

REGIONAL TECHNOLOGY DEVELOPMENT & ENTREPRENEURSHIP (A Case Study – Biotech)



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Biggest Global Problems Today

- Global Climate Change, Sustainability of the Planet
- Clean Water
- Energy Security, Energy Self-Sufficiency
- Food Security & Food Production
- Healthcare and Healthcare “Reform”

...and, Biotech will solve/tackle all of them

The Beginnings of an Industry – 40+ Years Ago

West Coast

- ALZA (1968)
- Cetus (1971)
- Genentech (1976)
- Hybritech (1978)
- Chiron (1981)
- Amgen (1980)

East Coast

- Genex (1977)
- Biogen (1978)
- Centocor (1979)
- Genzyme (1981)
- Celgene (1986)
- Cephalon (1987)

Several Thoughts on the Global Ecosystem

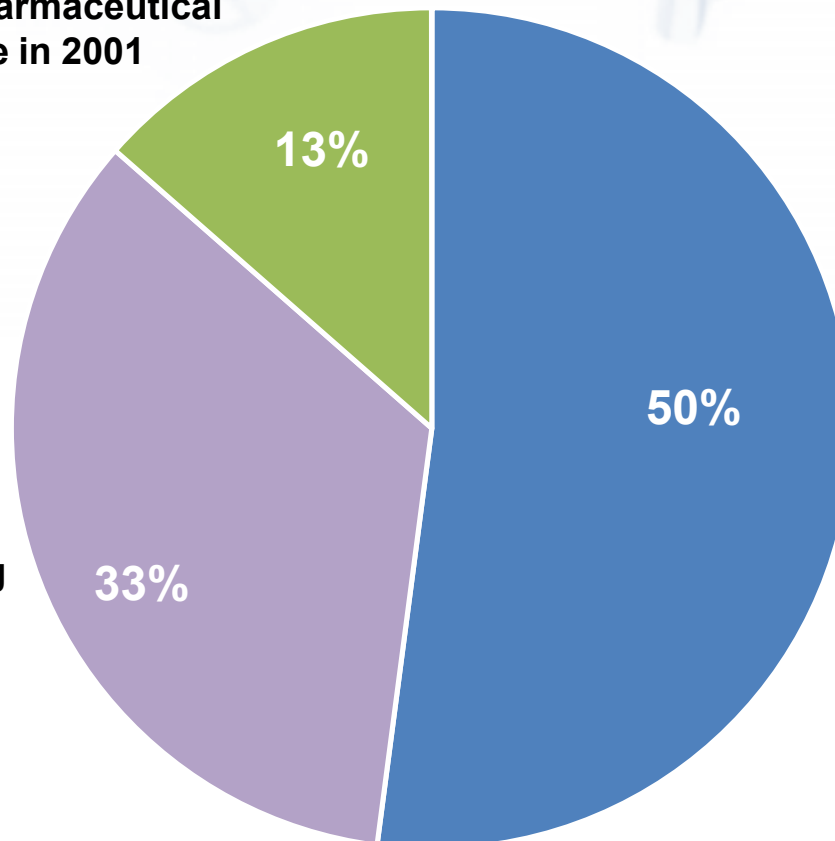
- Single, flat, interconnected, borderless marketplace
- Exploding population of middle class consumers
- Ascendancy of BRICs/CIVET
 - Brazil
 - Russia
 - India
 - China
 - South Africa
 - Columbia
 - Indonesia
 - Vietnam
 - Egypt
 - Turkey
- Decreased importance of US economy in the world
- Increasing regulatory and trade friction
- Governments building their local economies, excluding others
- Political instability
- ...but really ALL governments want to build/rebuild their economies with biotechnology

