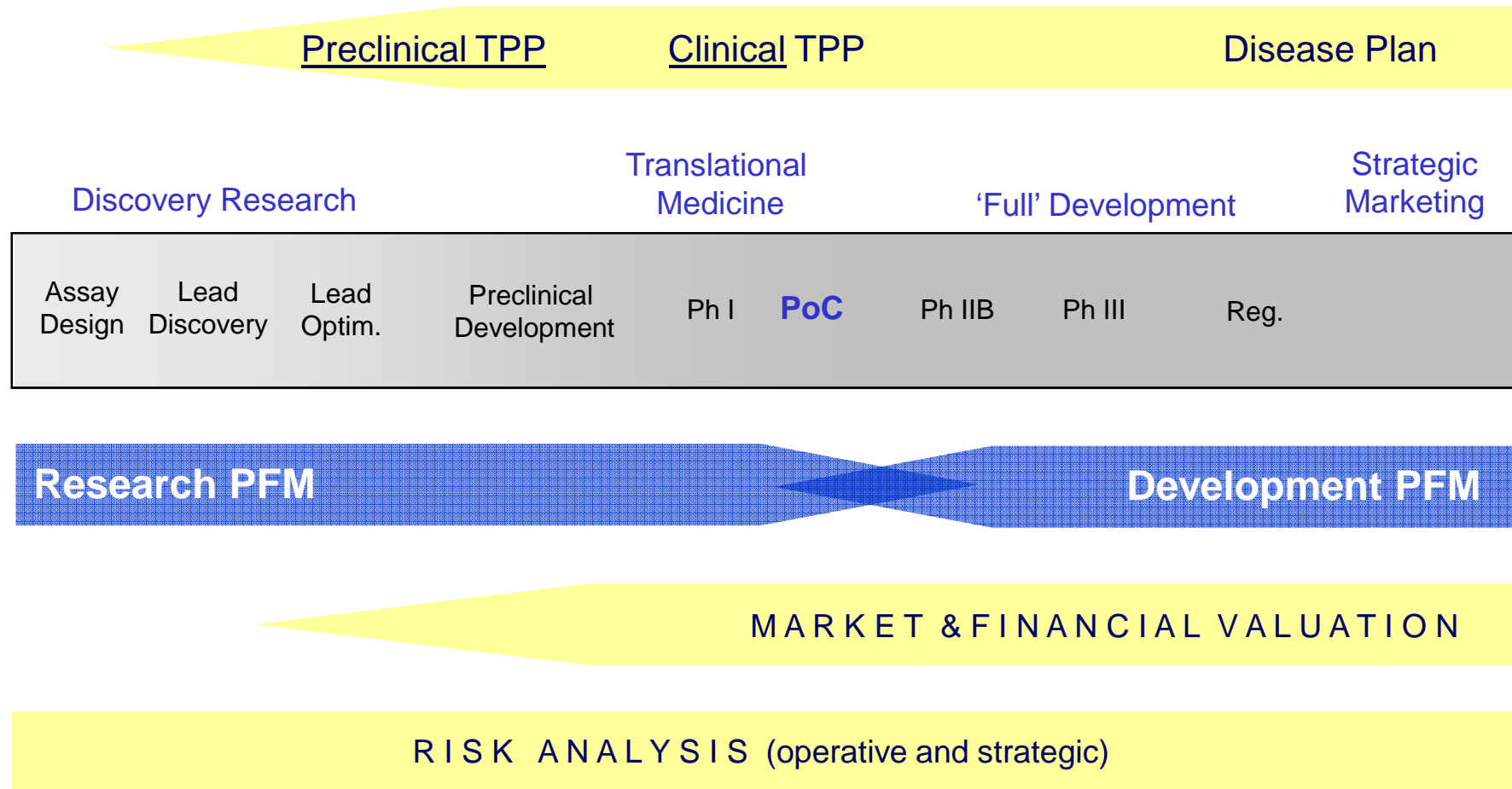
Portfolio management in pharmaceutical and biotech industry

	Big Pharma	Young Biotech
<i>Objectives</i>	Maintain/improve performance	Transform company from discovery to development / marketing organization
<i>Task</i>	Ensure filled pipeline	Build a portfolio
<i>Pipeline</i>	Select projects with sufficient commercial potential	Avoid reliance on single product
<i>Risk Management</i>	Analyze and manage project and portfolio risk in spite of big numbers	Scenario analysis, establish fall back options

Portfolio management process

	Big Pharma	Young Biotech
<i>Prioritization Criteria</i>	<p>Expected financial value Expected sales Pipeline fit</p>	<p>Maximize value uptake Optimize resource utilization Create news flow</p>
<i>Tools & Models</i>	<p>Sales forecast + NPV Project management Portfolio management (Capacity management)</p>	<p>(Sales forecast + NPV) (Project management)</p>
<i>Organizational Units</i>	<p>Portfolio management Project management (Business development)</p>	<p>Executive Board/CEO</p>
<i>Benefits</i>	<p>Less pipeline volatility Internal analytical capacity Efficient data management</p>	<p>Little portfolio management complexity</p>
<i>Challenges</i>	<p>Lack of attractive projects Complex cross-functional process Portfolio more difficult to steer Problems with knowledge transfer</p>	<p>Lack of diversification Limited resources for risk mitigating strategies Limited analytical resources</p>

Best Practice portfolio management in Big Pharma



The TOP-DOWN Perspective

- Strategic objectives
 - Qualitative
 - Quantitative
 - Corporate development
- Risk balance objectives
- Pipeline objectives
- Identification of portfolio gaps with respect to strategic goals

The BOTTOM-UP Perspective

- Valuation of individual project's
 - Commercial potential
 - R&D and market risk
 - Development effort and time
 - NPV
- Target Product Profile
- Risk structure
- Scenario analysis
- Portfolio decisions and operational action

