NERA
Economic Consulting

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Economic Trends: Prospects for Venture Capital Investment in Biotechnology

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How Markets WorkSM

Biotechnology Industry Overview—Pharmaceuticals

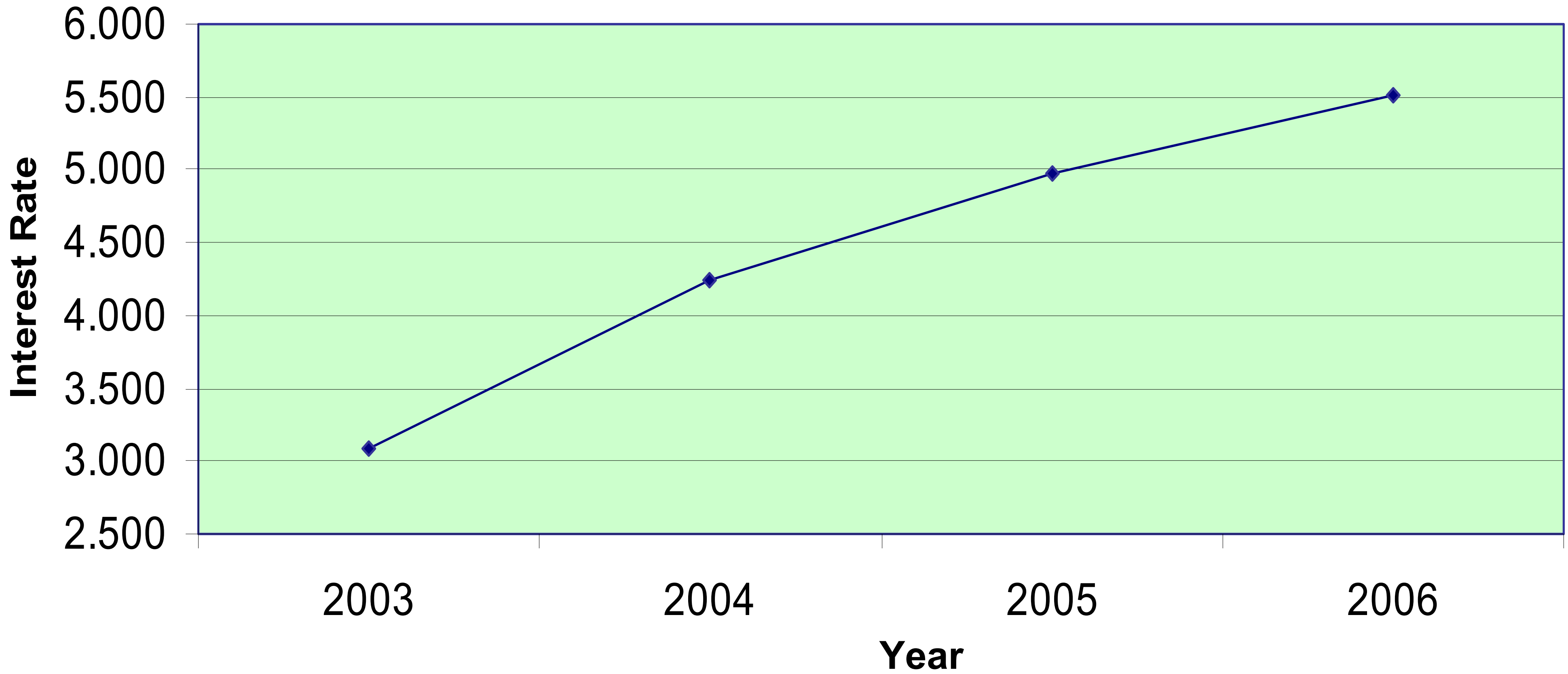
- Government
  - National Institute of Health
  - State and Federal Programs to Encourage Investment
- Academic
  - University Research Support
  - Publications/Conferences to Disseminate Results
- Private
  - Patients
  - Physicians
  - Pharmacists
  - Payers
  - Companies
  - Investors

Macroeconomic Developments

- Rising Interest Rates
- Recovering Equity Markets
- Growing U.S. Economy
- Increasing Government Spending

Rising Interest Rates

Projected Government Bond Rates



Recovering Equity Markets

"Improving economy will boost equities…There are positive signs of inventory building, higher profits, and benign interest rates."