Source: Jeff Kindler and Burrill & Company

Growth of Emerging Markets

25
YEARS

**Global Pharmaceutical
sales were in 2001**



**Global Pharmaceutical
sales will be in phamerging
markets by 2020**

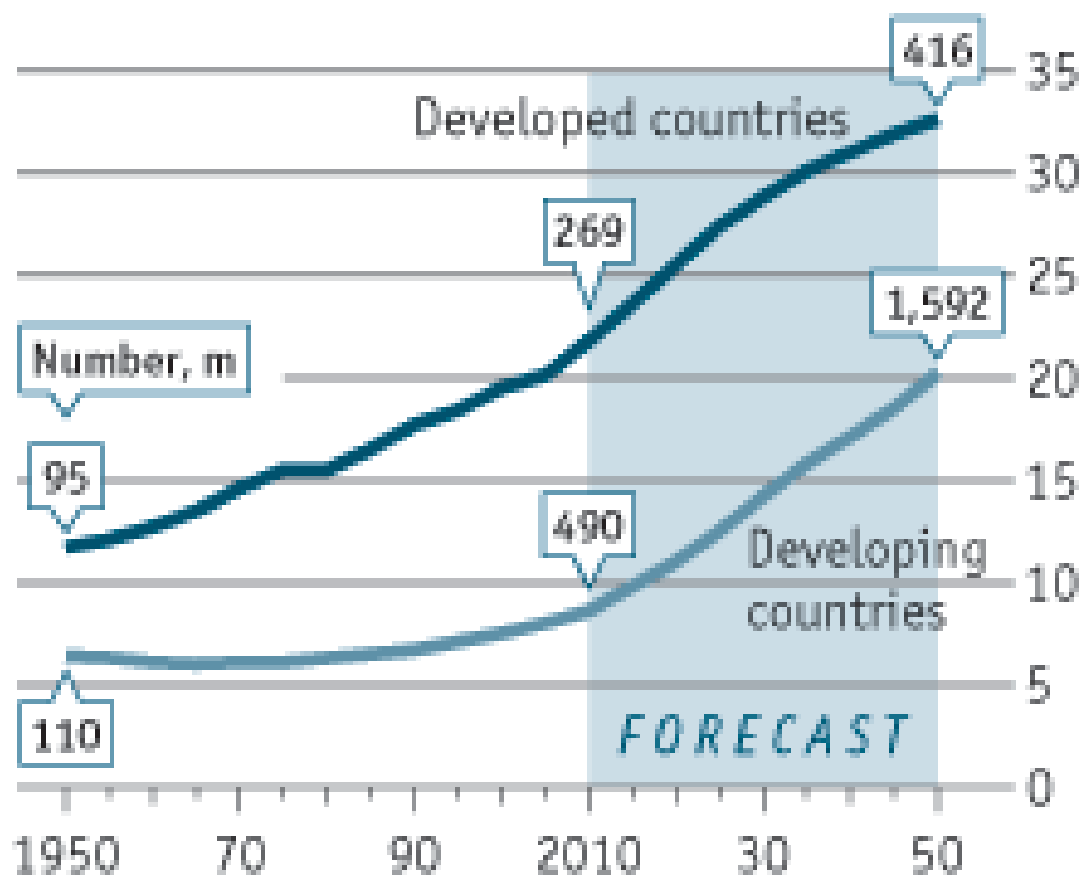
**Global Pharmaceutical
sales will be in phamerging
markets by 2011**