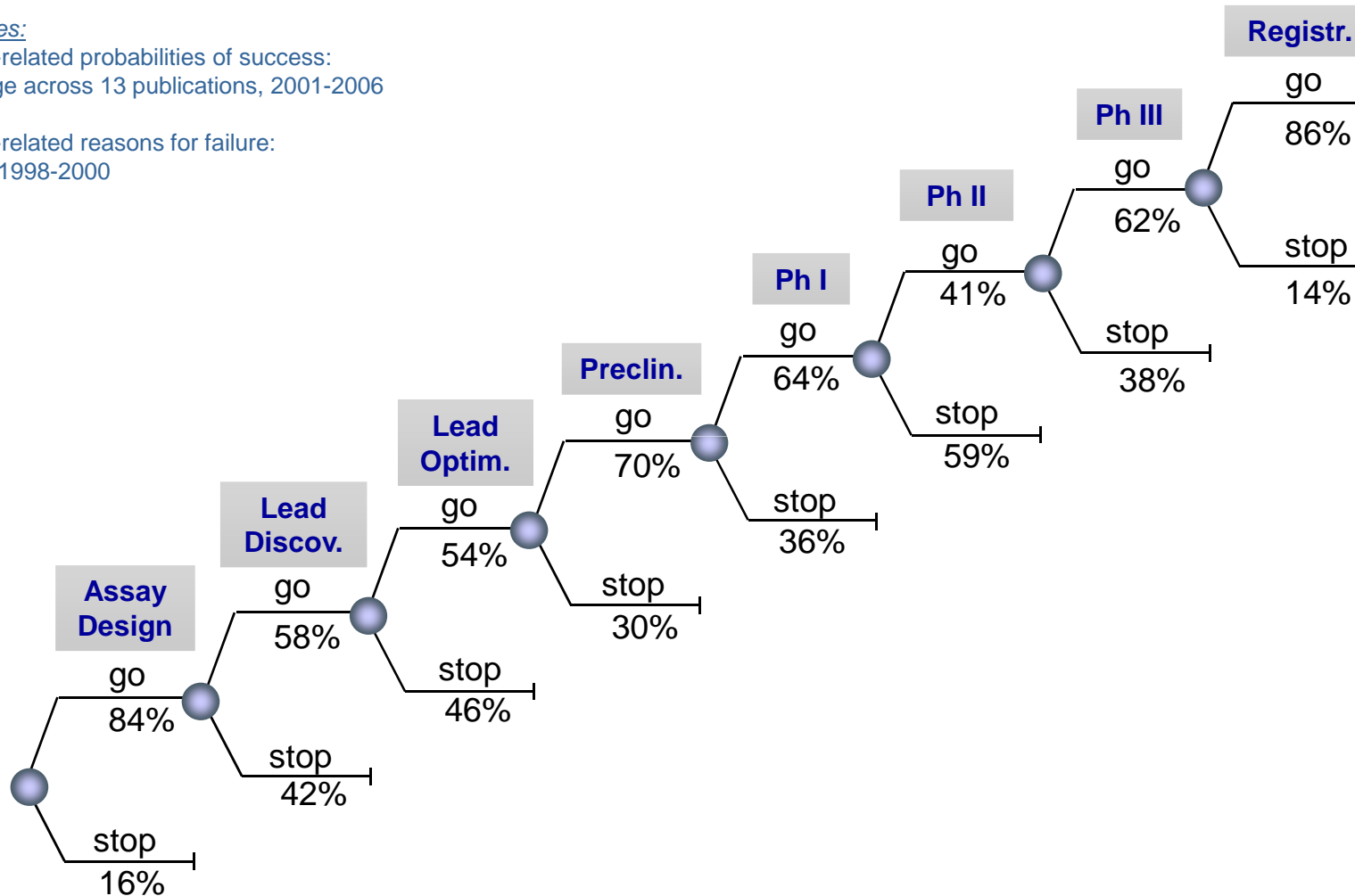


Documented stage-related attrition

Sources:

Stage-related probabilities of success:
average across 13 publications, 2001-2006

