VCAT Break-Out Session: Biosciences/Health Care

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VCAT Productivity Model Assumptions*

$$P_{vcat}(t) = \sum_i P_{vcat}^i(t)$$

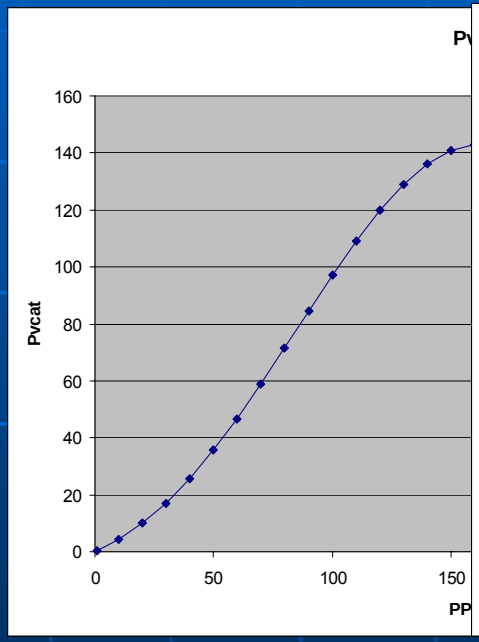
$$P_{vcat}(0) = \sum_i \alpha_i P_{vcat}^i$$

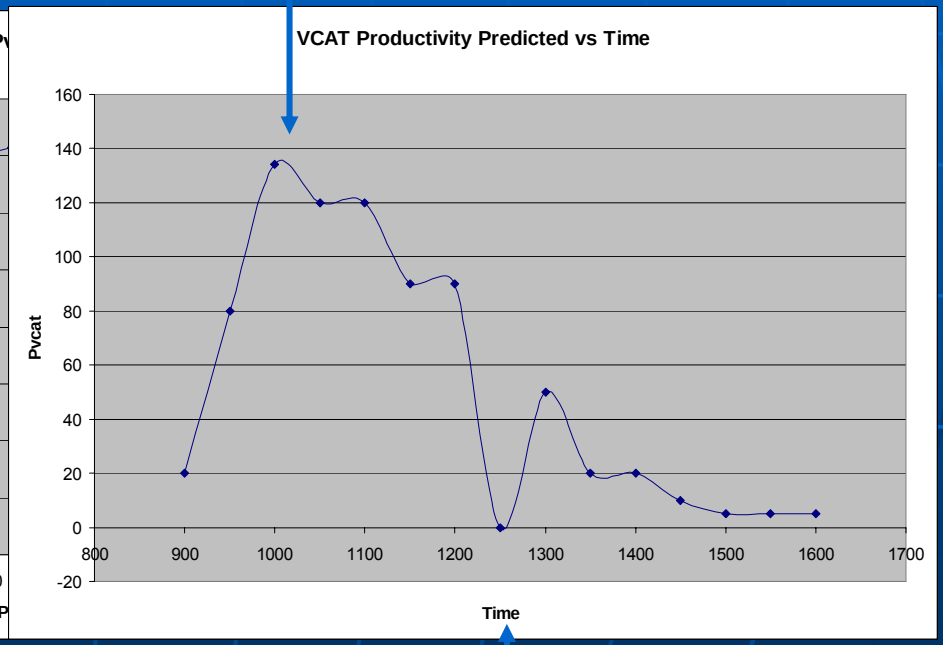
i	α_i
Spong	.999
Cassidy	.999
Heimbrook	.999
Serum	.95
Baer	.28
etc.	

* Gebbie, Furlani, Baer (2007)