- Business Times

"Stronger growth and the continuing recovery in profits should continue to support equities…"

- Wealth Management

Growing U.S. Economy

"Scrambling to keep up with surprisingly strong economic news, private forecasters have boosted projections of U.S. economic growth….to 4.2 percent from the 3.9 percent expected only a month ago."

- Reuters (Blue Chip Economic Indicators)

"The U.S. economy, primed by tax cuts and low interest rates, should grow next year at the fastest pace in two decades…"

-Associated Press

"The economy in the third quarter galloped ahead faster than an initial estimate, which was already the swiftest in nearly two decades. That burst, along with a surge in consumer confidence, raised hopes for the recovery's staying power."

- The Washington Post

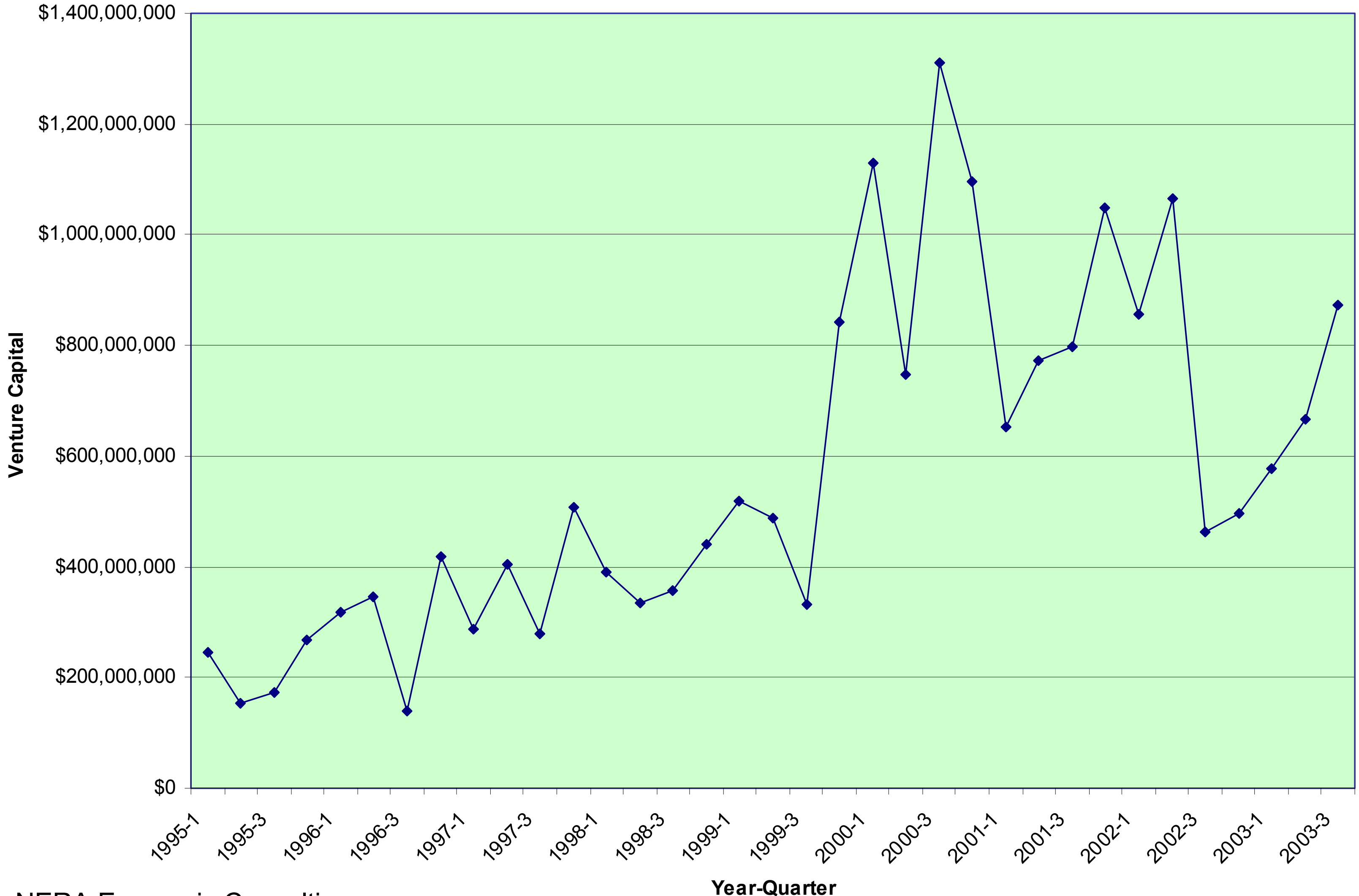
Increasing Government Spending