Source: IMS Health

Greying World

25
YEARS

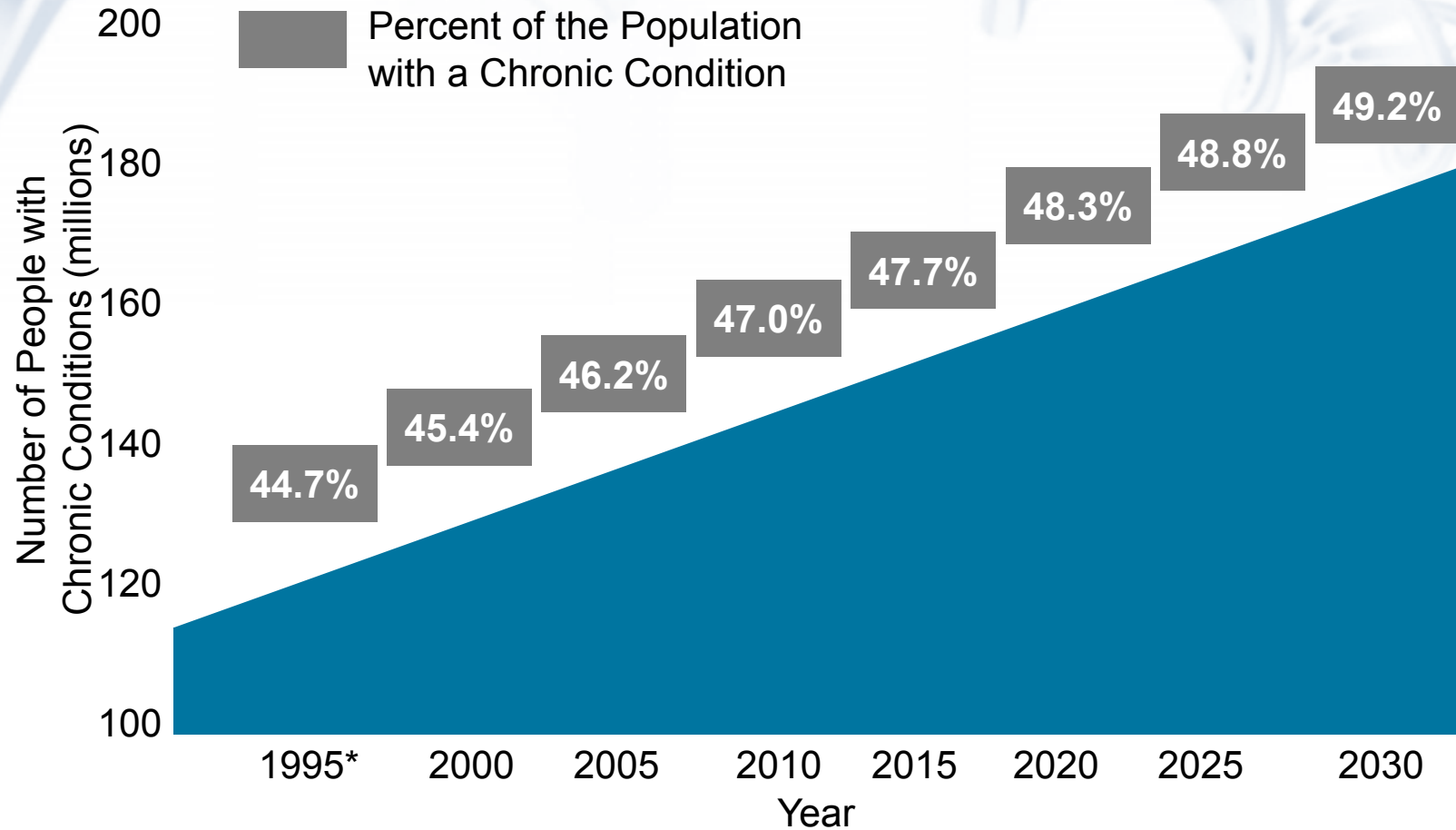
Population aged 60 and over, % of total



Source: "World Population Prospects:, United Nations, 2009

The Number of People with Chronic Conditions is Rapidly Increasing

25
YEARS



Source: Wu, Shin-Yi, and Green, Anthony. *Projection of Chronic Illness Prevalence and Cost Inflation*. RAND Corporation

The “Healthcare System (Globally) Is Changing

1900s

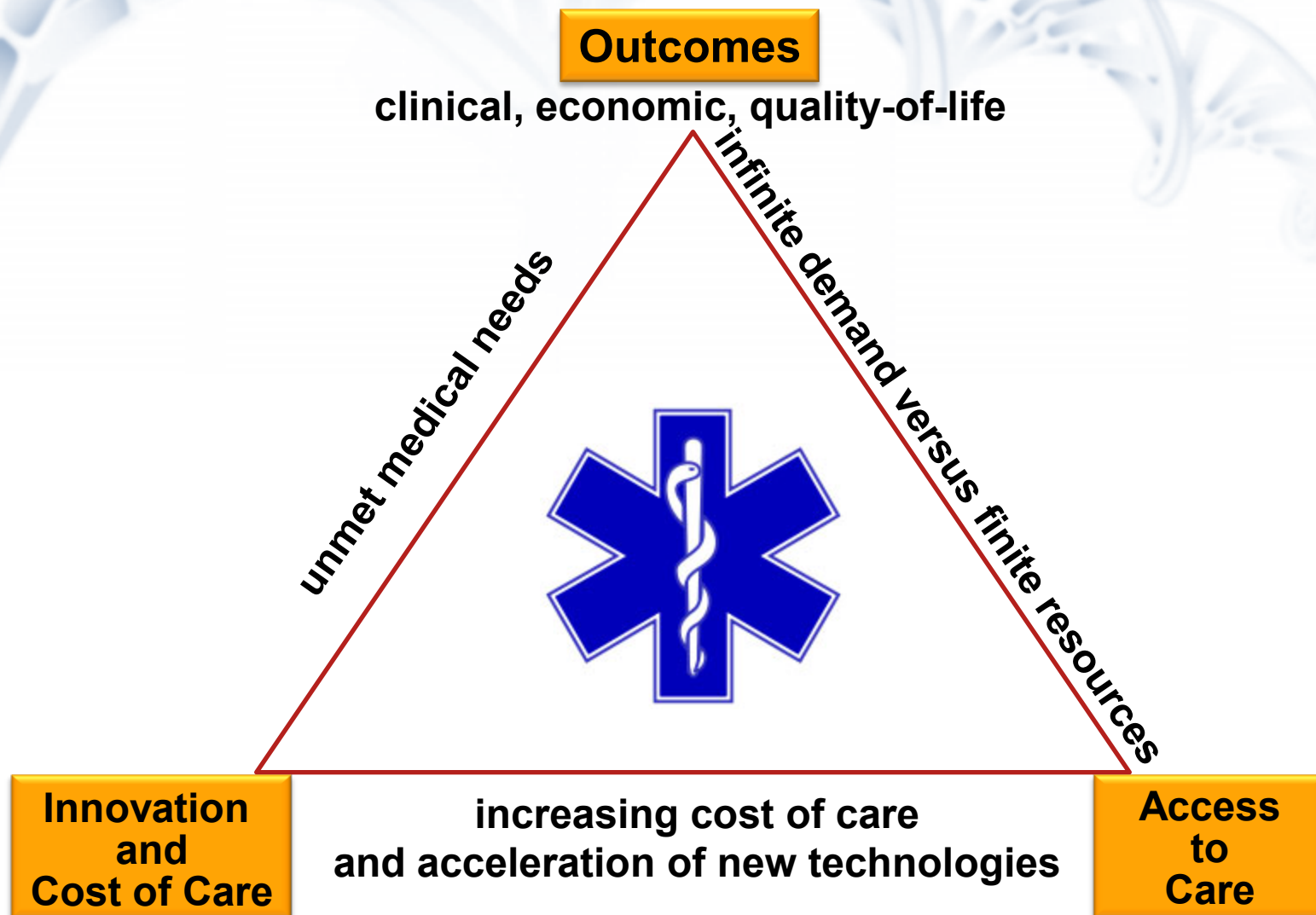
- Acute care
- People/dying patients
- Place (hospitals)
- Payment: Cost-based care

2000s

- Chronic care (to wellness care)
- Systems/Software
- Consumer digital health
- Value based care