VCAT Productivty Standard Model

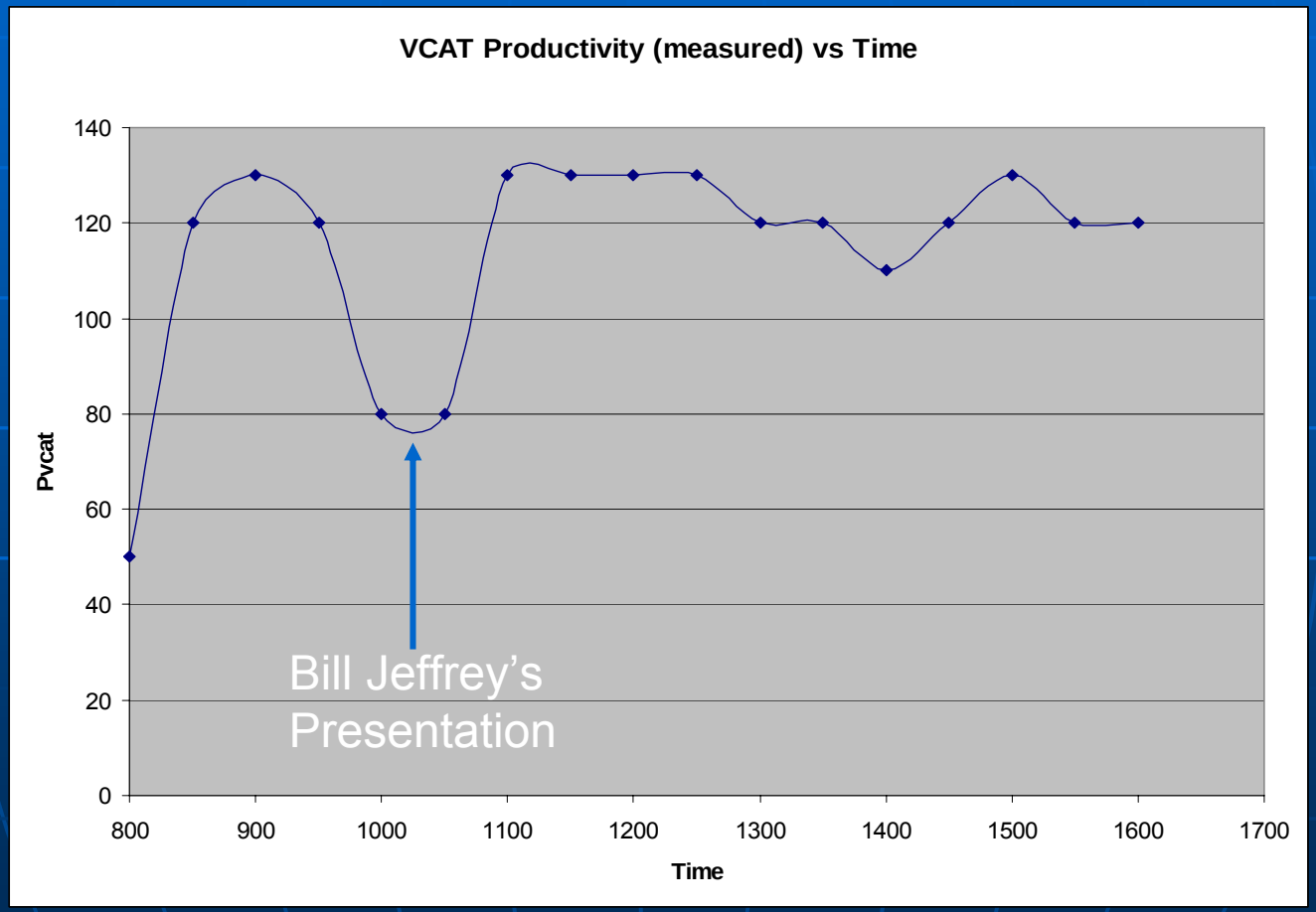
Bill Jeffrey's Presentation





Lunch

VCAT Actual Productivity vs Time



Biosciences/Healthcare Breakout Group

- NIST staff comments on VCAT subgroup activities
  - What would be most constructive way to interact?
- Group discussion on NIST history of supporting the biomedical industry
- Current NIST initiatives in this area
  - Current process for developing and prioritizing initiatives
- Industry overview (VCAT) and discussion (all)
  - Outline
  - Roadmap Examples
    - Diagnostics
    - Drug development
- Formulate Action Plan

Health Care, Biotechnology, Life Science NIST Strategic Planning: Strawman Process

- Outline industrial sectors
- Define critical measurements/technologies in sector
- Identify opportunities for advances in measurement science and development of critical standards
- Prepare summary
- Solicit input and comment from industry leaders
- Work with NIST staff to develop implementation plan

Major Industry Sectors Based on Bio and Medical Sciences

- Health Care
  - Diagnostics
  - Drug Development
  - Medical Devices
  - Services
- Biotechnology
  - Energy
  - Food products
  - Materials
- Life Science Research
  - Instrumentation, devices, and reagents for research
- Homeland Security
  - Forensics
  - Biometrics
  - Biohazard detection

- Health Care
- Biotechnology
- Life Science Research
- Homeland Security

Example:
Health Care Industry sub-Sector

- Health Care
  - Diagnostics
  - Drug Development
  - Medical Devices
  - Services
- Biotechnology
  - Energy
  - Food products
  - Materials
- Life Science Research
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Health Care Dollar Spending

Figure 6: Where the Health Care Dollar Goes

Source: C. Smith et. al., "National Health Spending In 2004: Recent Slowdown Led By Prescription Drug Spending," *Health Affairs* 25, no. 1 (2006): 186-196.