Health Insurance	• Extend health insurance coverage to four million low and middle income Americans	• Refundable tax credit to subsidize up to 90 percent of coverage for low and middle income Americans.
Health Centers	• Add 230 new and expanded sites to serve an additional one million people	• $1.6 billion (+$169 million) to fund 3,685 health center sites.
Disease Prevention	• Reduce the incidence of asthma, diabetes, and obesity	• +$100 million for the CDC in partnership with other HHS agencies.
Medicare	• Reform Medicare: improve care, including a prescription drug benefit option while ensuring its long-term financial viability	• +$400 billion (10-year increase).
Research and Development	• Promote scientific discovery and technological innovation to generate economic growth and jobs, and to improve national defense and the quality of life	• $123 billion (+seven percent).

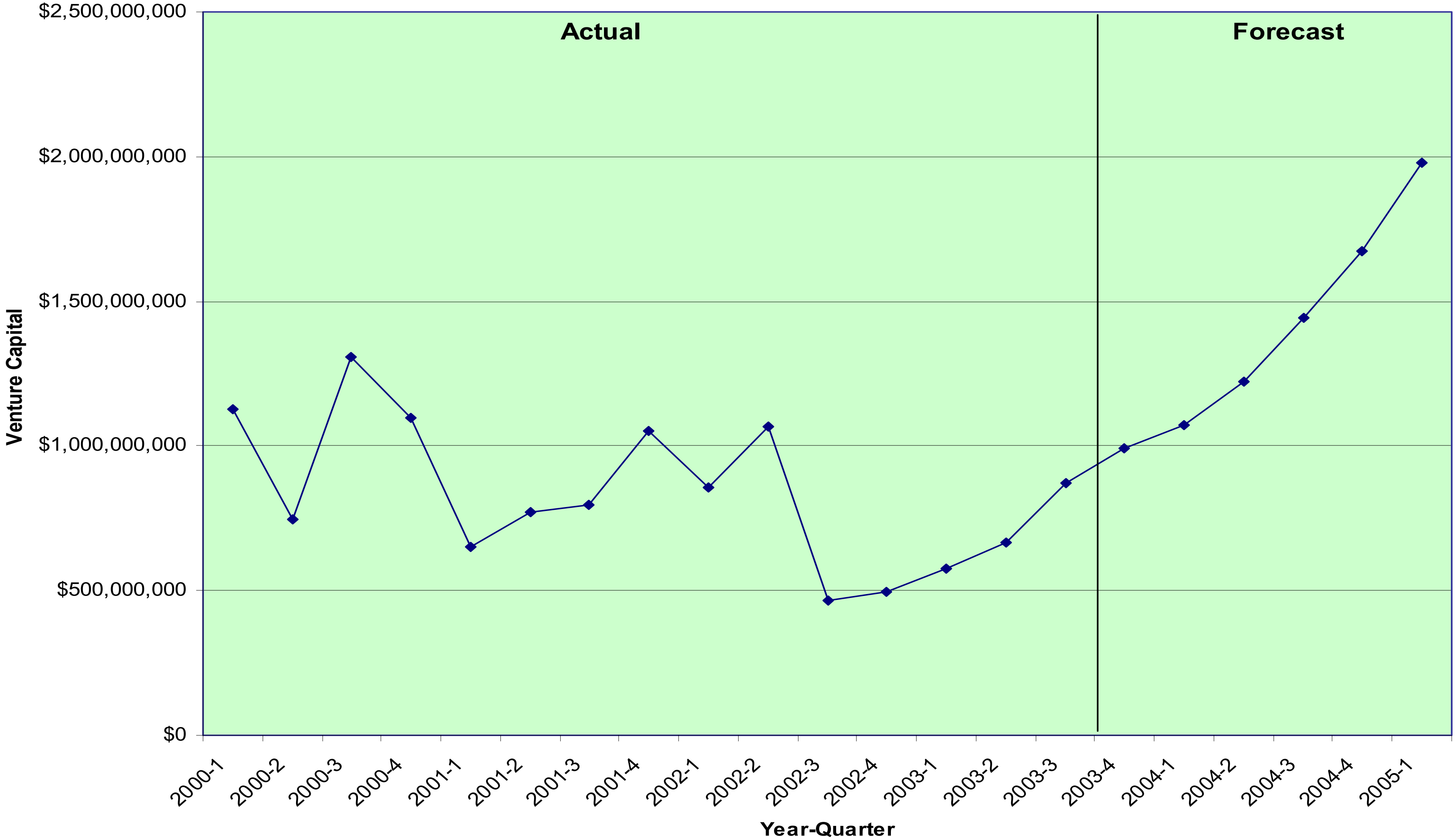
Source: Office of Management and Budget: The Executive Office of the President