Stage-related reasons for failure:
KMR, 1998-2000

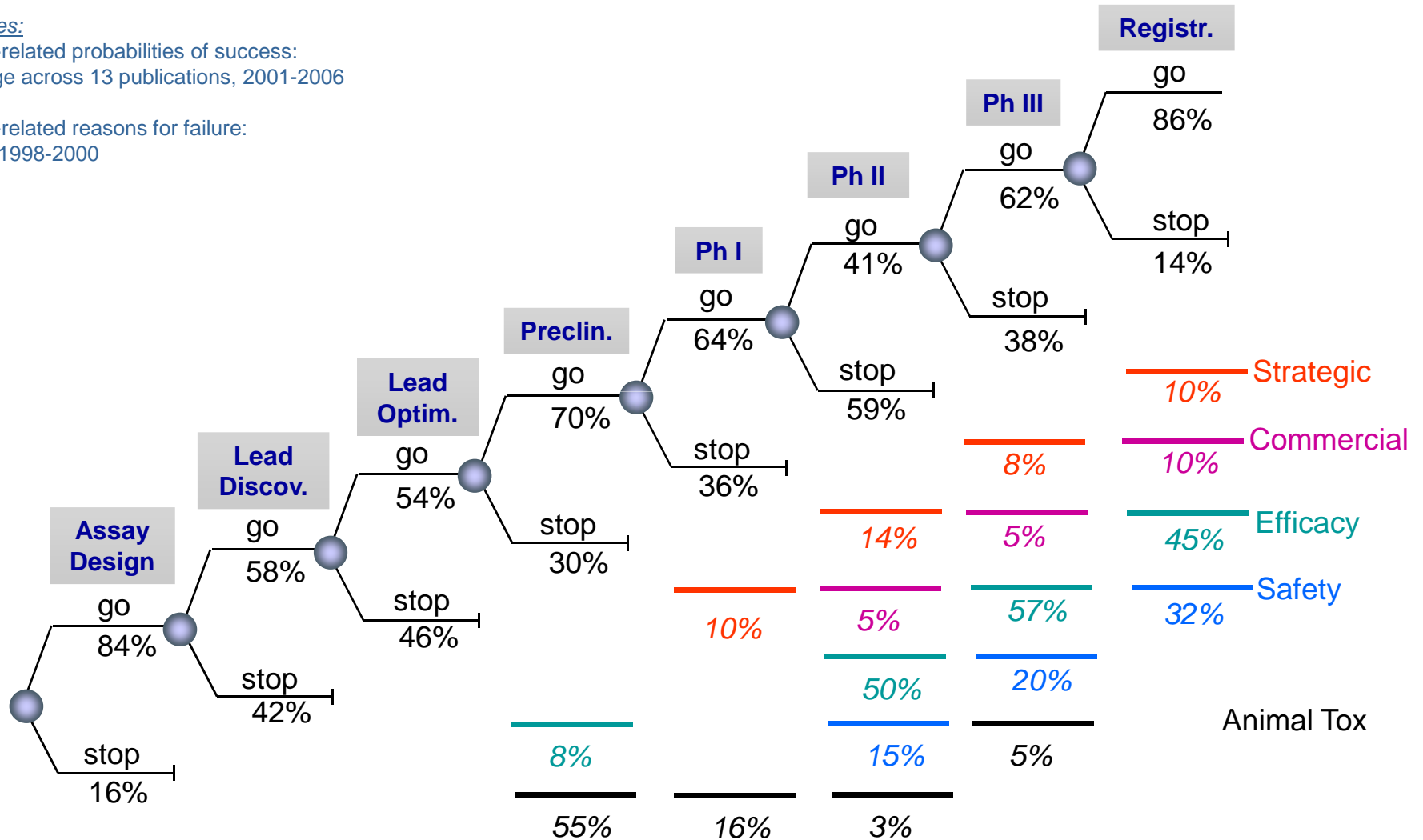


Reasons for failure

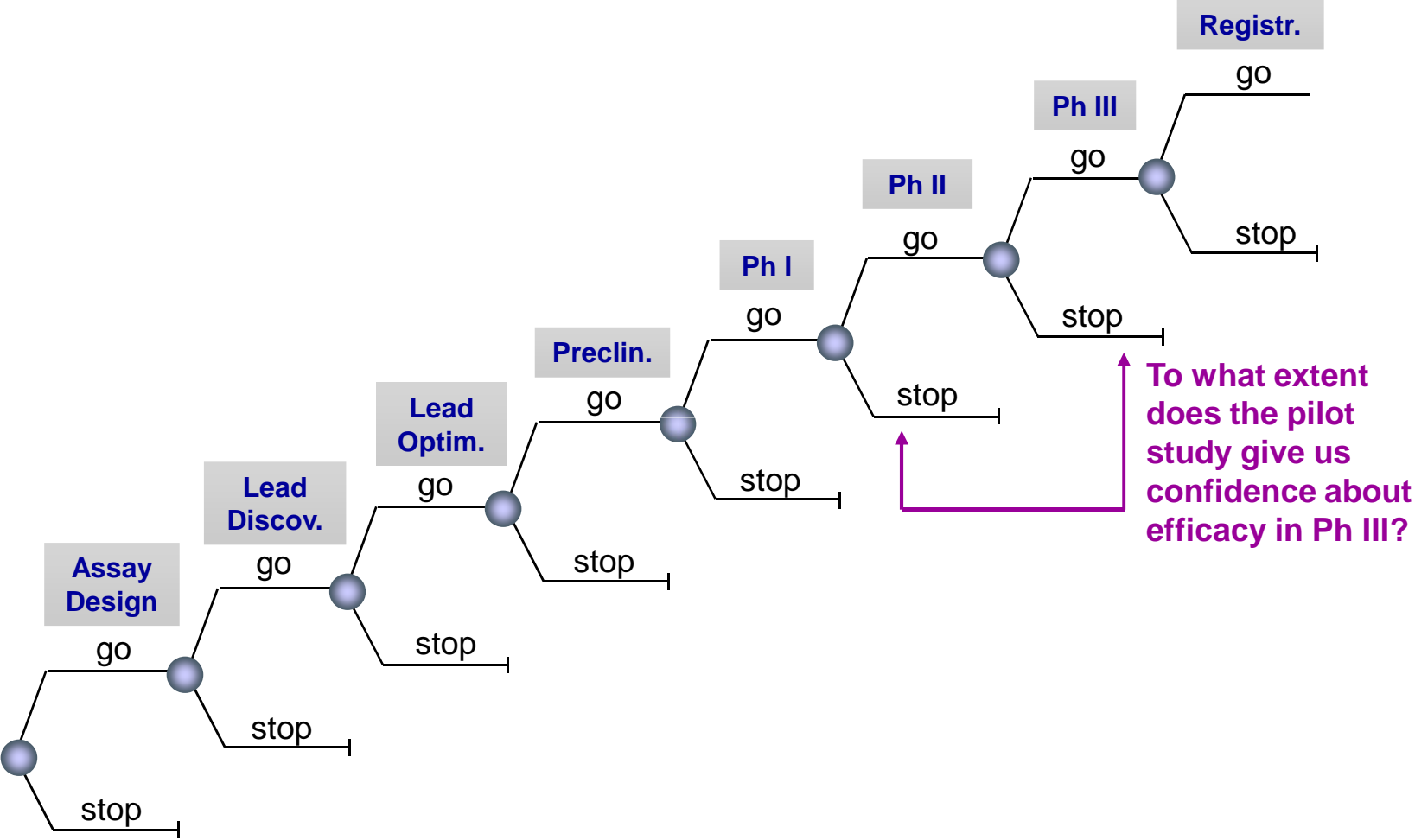
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Stage-related probabilities of success:
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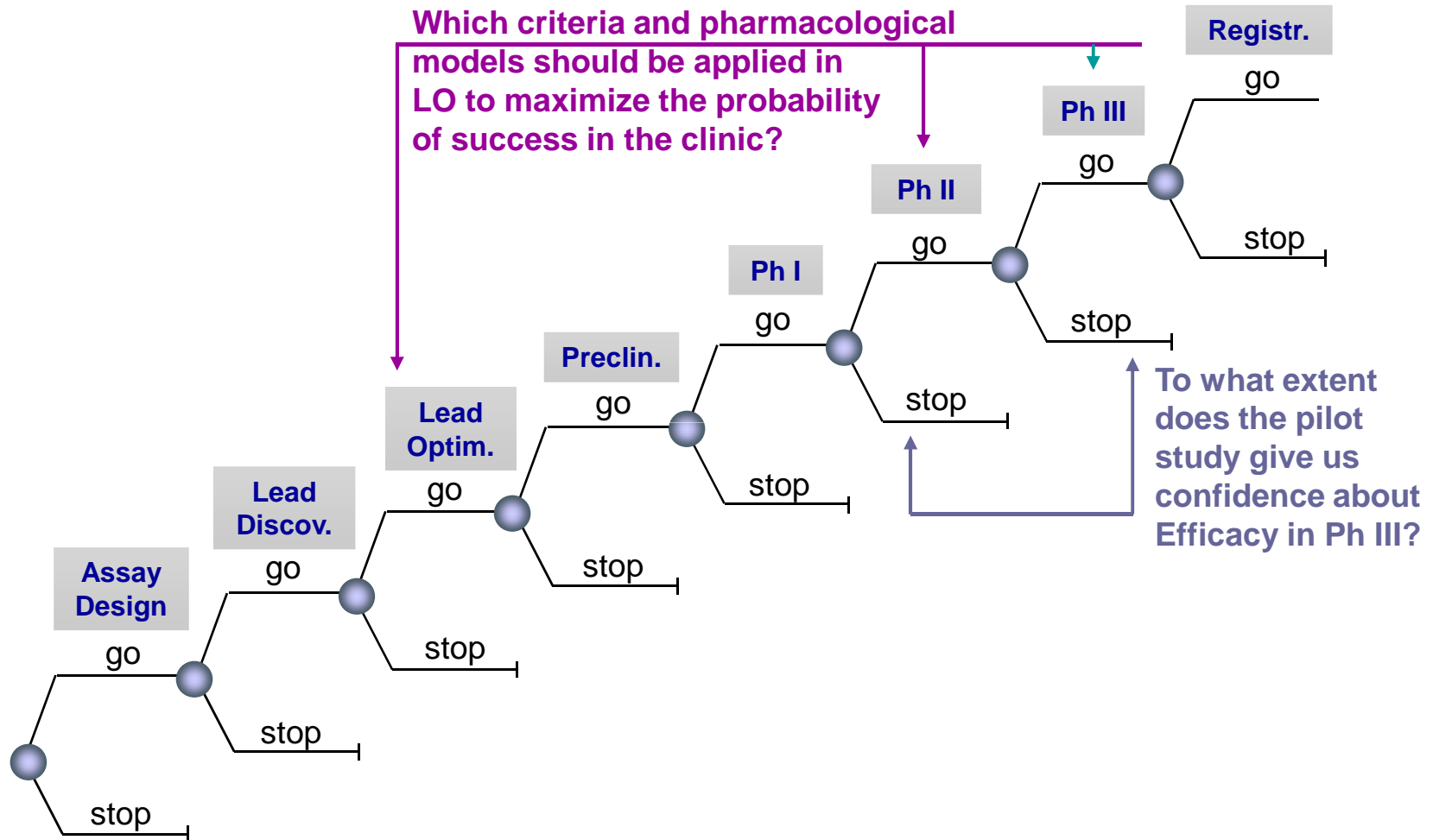
Stage-related reasons for failure:
KMR, 1998-2000



