



Transformational Change in R&D

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PhRMA Adaptive Designs Workshop

Washington November 13th 2006



Environmental Scan

◆ ***Public perception negative:***

- **Commentary vitriolic**
- **Trust lost**
- **Safety impact of single serious AE. The N of 1 phenomenon**

◆ ***Regulators defensive***

◆ ***Value of new products not shown and payers not satisfied***

◆ ***Centers engage in research as means of defraying costs***

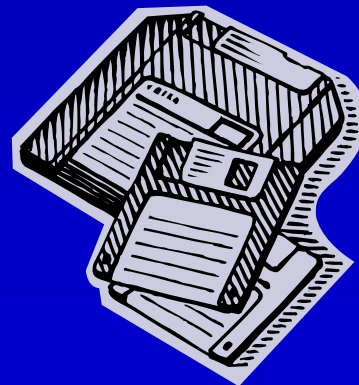
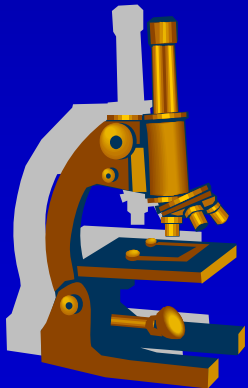


Diagnostic of Pharma R&D

- ◆ ***Science does not translate***
- ◆ ***We invest in failure***
- ◆ ***We do not learn***
- ◆ ***Time and cost of data acquisition unacceptable***
- ◆ ***Unnecessary divergence and lack of standards***
- ◆ ***Safety: a subjective perception***
- ◆ ***Analyses miss sub groups***



Clinical Research: A Complex Business





Transformation has occurred in other Business Sectors

- ◆ ***Automobiles***
- ◆ ***Fashion and clothing***
- ◆ ***Computing and software***
- ◆ ***Steel/Shipbuilding***

What about Life Sciences?