Venture Capital Investment in Biotechnology

Actual



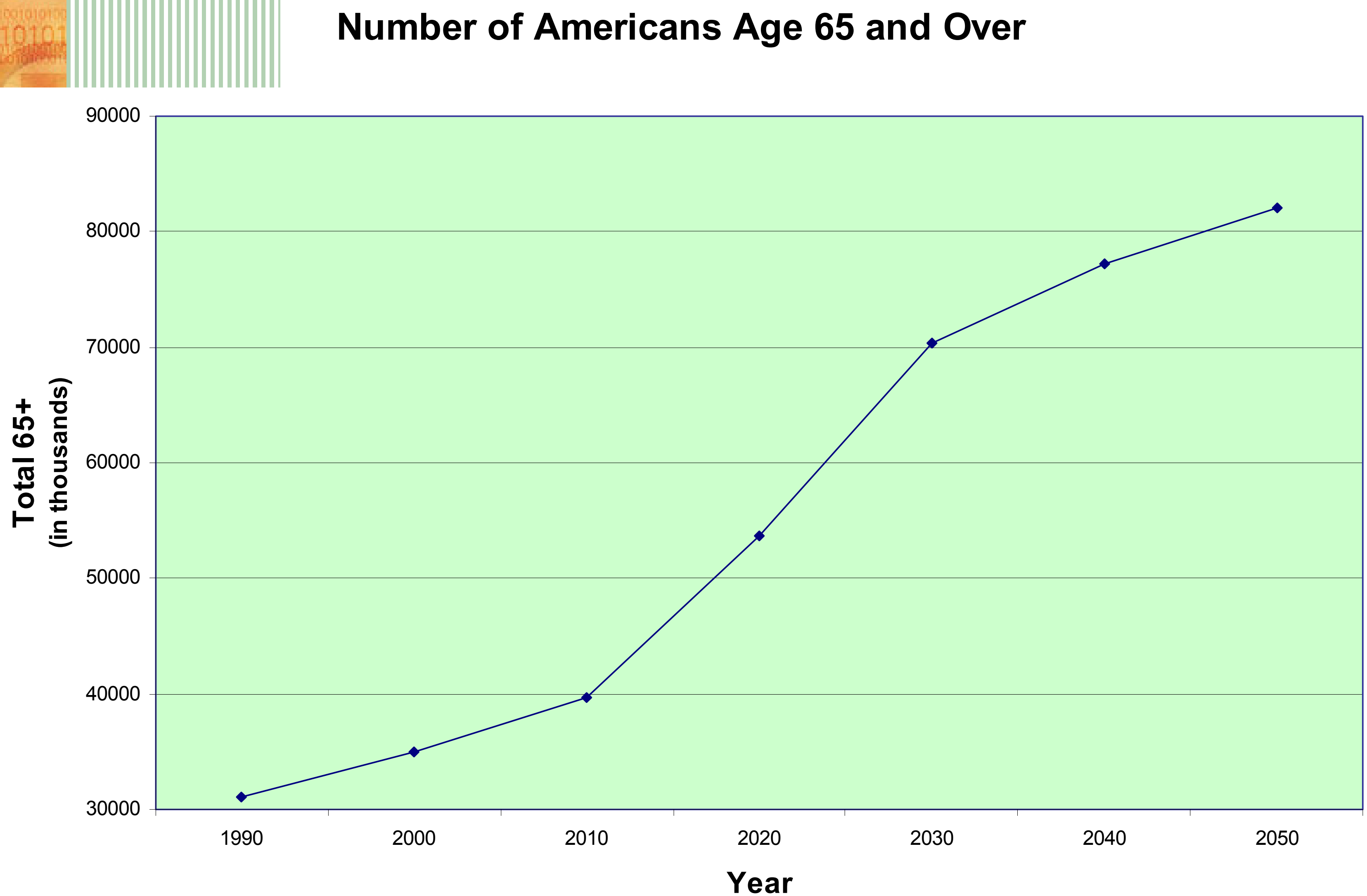
NERA Forecast of Venture Capital Investment in Biotechnology