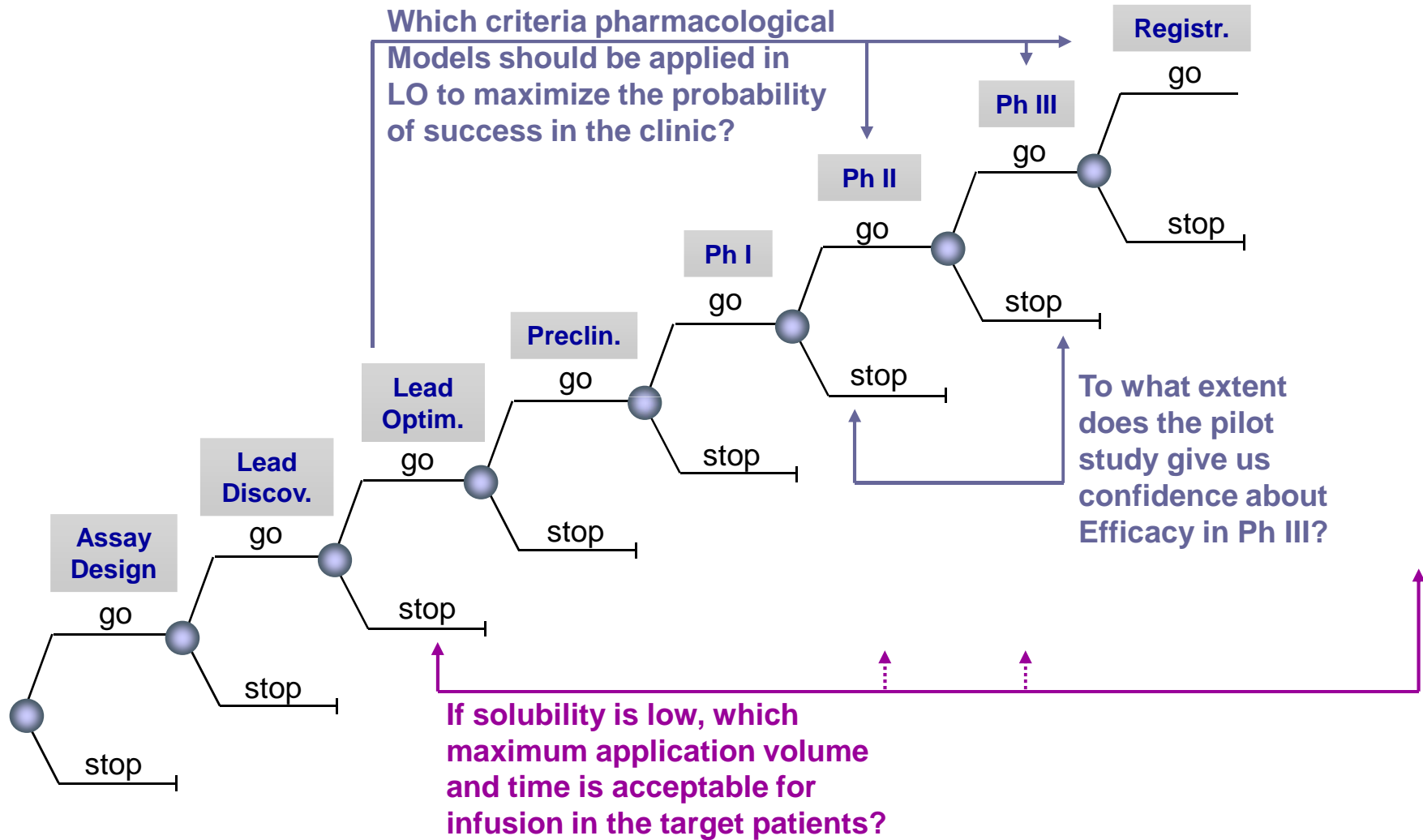
Analysis of R&D risk structure



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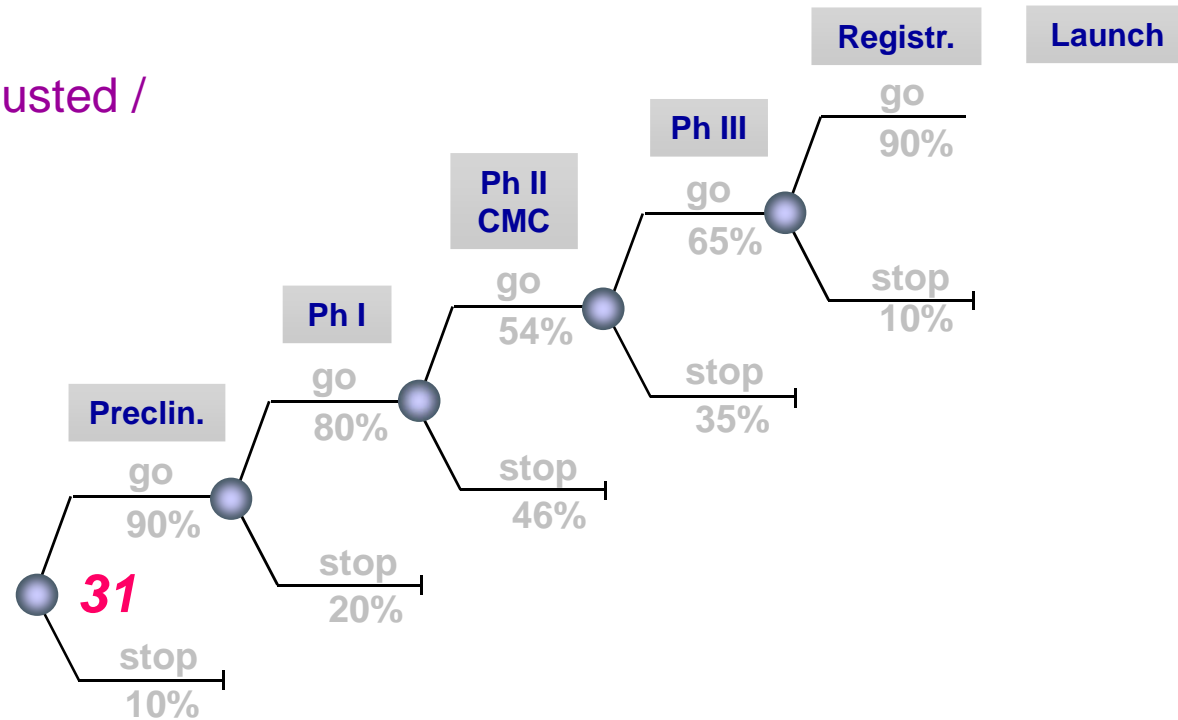


Analysis of R&D risk structure



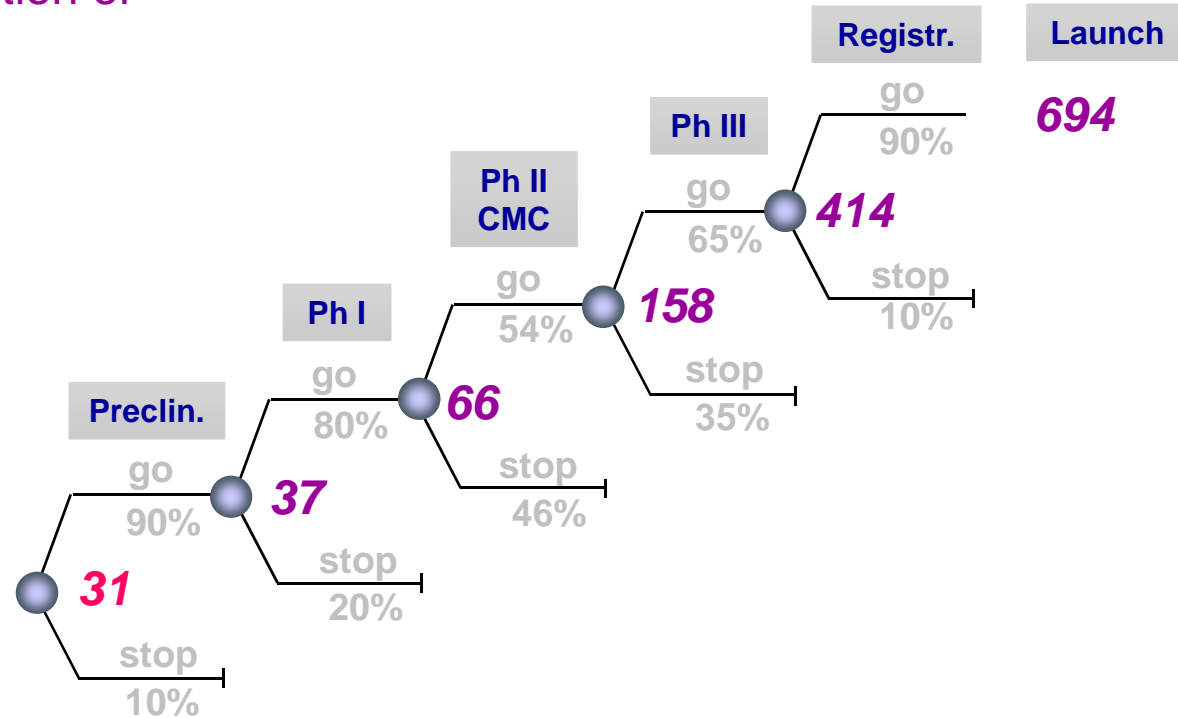
Net present value

Expected / risk adjusted / augmented NPV (€ million)



