Healthcare 2009: Navigating the Sea Change

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Burrill & Company – exclusively focused on life sciences

Private Equity / Venture Capital Group

- Investing across the entire spectrum of the life sciences/biotechnology $950 million under management

Merchant Banking (Burrill LLC)

- Strategic Partnering including licensing, research and other collaborations
- Strategic Advisory Services including new company formation
- Merger & Acquisitions across life sciences
- Spin-outs ranging from products, to research divisions to disease area franchises

Media

- Publications (biotech book, newsletters, special purpose publications [stem cells, personalized medicine, aging etc.], The Journal of Life Sciences, web-based intelligence reports)
- Conferences

Headcount: 60+ professionals and staff
Healthcare and Pharma: A View of What’s Ahead
Medicine Then and Now

• Medicine in the 20th century transformed by 1910 report: “Medical Education in the United States and Canada”

• 1980-2000: personal computers, cellular telephones, massive databases, Internet, wireless, technology
The Next 10 Years

• We are at the beginning of a period of transformational change in human healthcare

• The ‘tipping point’ will be accelerated by:
  ➢ Changing demographics
  ➢ New economic models
  ➢ Medical science and technological innovation
  ➢ Information and communication technologies
  ➢ Globalization

• The next ten years in healthcare will be about ‘creative destruction’: will threaten some existing business models, but offer extraordinary opportunities as well.
Life Expectancy at Birth

“If I’d know I was going to live so long, I’d have taken better care of myself.” - Eubie Blake, on turning 100

The Coming ‘Tsunami’

AGE WHEN INCIDENCE OF CHD INCREASES

AMERICAN HEART ASSOCIATION 2002
Healthcare Costs Have Been Rising - For a Long Time
The Cost of Developing a New Drug has Greatly Increased

Source: Tufts Center for the Study of Drug Development
Innovation Gap Getting Wider

Source: Burrill & Company; US Food and Drug Administration
Declining Innovation - % of global pharma sales from products past five years

Source: Wood MacKenzie (using figures from the Freshness Index)
Re-Inventing the Biopharmaceutical Industry

- Changing the industry versus changing with the industry
- Escaping the myopia of current markets and investor horizons
- Organizational re-structuring and process re-engineering are insufficient for survival
- Creation of unimagined products, services and businesses
  - Integration of Dx, Rx, and Ix

Where is the white space? How do we create new companies in a new and different competitive environment?

Source: George Poste/Burrill & Company
The old models are not working – but what is ahead?

• Increased focus on wellness, not sickness
• Development of personalized medicine and targeted therapies
• Continued rapid pace of innovation in medicine (stem cells, engineered materials, bio-nano, et al.)
• Virtual integration of pharma/biotech/service providers (VIPCO not FIPCO)

• Globalization
Practicing “prospective” medicine

- **Normal** Health
  - Predisposition: Predictive, Preventive, Wellness
  - Pre-symptomatic: Early detection, Prevention
  - Progression of disease:
    - Start of Clinical Symptoms
  - Disease is irreversible

- **Abnormal Health**
  - Symptomatic: Disease management, Costly intervention, chronic care

- **Time**
Molecular Diagnostics is at the Center of Prospective Medicine
Biomarkers in Drug Development

Drug Safety and Contraindications

Demonstration of efficacy for targeted populations
- Prospective hypothesis (e.g., EGFR receptor targeted drugs)
- Retrospective analysis (e.g., tamoxifen)

Biomarkers as surrogate endpoints for trials
- Accelerating clinical development
- Enabling adaptive trials

Differentiating pharmacokinetics and metabolism
- Determining personalized dosage
“Today's approved labeling change is one step in our commitment to personalized medicine. By using modern science to get the right drug in the right dose for the right patient, FDA will further enhance the safety and effectiveness of the medicines Americans depend on,” said Commissioner of Food and Drugs Andrew C. von Eschenbach, M.D.”
Selected Targeted Treatments

- Personalized cancer vaccines
  - Favrille – FavId for non-Hodgkin's lymphoma
  - Genitope – MyVax for non-Hodgkin's lymphoma
- Gleevec (Novartis) - pH+ CML kinase inhibitor
- Iressa (AstraZeneca) – EGFR tyrosine kinase inhibitor
- Tarceva (Genentech/OSI) – HER1/EGFR inhibitor
- Erbitux (ImClone/BMS) – HER1/EGFR inhibitor
- Avastin (Genentech) – VEGF/VEGFR inhibitor
- Herceptin (Genentech) – HER2 inhibitor
- BilDil (NitroMed) - heart failure in African American patients

Other “Semi Targeted” Treatments (approved or late stage trials)
- Nexavar (Bayer/Onyx) – multikinase inhibitor
  - Tykerb (GSK) - ErbB-2/EGFR inhibitor
  - Enzastaurin (Lilly) - PKC-Beta, AKT/P13 inhibitor
Genomic Health Leads the Way in Personalized Cancer Therapy

“Genomic Health’s vision is to enhance the lives of patients with cancer by applying genomics to individualize treatment decisions.”