Microeconomic Developments

- Aging Population
- Prescription Drug Coverage for the Medicare Population
- Drug Reimportation
- Emerging Opportunities for Generic Biotechnology Products
- Major Pharmaceutical Companies Have Grown through Acquisition and Licensing
- Prescription Products Switched to Over-the-Counter

Aging Population



Prescription Drug Coverage for the Medicare Population

"The Medicare bill intended to give 41 million Americans prescription drug coverage would be a boon to the health industry not just for what's included but what isn't: price controls and legalization of importing drugs from Canada."

-The Washington Post

"The Republican-controlled Congress sent President Bush historic Medicare legislation…combining a new prescription drug benefit with measures to control costs before the baby boom generation reaches retirement age."

-The Washington Post

Drug Reimportation

"Support for drug reimportation has grown in Congress and has spread to several states….Governors and legislatures in a half-dozen states have [proposed] to stretch their budgets by reimporting cheaper prescription drugs from Canada as part of their employee health benefits programs."

- American Medical Association

Reimportation will not necessarily result in lower prices for consumers. Companies will likely abandon the smaller Canadian market to focus on the U.S.

Emerging Opportunities for Generic Biotechnology Products

"The potential for a generic biologics approval system is probably the highest profile regulatory issue for biotech firms." During a February 14, 2003 meeting arranged by Sen. Kennedy, "McClellan is understood to have delivered a clear message…the biotech industry needs to accept the inevitability that there will one day be a system for interchangeable biologics."

- The Pink Sheet

Eleven biopharmaceuticals face patent expiration by 2006, including the following drugs that each had 2002 sales over $1 billion: Epogen/Procrit, Neupogen, Humulin, Avonex, and Intron A.

Major Pharmaceutical Companies Have Grown through Acquisition and Licensing

Pfizer

"[A]cquisition activity is more likely to come in new technology, in biotechnology…"

- Pfizer
- Warner-Lambert
- Pharmacia AG
- Upjohn
- Monsanto

GlaxoSmithKline

- Beecham
- SmithKline Beckman
- Wellcome
- Glaxo

Bristol-Myers Squibb

- Squibb
- Bristol-Myers
- DuPont Pharmaceuticals

Wyeth

- American Cyanamid
- American Home Products
- Genetics Institute

Roche Holding

- Roche Holding
- Genentech

Novartis

- Purchased Stake in Roche
- Ciba-Geigy
- Sandoz

Aventis

- Fisons
- Rorer
- Rhone-Poulenc
- Hoechst
- Marion Merrell Dow

Therapeutic Categories with Multiple Products Switched to Over-the-Counter

- Antihistamine
- Bronchodilator
- Cholesterol Lowering Agent
- Antibiotic
- Antifungal
- Non-Steroidal Anti-Inflammatory
- Antiviral for Cold Sores
- Antiviral

Influence of Economic Developments

- R&D Pipeline
  - Drugs for Diseases Affecting the Elderly
- Regulatory Environment
  - Standards for Generic Biologics
- Reimbursement
  - Opportunities for Private Sector in Administering Prescription Benefits in Medicare
  - Insurers’ Ability to Shift Costs Back to Patients with Over-the-Counter Products
- New Sources of Competition

Conclusion

Venture capital investors in biotechnology are likely to benefit from both the macroeconomic trends and microeconomic developments in the healthcare industry.