The ,optionality' of R&D investments

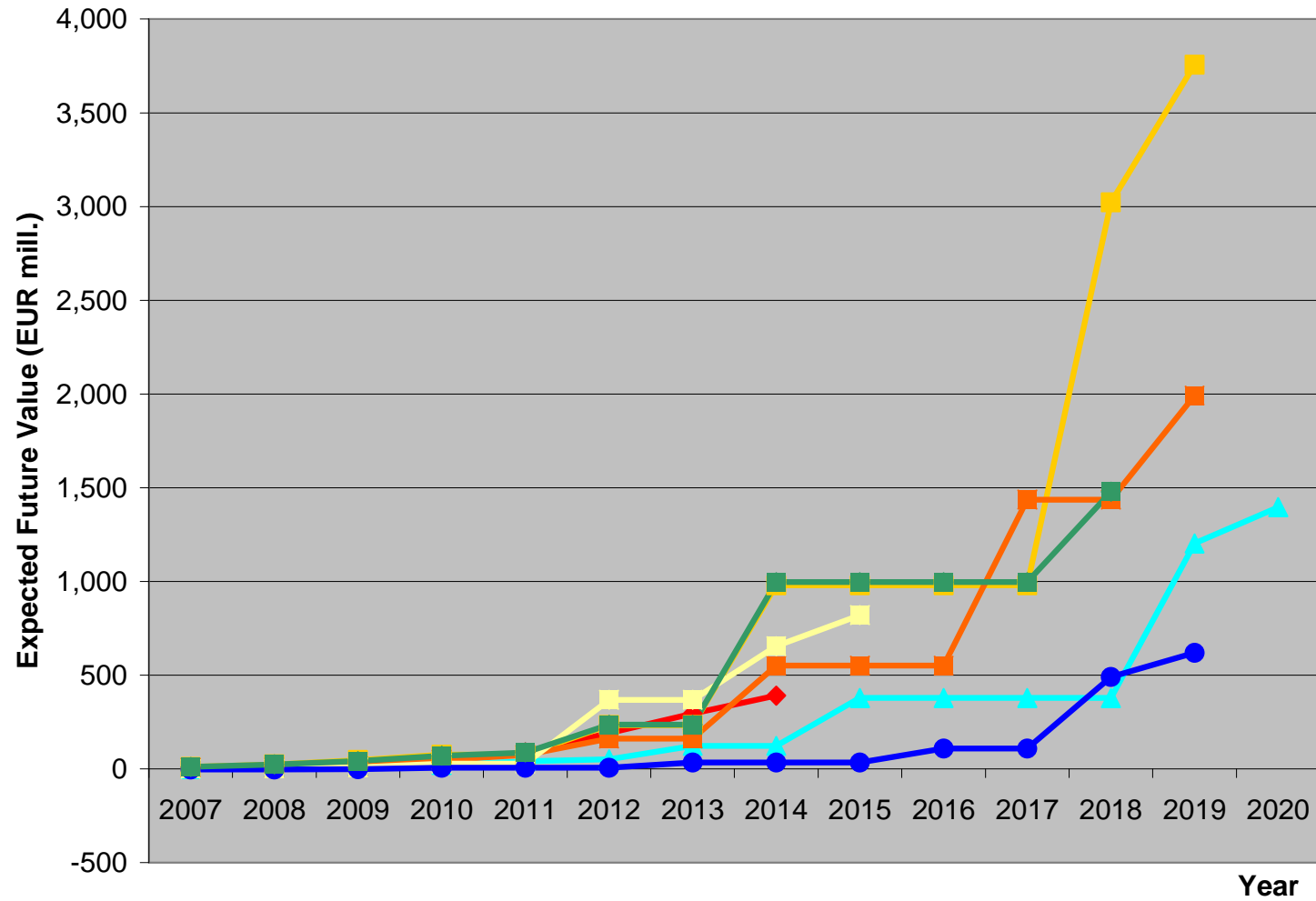
Expected value uptake at successful completion of development MS (€ million)



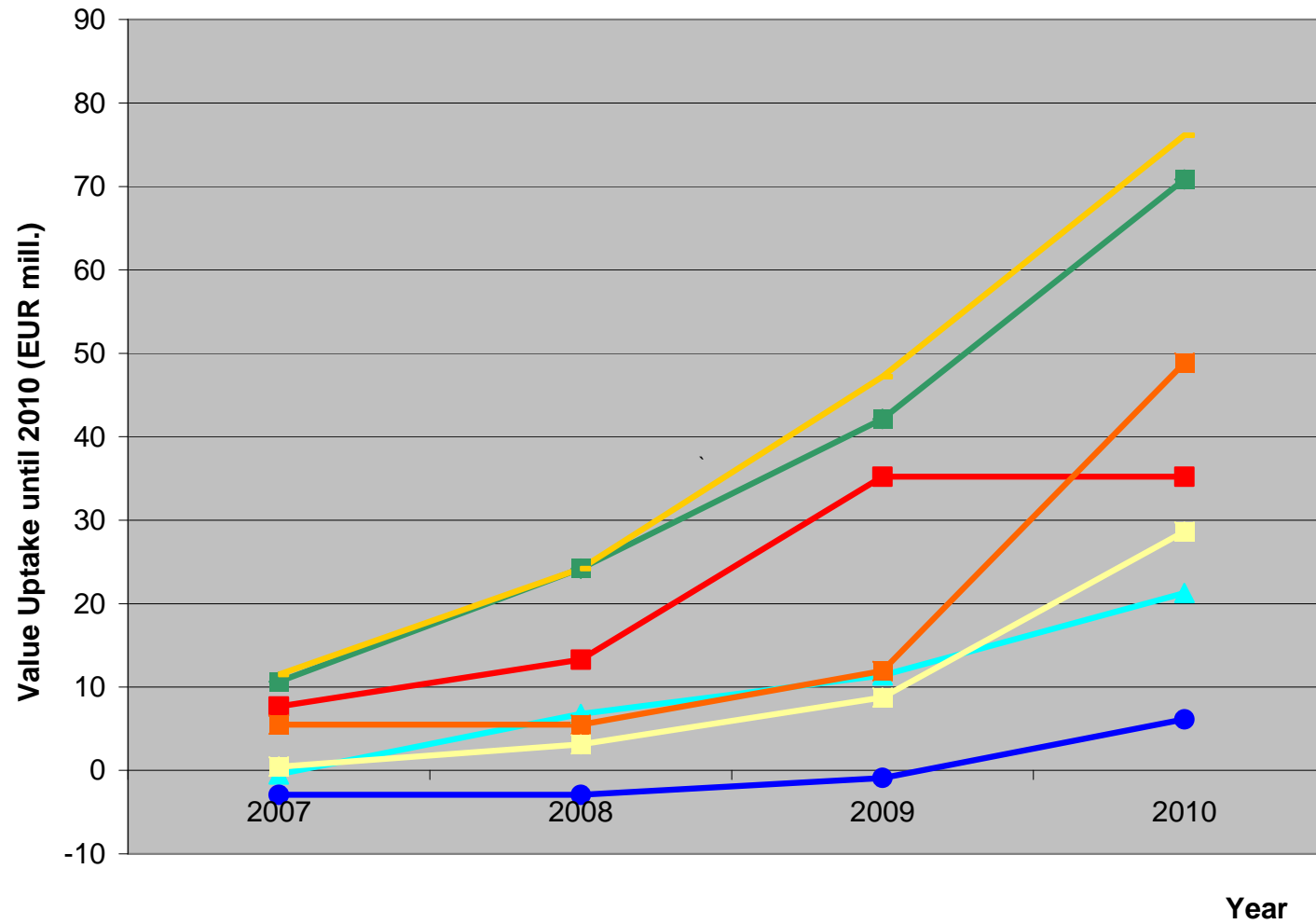
R&D investment to progress to next MS (€ million)

0.5 7.2 15.5 36.6

Expected value uptake – a portfolio of seven preclinical projects



Expected value uptake – preclinical portfolio (within next 3 years)