• Launched 2000
• Product OncotypeDx, a 21-gene test that looks at known expression biomarkers in the tumor tissue and predicts the likelihood of cancer recurrence for women with ER-positive, node-negative breast cancer
• The test is used by a woman and her doctor to determine necessary and appropriate follow-up treatment, including chemotherapy for each patient
Traditional Medical ‘Value Chain’ is changing!!

Universities
Government
Labs

Pharma
Biotech
Diagnostics
Devices

Physicians
Hospitals
Pharmacy
Other
Caregivers

Personalized
Wellness
Coach, Fitness, Diet

Consumer
Directed
Payment Plans

Rich Health
Information via
Internet

Patient-
Centered
Care
“The Science of You”

- Formed in 2000
- Nutritional advice based on scientifically validated 21-gene screen
- MyCellf test direct to consumers
- Addresses weight management, sports performance, wellness (hearth health, metabolic disease, bone health)
- And more companies get into the ‘personal genome’ market: Navigenics, 23andMe, …

“Optimize your health and lifestyle, based on your personal, unique DNA profile.”

Global Nutraceuticals and supplements market $228B in 2007 – unreimbursed !!!
Payers Offering Wellness Incentive programs

- Stickk.com – paying people to lose weight
- FitNet
- Gogetter
- Virgin
- Lifespring
- Insurer rewards
- Employer driven incentives
Mobile and Home Health Monitoring

• Chronic disease – diabetes, congestive heart failure, etc. – accounts for 75% of medical costs in the US

• Disease management can substantially improve patient outcomes and lower cost

• Medical devices and telecommunications technologies are converging to develop monitoring and control systems for patients with chronic disease
Telemedicine and remote monitoring for chronic disease care

“We will see an immediate impact improving the quality of life of congestive heart failure patients by reducing hospital readmissions… This way a patient is never far away from health care.”

Terianne Cerep, Mgr Home Health

Mercy Hospital, Scranton PA

- Monitoring key health indicators for congestive heart failure patients
- Data transmitted to secure website monitored by nursing staff, patient’s relatives
Tracking & Feedback

• Nike/Apple – iPod Nano and online workouts/equipment/fitness linked

• Tools to monitor medication regimens to increase compliance

• Tools to measure
  – Activity
  – Sleep
Patient-centric healthcare: closer than we think?

• Founded in 2000
• Walk-in health care clinics, no appointment needed
• Located in 20 states, 200 centers
• Staffed by nurse-practitioners
• Location in popular retail stores: Target, CVS
• 350,000 visits, 99% Patient satisfaction

“We’re delighted with the continued expansion of MinuteClinic and with the enthusiastic response of health care consumers to this expansion in access to quality health care for common ailments. We’re bringing innovation and change to the marketplace and consumers…”

Michael Howe, CEO
A Systems Biology Approach – Follow the Pathways

A SYSTEMS BIOLOGY APPROACH: FOLLOW THE PATHWAYS

Novel Biological and Therapeutic Insights

Disease Processes

Cellular Processes

Molecules

Experimental Platforms

Source: Burrill & Company

Cancer

Angiogenesis

Apoptosis

Fas

VEGF

Expression Arrays

Proteomics

Traditional Assays

Life Sciences: Venture Capital, Private Equity, Merchant Banking, Media

Burrill & Company
Nano/Bio/Regenerative Medicine

- Continued progress in stem cell research
- Neural-machine interface devices
- Nano devices in blood vessels “roaming under own power” to diagnose and fix problems
- Nanoparticles:
  - Targeted drug delivery
  - Removing bacteria from food
  - Adding nutrients
  - Aids in packaging/retaining freshness

- Artificial Organs:
  - Heart, lungs, pancreas, liver, kidney, blood, eyes, ears, legs, hands, etc.