The Healthcare Challenge

25
YEARS



Source: George Poste

Economic Unsustainability

Reform and Rational Care

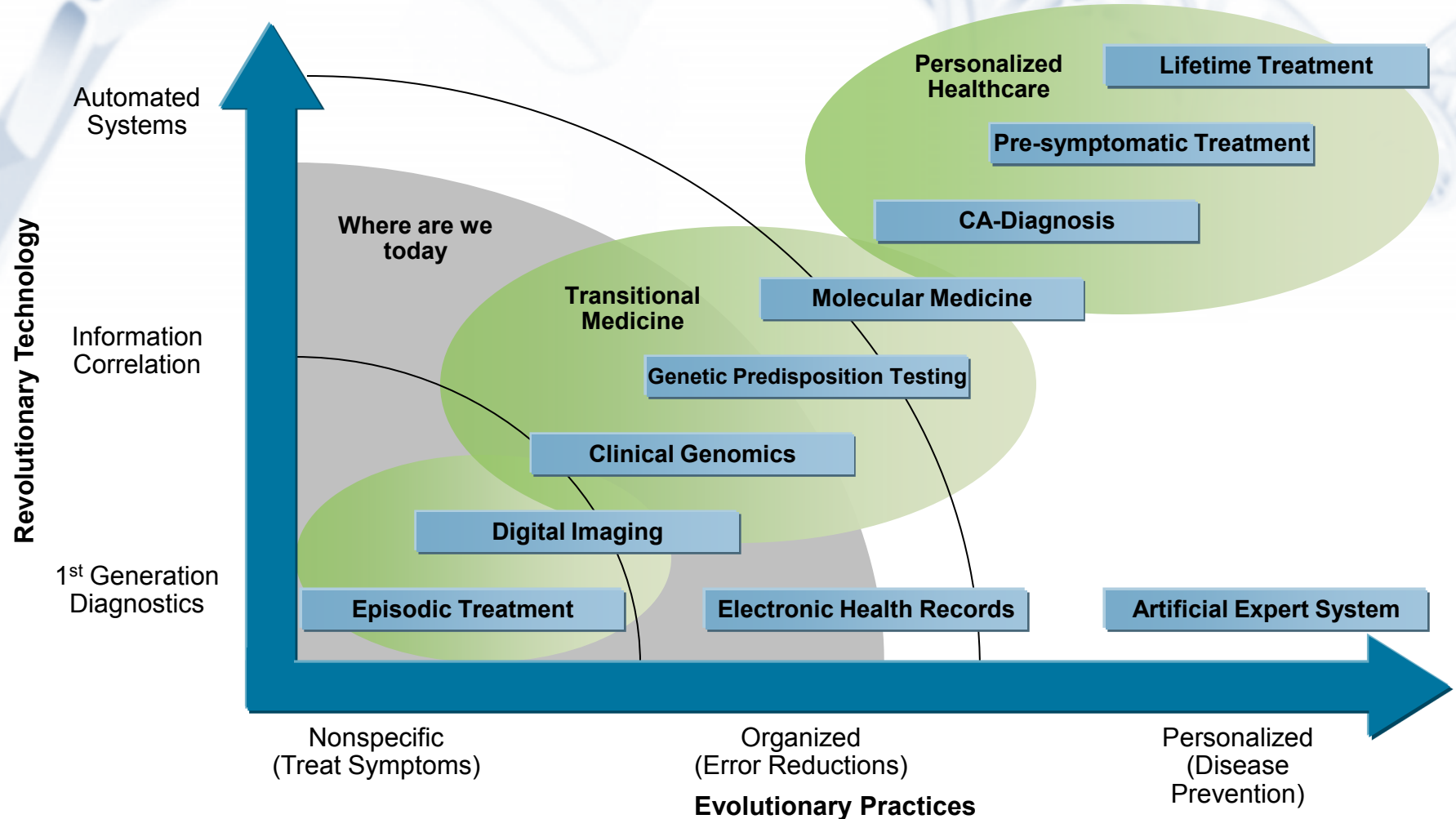
or

**Confronting the Imbalance Between
Infinite Demand and Finite Resources**

Source: George Poste

Market Trends and Drivers: Revolutionary Technologies and Evolutionary Practices

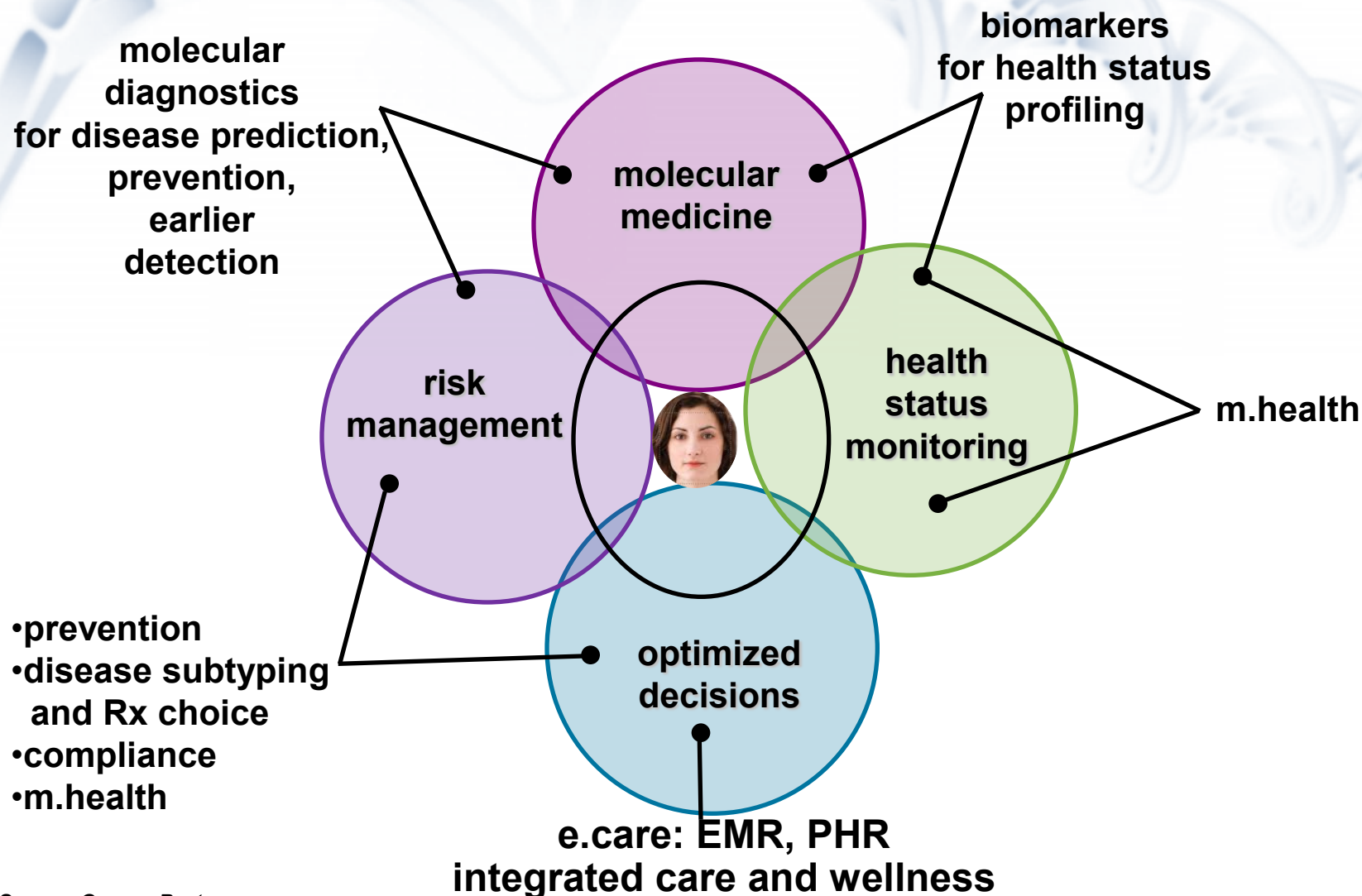
25
YEARS



Source: IBM Life Sciences Solutions/Burrill & Company

The Key Strategic Elements in the Evolution of Healthcare

25
YEARS



Source: George Poste



25
YEARS

So what will healthcare look like in 2020?

Healthcare is Digitized!

Home Diagnostics/Monitoring Systems:

- Drop blood onto your Blackberry  or iPhone , telecommunicated to central labs, real-time Dx/Px
- Home monitoring