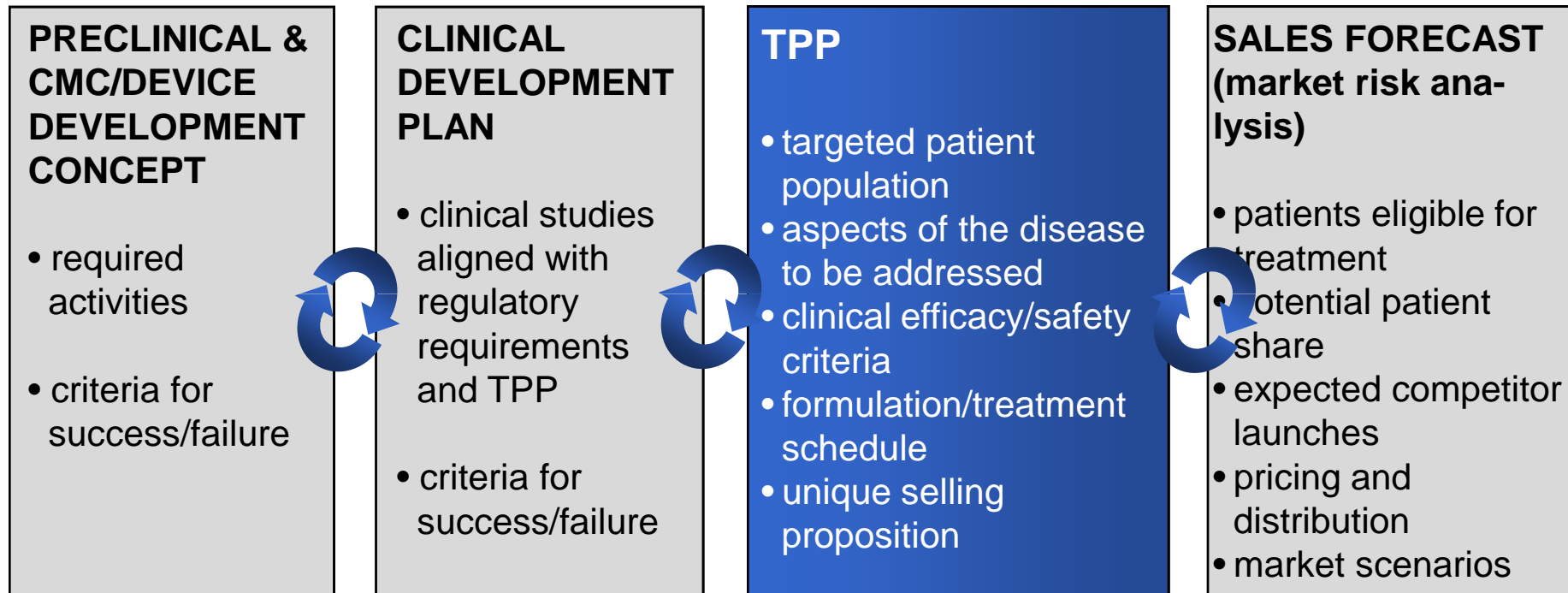


Conclusions

- No portfolio management system works perfectly
- It is worth while implementing individual elements
- Do risk analysis and commercial valuation (incl. market research)
- No system replaces analysis and judgment
- Portfolio decisions must be communicated and translated into operational actions



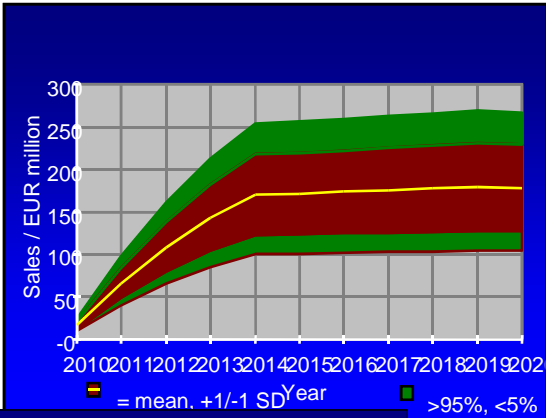
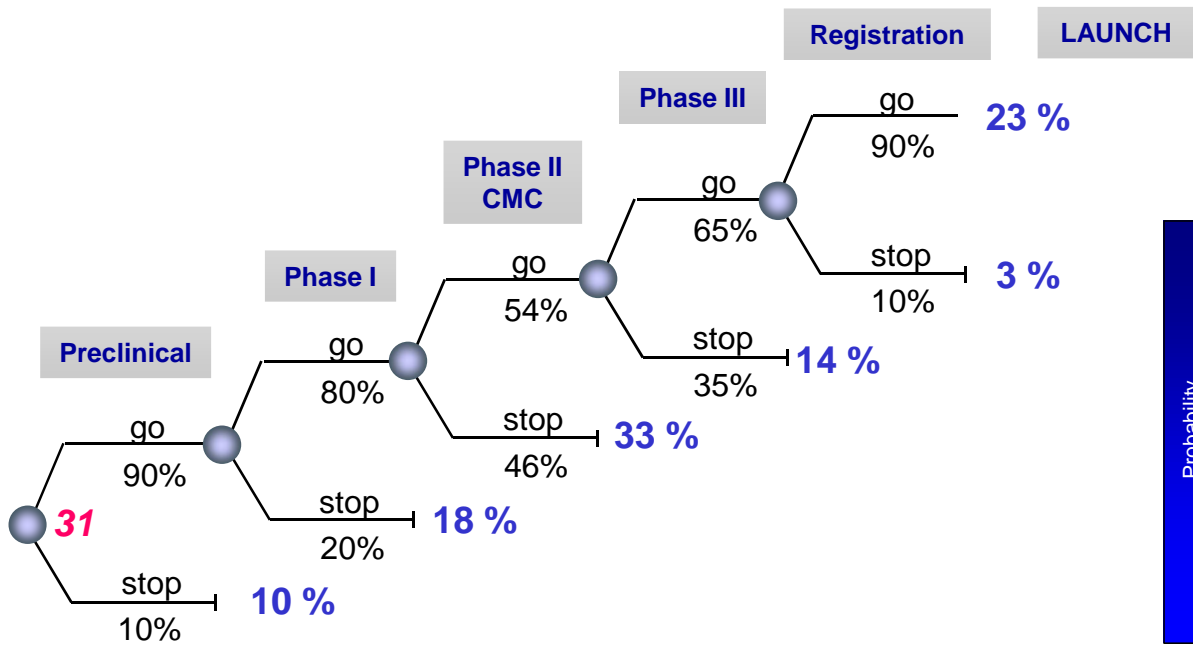
Target Product Profile (TPP) – the basis for project management and valuation



Risk-adjusted ('augmented') NPV

Expected Project NPV = EUR 31 million (mean)

Scenario	Probability	Scen. NPV (EUR thousands)	Exp. Scen. NPV (EUR thousands)	
1	23%	177,600	40,395	Launch
2	3%	-49,305	-1,246	STOP after failure of Registration
3	14%	-23,923	-3,255	STOP after failure of Phase III
4	33%	-11,627	-3,851	STOP after failure of Phase II
5	18%	-6,143	-1,106	STOP after failure of Phase I
6	10%	-2,841	-284	STOP after failure of Preclinical