- Advanced Prosthetic Devices:
  - Arms, legs, hands- all with biological/ technological / psychological interaction sensors
Big “New” Markets

- Obesity/diabetes/metabolic disease
- Alzheimer's/memory
- Anti-aging
- Anti infectives (antibiotic resistance)
- Wellness (preventative/predictive cure)
Changing Business Models

FIPCO (Fully Integrated Pharma Co.)
- Sales & Distribution
- Manufacturing
- Clinical & Regulatory
- Research Technology

VIPCO (Virtually Integrated Pharma Co.)
- Sales & Distribution
- Manufacturing
- Clinical Development
- Preclinical Support
- R&D

Partnerships
- CSO
- CMO
- CROs
- Preclinical CRO
- Academia, Scientific, Institutions

VIPCO (Virtually Integrated Pharma Co.)
- CSO
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...biotech companies are becoming increasingly important as a source of value creation and innovation in the healthcare sector.

Top Five US Pharma* vs. Total Biotech Market Cap

![Graph showing market values of top five US pharma and total biotech market cap from 2001 to 2008.]

*Pfizer, Merck, Lilly, and Schering-Plough

Source: Capital IQ, Windhover, Burrill Analysis
2020 – Globalization / Changing the environment

- Markets - demand increases in Asia & developing world
- R&D migrates to Asia
- Regulations – International agencies collaborate
- Information – healthcare payors share data on performance (clinical & financial)
- Diseases know no boundaries
- Every company is global from day one!
Major Government Initiatives in Biotechnology

- EU/Eastern Europe/Scandinavia
- China
- India
- Japan
- Malaysia
- Singapore
- UAE/Dubai and Kuwait
- Israel
- Various Latin American Countries (esp. Chile/Brazil)
Finance and Capital Markets

The global financial markets have created additional opportunities for companies to look outside their borders for financing

- Europeans on NASDAQ/NYSE
- Chinese on NYSE
- Americans on AIM/Euronext/SWX
- Other markets are available
  - Mothers (Tokyo)
  - DFX (Dubai)
  - Hong Kong
China/India Biopharmaceutical Roadmap

- Proprietary/Innovation
- Commodity/"Copies"

We are here

Time

- High Margin
- Low Margin

Services and Commodity based businesses
- Technology Transfer Co-development
- Proprietary Pipeline

China/India Biopharmaceutical Roadmap

Life Sciences: Venture Capital, Private Equity, Merchant Banking, Media
What really happened in the last year?

• World financial crisis – unprecedented (and not over yet)
  – “Wall Street” totally restructured

• Economic dislocation in the world (well beyond the US) will be pervasive and long term…Recession!

• Healthcare systems around the world reforming
  – too expensive to treat everyone with all the new technology
  – an aging population dramatically increasing
Impact of US election / the Obama Administration

• The Obama administration will seek major reform, and attempt universal coverage
• Congress will add power to Medicare to negotiate what it pays for drugs...tough for drug/biotech industry
• Congress will reduce capital gains differential (bad for capital raising, capital more expensive)
• Stricter regulatory oversight – Regulatory hurdle increases
  – Drug safety (pharmacovigilence) will trump approval
  Pharmacogenomics a third approval
The Strategic Future of Healthcare

Economic Unsustainability  Reform and Rational Care

or

Confronting the Imbalance Between Infinite Demand and Finite Resources

Source: George Poste
Wall Street’s Implosion…What does it mean to us?

It’s a sea change, not a temporary blip

• We’ve had ≈ 30-40 years of relatively easy access to relatively cheap capital
  – That game is OVER! Capital markets permanently restructured

• Access to capital
  – More difficult to find (IB resources for micro-cap stocks decreased)
  – More expensive
  – Buyside interest/resources reduced (Hedge funds gone)
  – VC/private investors (deep pockets/short arms) business is challenging
    – no IPOs for exits

• Big Pharma – not as eager (things will be cheaper if they wait)
What will the Pharma Industry look like in 5-10 years?

- Low margin ethical drugs will predominate
  - China/India/other low cost manufacturing sites will have an edge
- Theranostics – Rx tied to Dx
- Worldwide pricing/parallel pricing – direct importation from lowest priced country
- Pro-generics environment
- Patents devalued – increasing competition in marketplace
- Big pharma will become product distributors/disease managers – more value across the entire disease care spectrum, but more specialized
“The future is not so hard to predict. It’s already here. It’s just not evenly distributed.”

William Gibson