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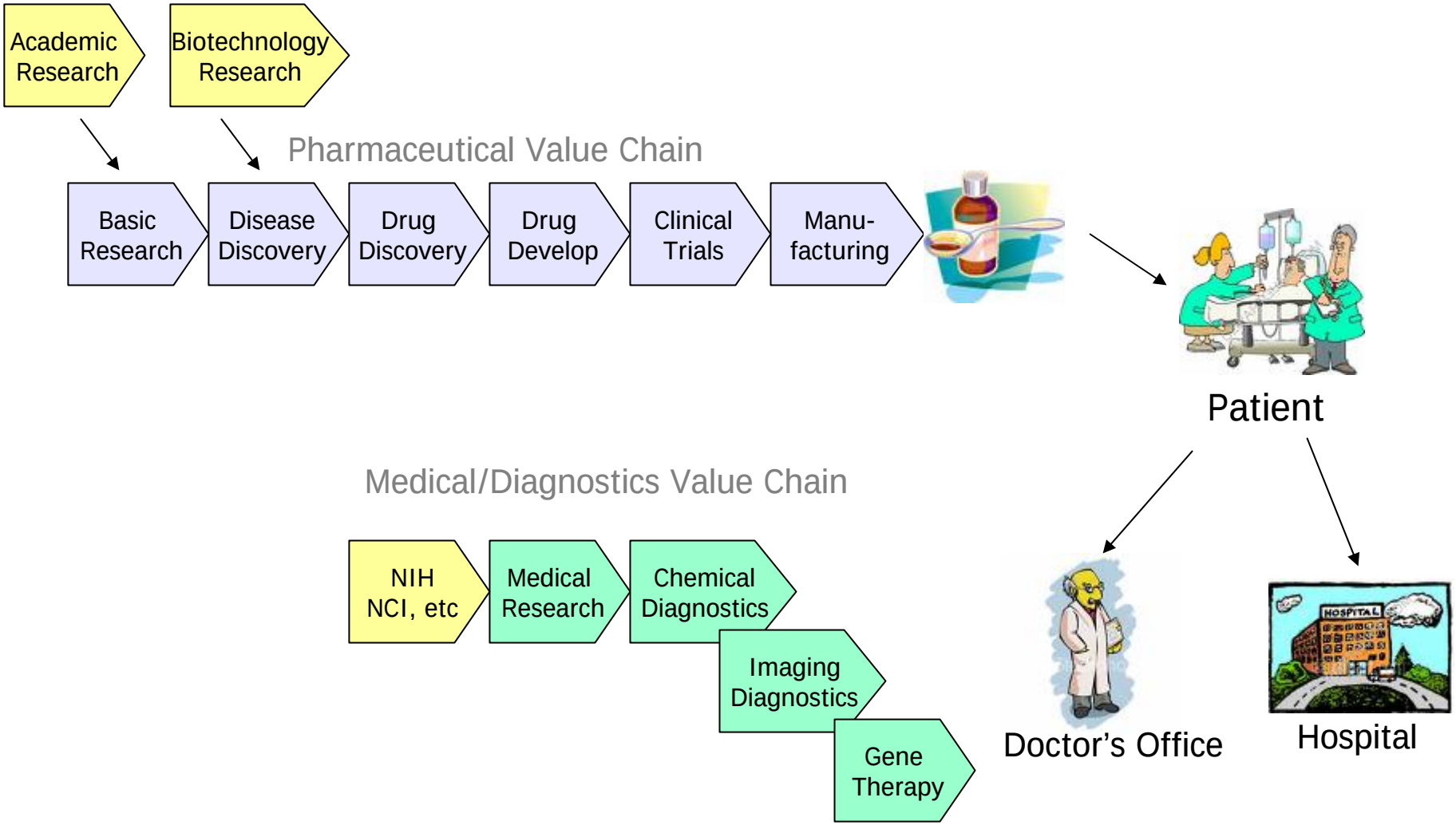
Health Care Sub-sector Application Areas