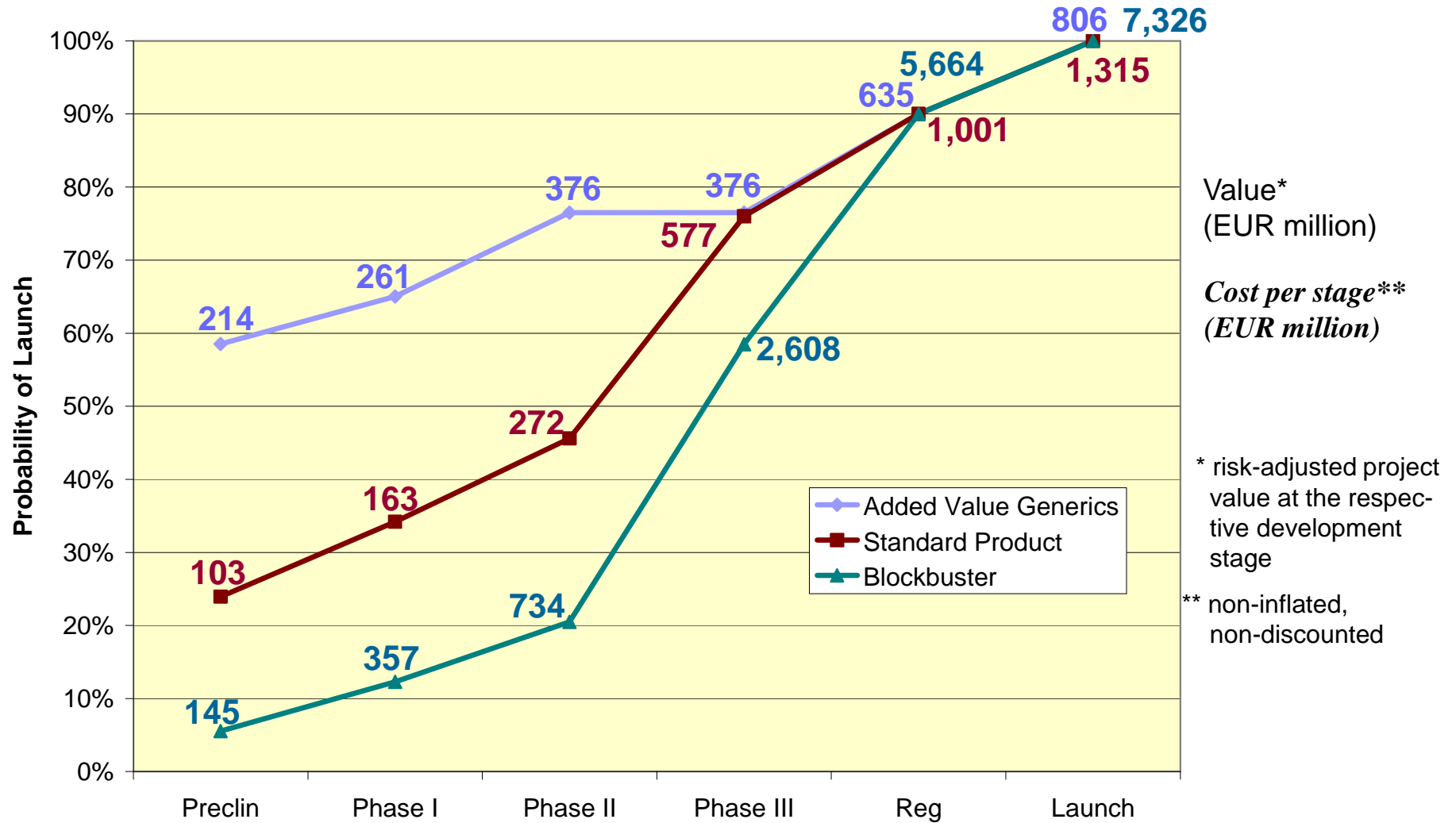


Illustrative example - assumptions

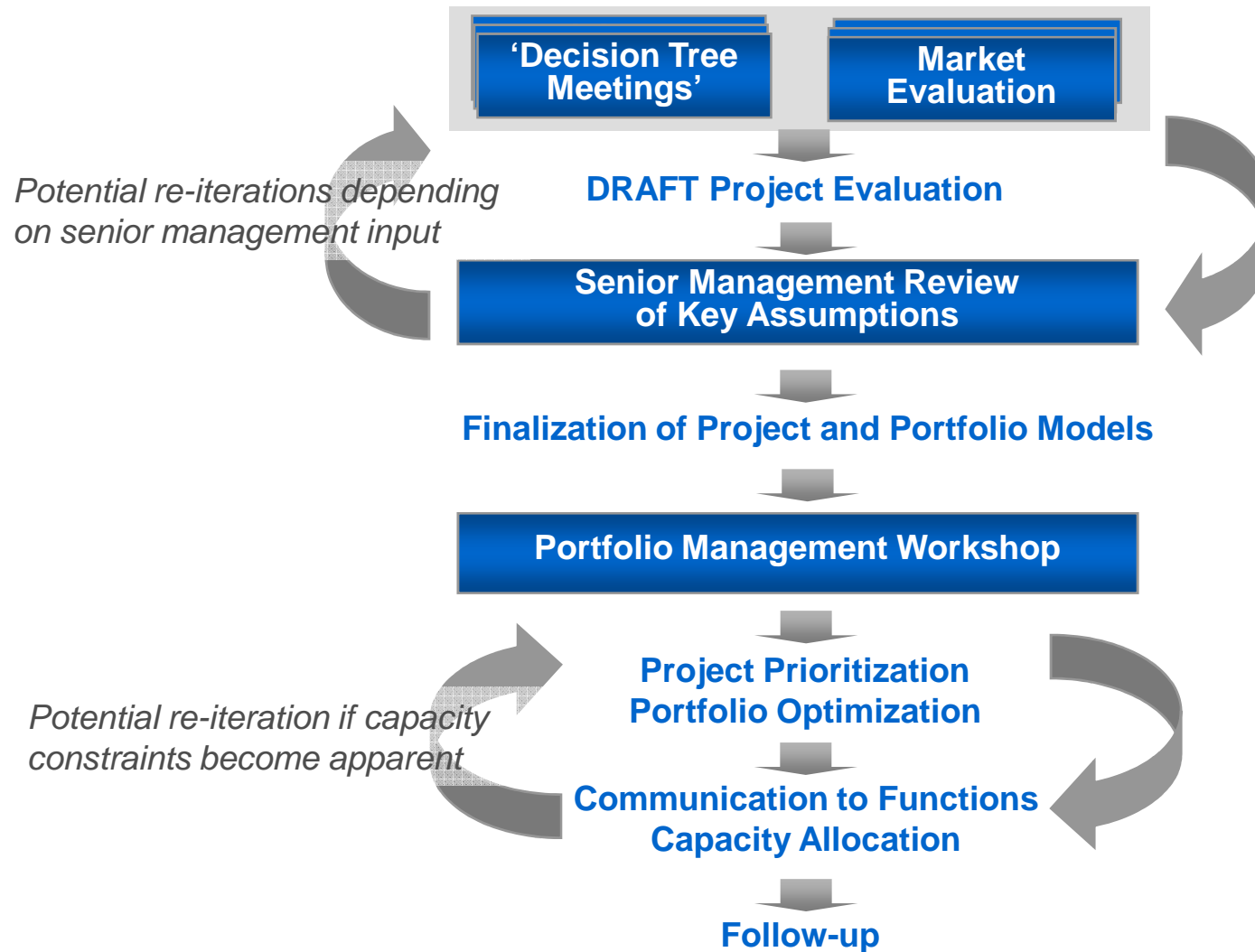
<i>discount rate: 10%</i> <i>tax rate: 40%</i>	Peak sales (EUR mill.)	Years to peak	COST (EUR mill.) / probability of success							% sales reduction in year of patent expiry	
			Preclin	Phase I	Phase II	Phase III	Reg	Phase IV	CMC/ Product devel.		Marketing (year of launch)
Added value generic	250	5	<i>Phase II/III</i>							-	
			3	6	44	39	-	5	38		
			90%	85%	85%	90%					
Standard product	500	5	7	9	22	98	66	5% of peak sales (years 1-5 after launch)	13	125	75%
			70%	75%	60%	80%	95%				
Blockbuster product	3,000	7	7	10	32	258	452	5% of peak sales (years 1-5 after launch)	13	450	90%
			45%	60%	35%	65%	90%				