Centrally Delivered

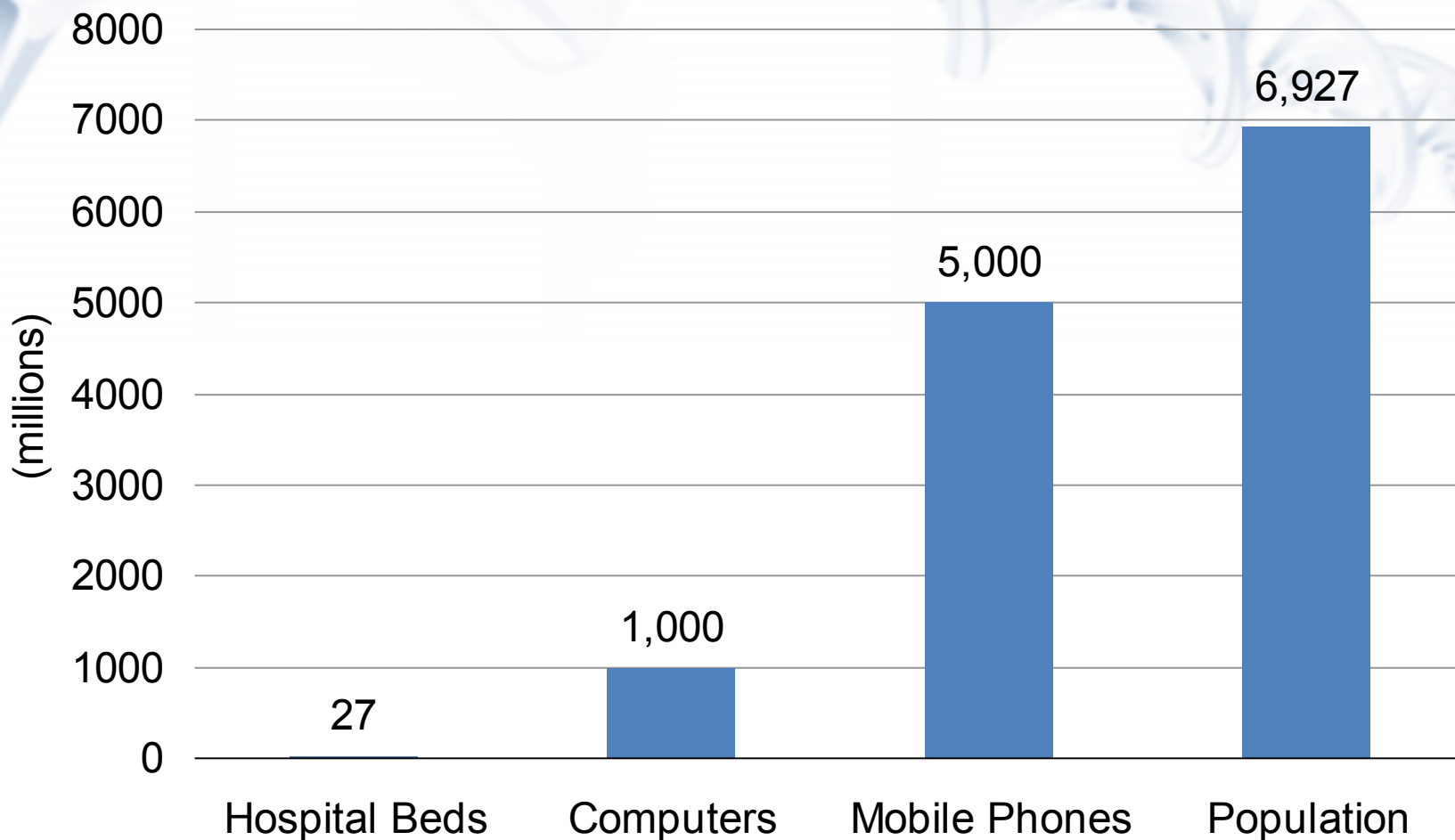
- **WAL★MART®**
& other consumer distribution centers
- Genetic Screening
- Pharmacy Distribution
- “Doc-in-the-Box”, staffed with nurse practitioners

Specialized Delivery

- Comprehensive cancer / cardiovascular centers
- “Heart Transplants ‘R’ Us” (surgery centers)
- Mayo/Cleveland Clinic for complex diseases

Big Trends: The Promise of Mobile Technologies for Health

25
YEARS



Source: World Bank, world Development Indicators, U.N. telecommunications agency, Kaiser Family Foundation

So Who is Interested in Consumer Digital Health?