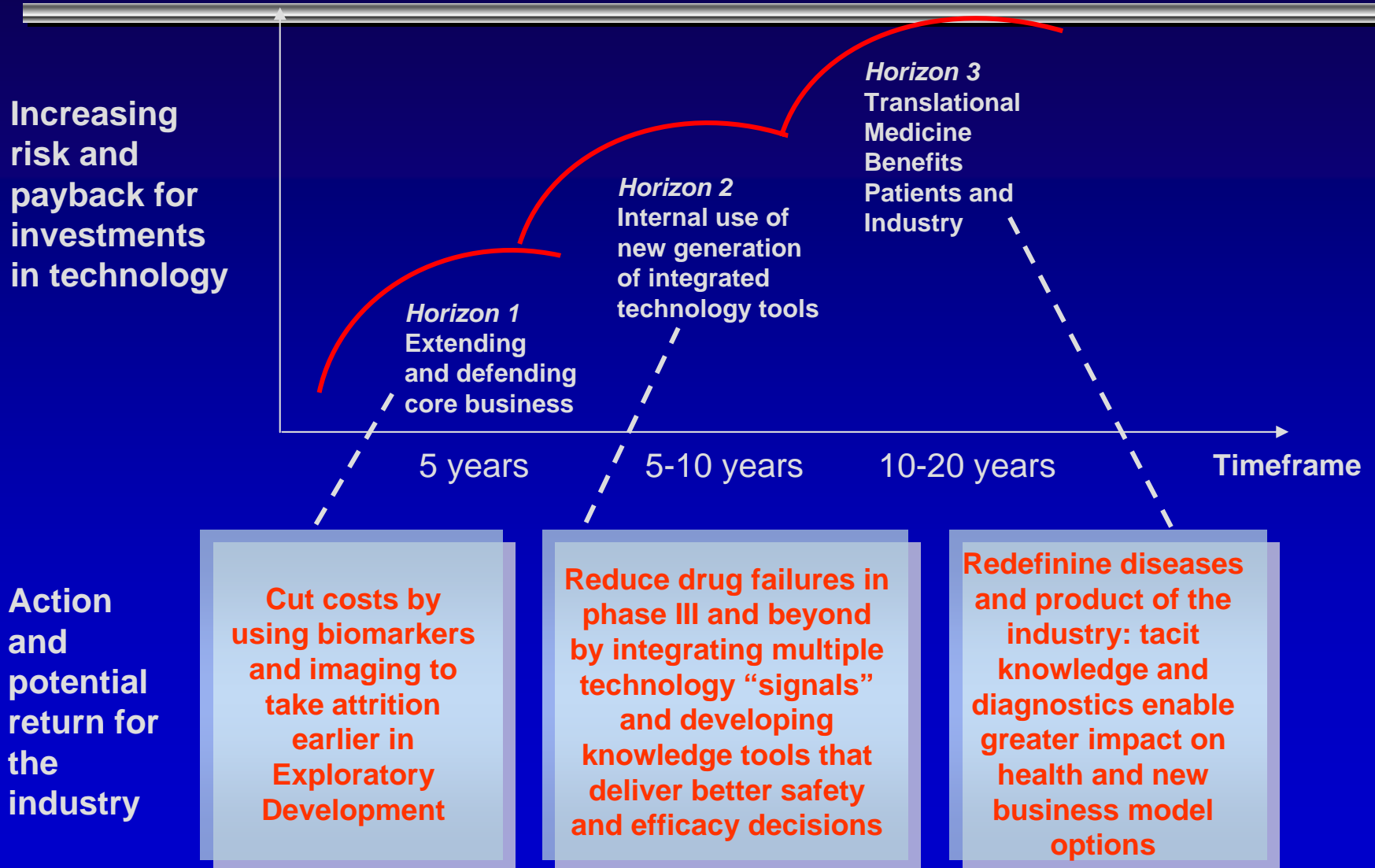
Drug Development: A Knowledge Business

- ◆ *Increase data acquisition capability*
- ◆ *Increase access to data to create knowledge*
- ◆ *Improve prediction, precision and translation*
- ◆ *Move to precision therapies in responsive subgroups*

- ◆ ***Translational Medicine***
- ◆ ***Optimize Data Utility***
 - Electronic Health Records
 - Large Data bases
 - Data mining
 - New analytic tools eg adaptive designs
 - HTA and EBM
 - Consortia
- ◆ ***Decision Making***
 - Early kills
 - Modeling and simulation
 - How to handle false positives/negatives
 - Minimum treatment effect needed
- ◆ ***Managing Costs***
 - New Theatres of Operation
 - Key skills needed for outsourcing
- ◆ ***Trust Offensive***



Translational Medicine:





- ◆ **1996: Genetic evidence that CCR5 is essential for HIV infection and influences pathogenesis**
 - Provides CIR for the development of a CCR5 antagonist in the treatment of HIV

- ◆ **Existence of healthy CCR5 Δ 32 homozygous individuals (human knockouts)**
 - Provides CIS for the use of a CCR5 antagonist as a pharmacological agent

- ◆ **Screening started at Pfizer in 1997 of CCR5 antagonists**

- ◆ **2006 Maraviroc Phase III program complete**



Optimizing Data Utility

◆ ***Pre competitive alliances***

- Placebo consortium
- Safety consortia
- Biomarkers

◆ ***Mega data bases***

- Post marketing analyses and reports
- Disease outcomes
- Therapy impact
- Validation of surrogates

◆ ***Data standards***



Decision Making

◆ *Real time data access*

◆ *Knowledge Management*

◆ *Therapeutic teams*

◆ *Modeling and Simulation*

◆ *Collapse Phase I and II trials*



◆ *Early kill decisions*

◆ *Avoid repetitive mistakes*

◆ *Better dose selection*

◆ *New indications*

◆ *Performance enhancement*



Managing Costs and Failure

◆ **Cost**

- **Supplier relationships**
- **Geography**
- **Non productive sites**
- **Greater use of technology eg EDC**

◆ ***Precision research***

- **Decrease the variability of subjects**
- **Better descriptor of the phenotype**