* total stage-related costs, non-inflated and non-discounted

Risk structure and value uptake of 3 categories of R&D projects

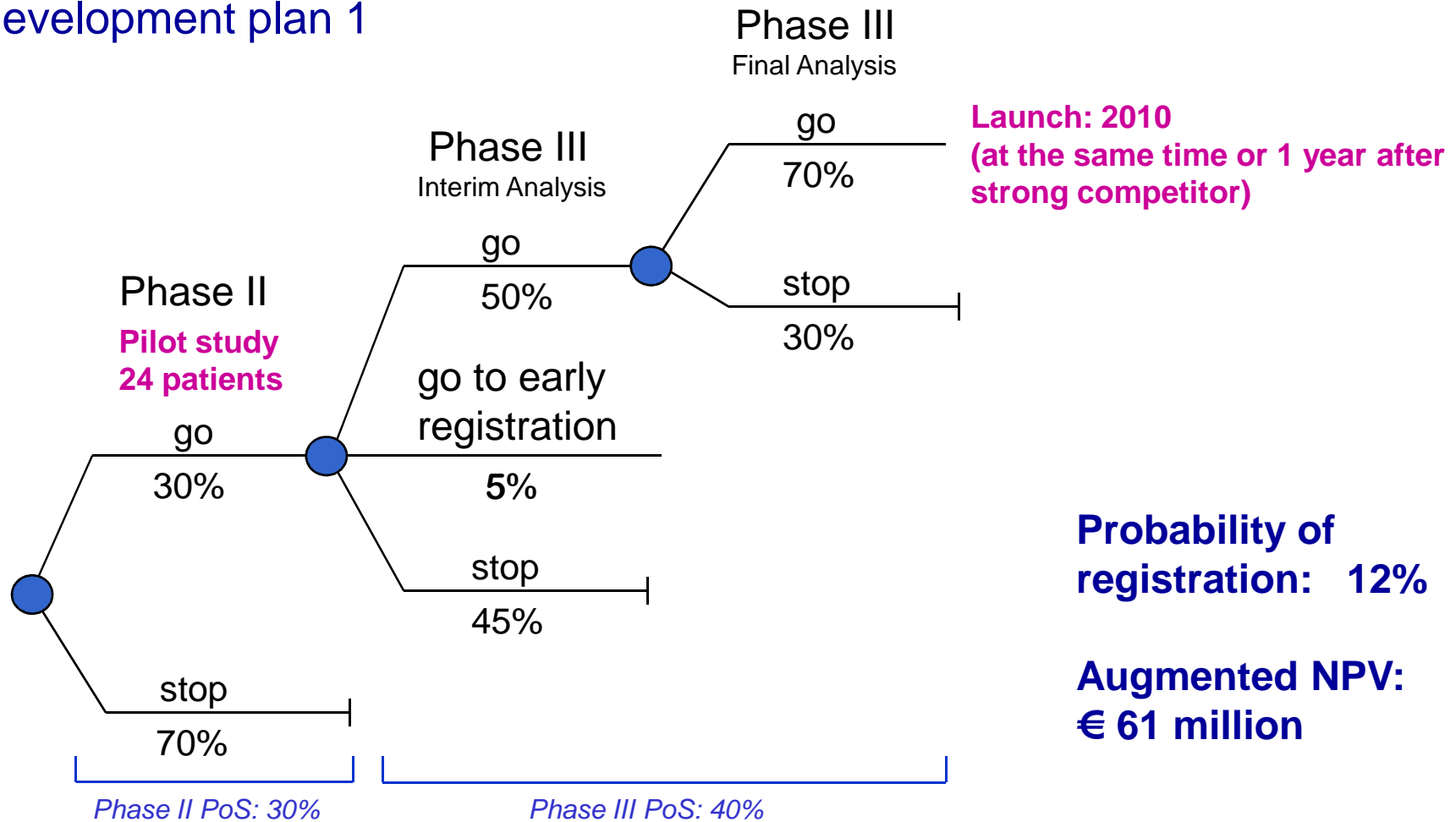


Project and portfolio evaluation workflow



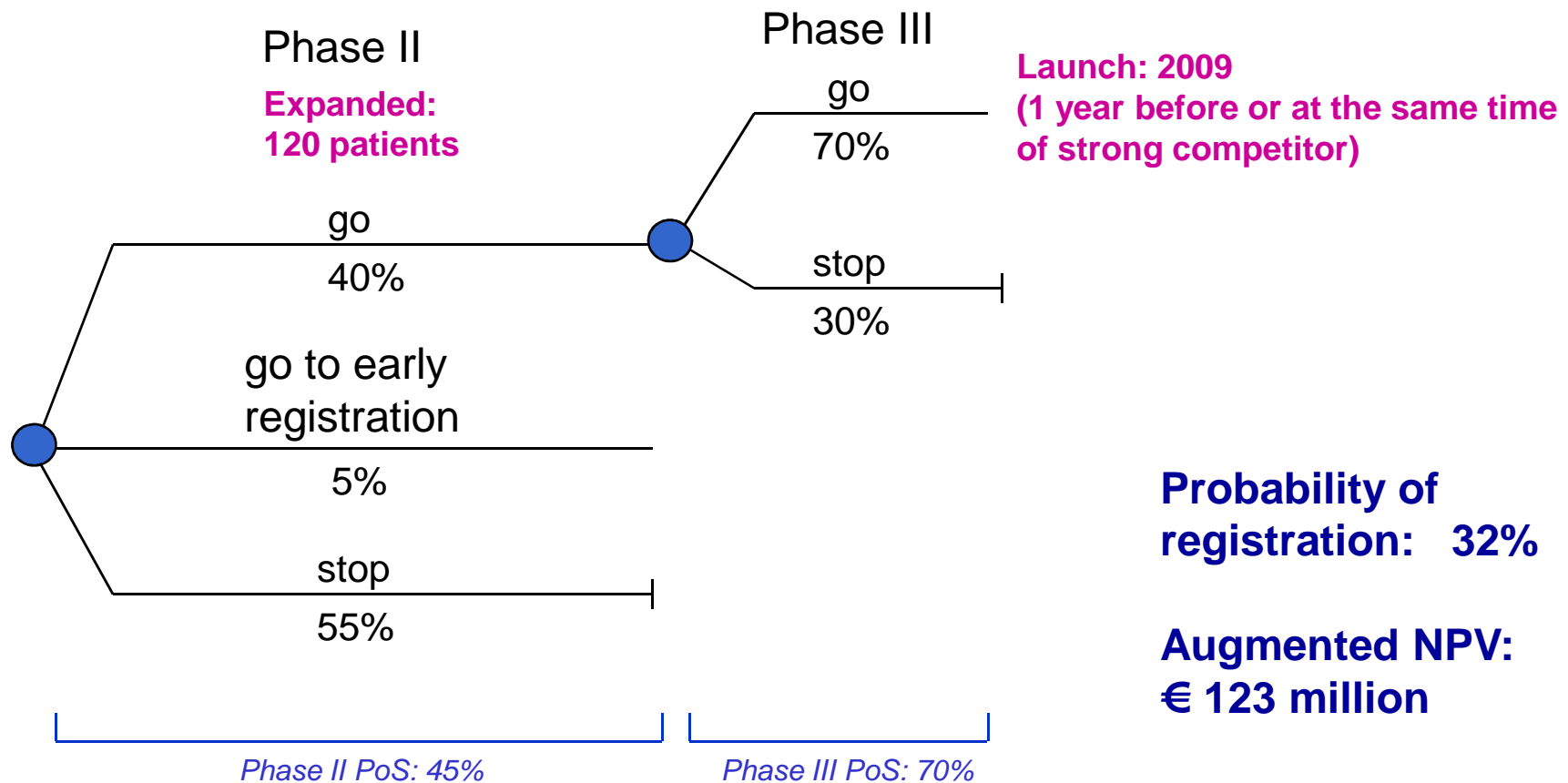
Effect of risk structure on project value and overall probability of success (1)

Hemorrhagic shock development plan 1



Effect of risk structure on project value and overall probability of success (2)

Hemorrhagic shock development plan 2



Big Pharma: portfolio perspectives for project prioritization (quantitative)