- Health Care
  - Diagnostics
    - IVD
      - Blood/Tissue Chemistry
        - Trace heavy metals
        - Macromolecules: DNA, RNA, Protein
        - Metabolites
      - Infectious diseases
        - Micro-organisms
      - Blood products: bone marrow, plasma, platelets
    - Pathology
      - Immuno-histochemistry
      - ELIZA
      - FISH
    - Vital Signs Monitoring
      - Blood pressure
      - Body temperature
      - O_2 sat
      - EKG,EEG
      - Respiration
      - Blood glucose
      - Blood coagulation
    - Imaging
      - Arthroscopy
      - Non-invasive imaging
        - CT, MRI, PET, US, thermal
      - Biomarkers

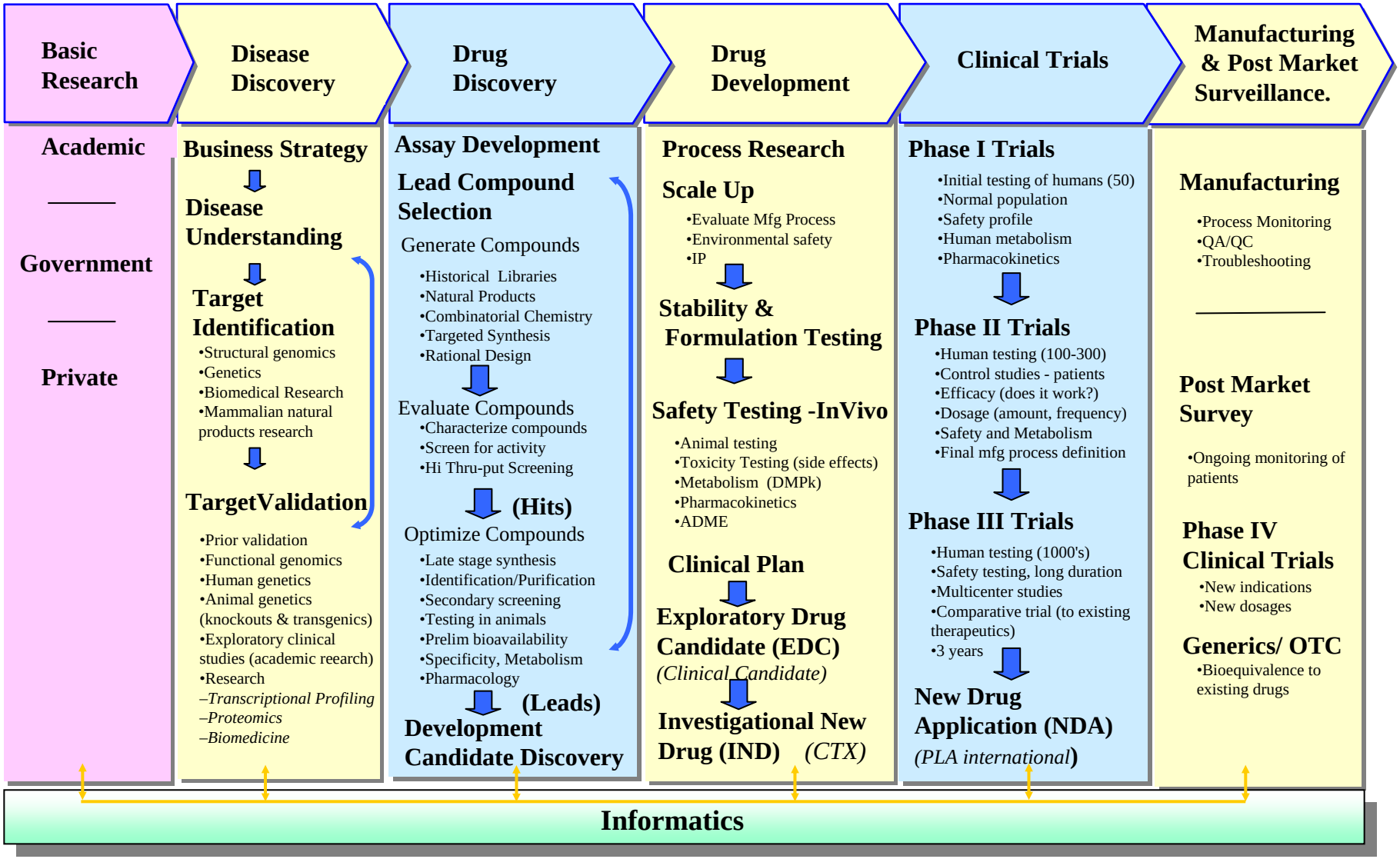
Definitions

- What is Bioscience?
  - The study of the cause of diseases, the development of therapeutics and the diagnosis and treatment of diseases
  - The study of biological materials for food, energy, environment, forensics and biohazard detection