Answer: **EVERYONE**

Enablers



Information

Microsoft



Broadband Carriers



Providers



KAISER PERMANENTE®



**All Hospitals/
Clinics**

Payors



Facilitators



Local Delivery

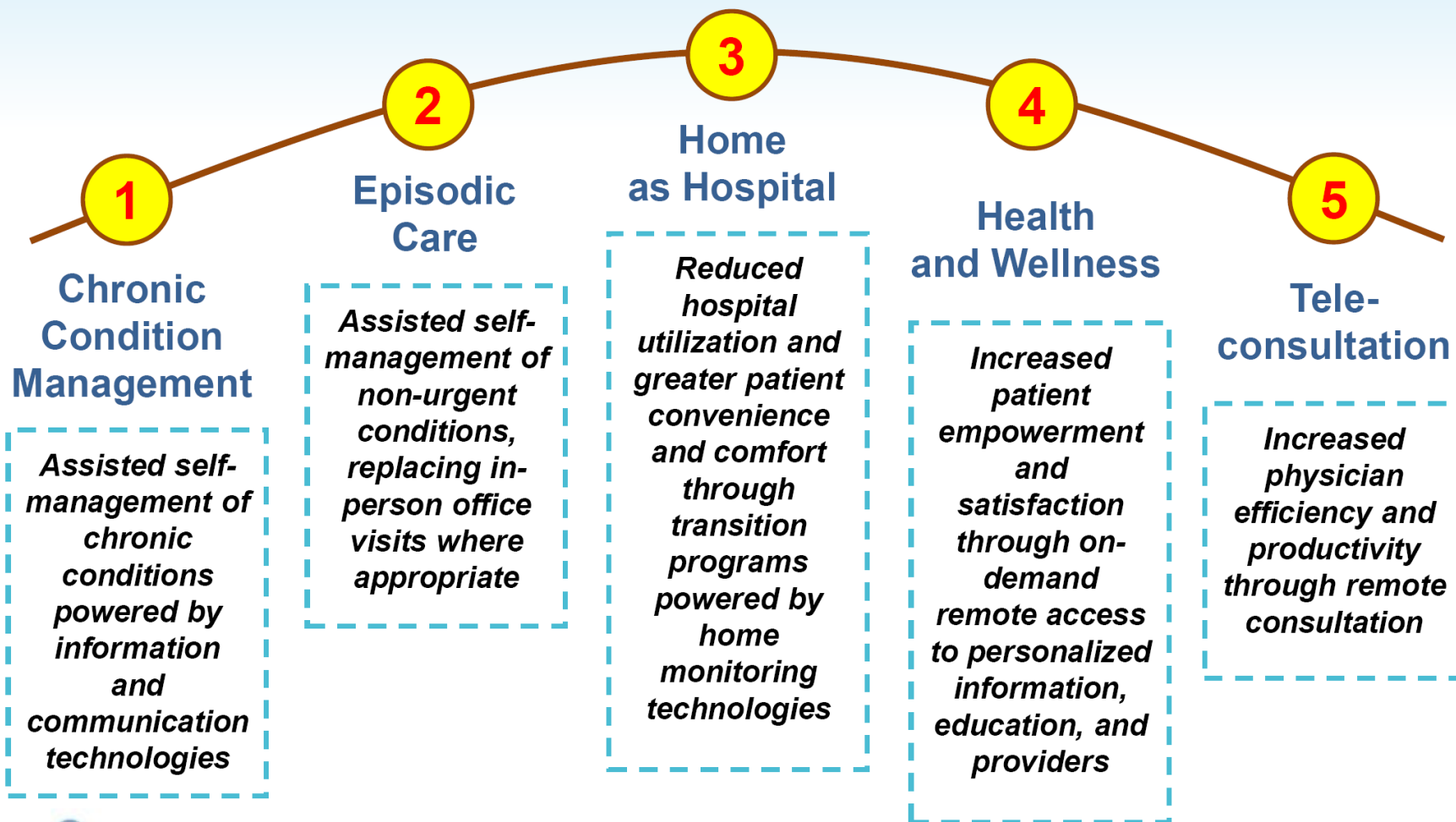
Digital Health Companies



Patients

- Individuals
- Social Media
- Blogs

Continuum of Care



Source: Kaiser Permanente

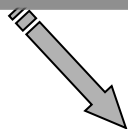
A Bio-Refinery Industry is Emerging

Petrochemical Industry

Crude oil and natural gas



Hydrocarbons



Fuels:
Gasoline, diesel
Chemicals
Materials

Feedstocks and intermediates



Fuels
Bulk and Specialty Chemicals

Biobased Industry

Plant biomass and wastes



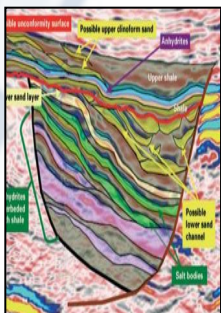
Sugars, oils, etc.



Biofuels:
Alcohols, Alkanes
Biodiesel
BioChemicals
BioMaterials

Biomass Crop-Energy Business

Petroleum Industry



Exploration



Production



Supply



Refinery



Terminal



Transport



Retail

Reshaping the Biomass Feedstock Industry



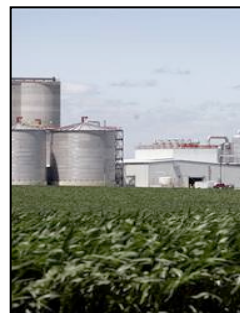
Biotechnology



Seed



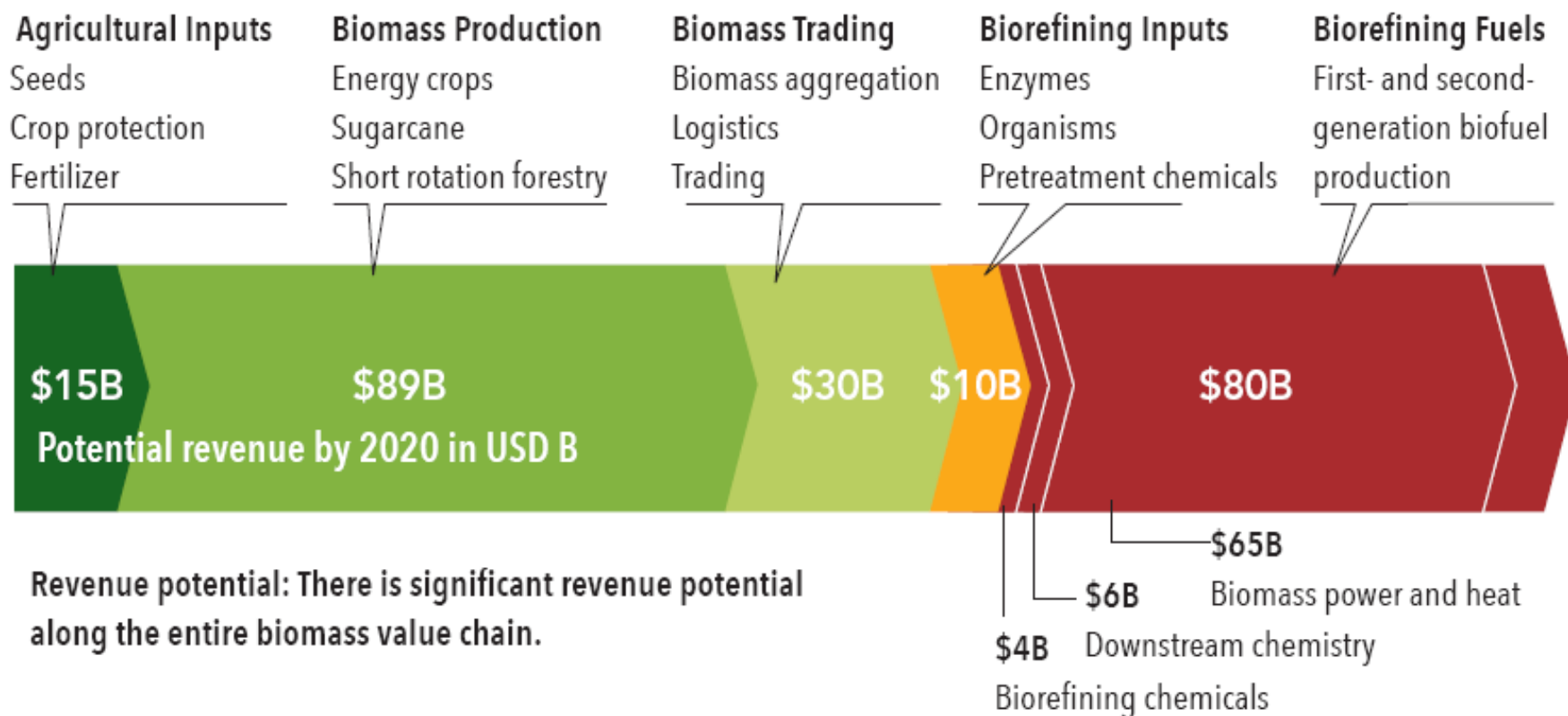
Feedstock



Biorefinery

- **Proprietary feedstock**
- **Scaled production**
- **Designed to spec**
- **Coordinated supply**
- **Process efficiency**

Revenue Potential of Biorefineries



Source: World Economic Forum

Conclusions Regarding Capital Markets:

Capital is readily available globally

- Regional differences in both availability and cost
- Angels: More established in US/Europe, but available globally
- Venture capital/private capital is readily available globally
- Public equity capital generally available for risk mitigated companies
- Non-dilutive capital available
 - Gift/grants
 - “Global arbitrage”
- Debt capital generally available only for operating companies with cash flow and/or profits

Creativity in capital raising is a must!

Conclusions

- Confluence
- Co-opetition
- Consumerization/customers
- Commercialization
- Cultures
- Creativity especially in business models/financings
- Change (accelerating)

Looking Back

- Science moves faster than expected
- Still IP uncertainty globally
- Capital was readily available and affordable
- Company model created value
- Traditional competition
- Value created in all segments

Innovation Makes a Difference

- Changes in healthcare solutions
- Reduces cost dramatically

...and it creates value:

- For Society: 1970-2000, increased life expectancy produced 50 percent of the growth in America's GDP
- For Companies: Genentech \$100B when acquired by Roche (Pfizer \$91B at that time)

Defining Innovation

- The introduction of something new, a new idea, method, or device
Merriam-Webster
- Innovation is a new way of doing something or “new stuff that is made useful”. The goal of innovation is positive change, to make someone or something better.
Wikipedia
- The specific instrument of entrepreneurship. The act that endows resources with a new capacity to create wealth
Peter F. Drucker
- Without tradition, art is a flock of sheep without a shepherd. Without innovation, it is a corpse
Winston Churchill
- Innovation distinguishes between a leader and a follower
Steve Jobs, Apple

But What Is It Really...

- Where does it come from?
- Why do we have a lot of it here?
- What does it take to foster our innovative environment?
- What hurts innovation / makes it difficult
- What have we learned about innovation?

We encourage taking risks?
or
We tolerate failure?

Innovation Takes Many Forms

- New ideas, new products
 - Fax
 - GPS
 - Email
 - WebMD
- Changing existing products with new features/new industries
 - US mail → FedEx
 - Diagnostic test → “Onco-type Dx” (personalized medicine)
 - Rx (“one size fits all”) → Targeted therapeutics (biomarker/mutation based)

How Do We Stay Innovative?

- Allocate time to it
 - Google
 - 3M
- Build it into culture
 - Mission statement
 - Internal reinforcement
- Reward it
 - Measurement – financial, options (entrepreneurship /intrapreneurship)
 - “Atta boy!”
- Spin-outs are good
 - Genentech > Genencor
 - Cell Genesis > Abgenix

What Do We Know from Winners

- Management: Back the best people!
- Market: Identify large market need and satisfy it
(be aware of “snapshot mentality”)
- Technology: Understand freedom to operate, needs to be real breakthrough innovation
- Execution: Essential
- Financial: Is there a well thought out road to success?

Lessons from “Losers”

- What can go wrong will go wrong
 - Technology is tough
 - IP:FTO
 - People issues
 - Time delays
 - Burn rates out of control
 - Clinical failures/delays
 - Reimbursement more challenging
 - Competition underestimates

Therefore, anticipate problems – they will happen

**“Leadership is the art of
accomplishing more than the science
of management says is possible”**

Colin Powell

Keys to Regional Innovation and Entrepreneurship

- Network, virtual world – physical geographic clusters less important
- Capital always available, just inefficient to get (and sometimes costly)
- Every idea “deserves” a company product – not true
- Entrepreneurs can be trained, it’s not born into them (Biz Plan Competitions, EOY, Idea to IPO, etc.)
- It’s not just having a patent, it’s FTO and it’s barriers to entry
- Importance of role models and community support

Therefore, it can happen everywhere!

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