Life Sciences Industry Profile

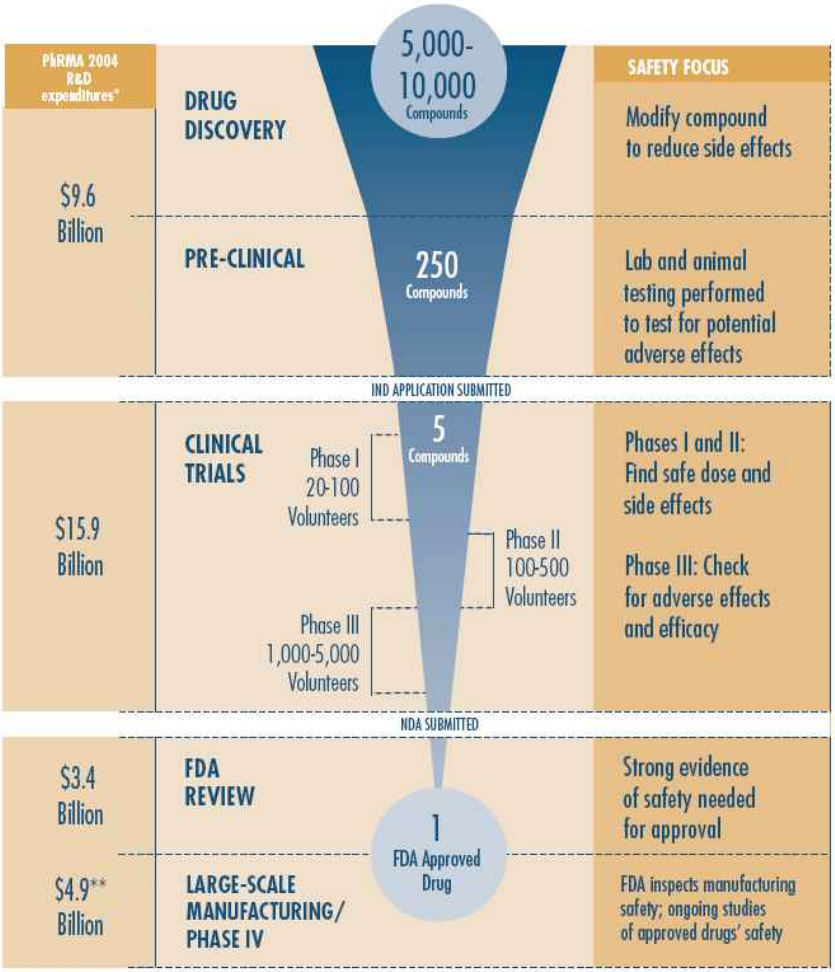


Pharmaceutical Value Chain



VCAT Healthcare Subcommittee

Figure 1: The R&D Process — Developing Safe and Effective Medicines for Patients



* Adapted from Appendix Table 4, uncategorized: $3.2 billion.
** This figure includes Phase IV testing only.

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Pharmaceutical Industry Needs

	Basic Research	Disease Discovery	Drug Discovery	Drug Develop	Clinical Trials	Manu-facturing
Measurement Requirements						
Current Techniques						
Measurement Issues						

Template

VCAT Healthcare Subcommittee

NIST in Biosciences/Healthcare

- Characterize industry segments and identify
- FOCUS, FOCUS, FOCUS
- Know where you want to make a contribution and prioritize your choices
- It takes a lot of money/resources to succeed in addressing the most critical measurement issues in Bioscience
- Dare to be “great”. Think big, think BOLD
- Assemble an organization that leverages the resources
- Set a goal to “be the recognized leader” for measurements and standards in your chosen segments of the industry… and make it a passion

Health Care, Biotechnology, Life Science NIST Strategic Planning: Strawman Process

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