The Changing Face of eHealth: Here, There, Everywhere, Anywhere

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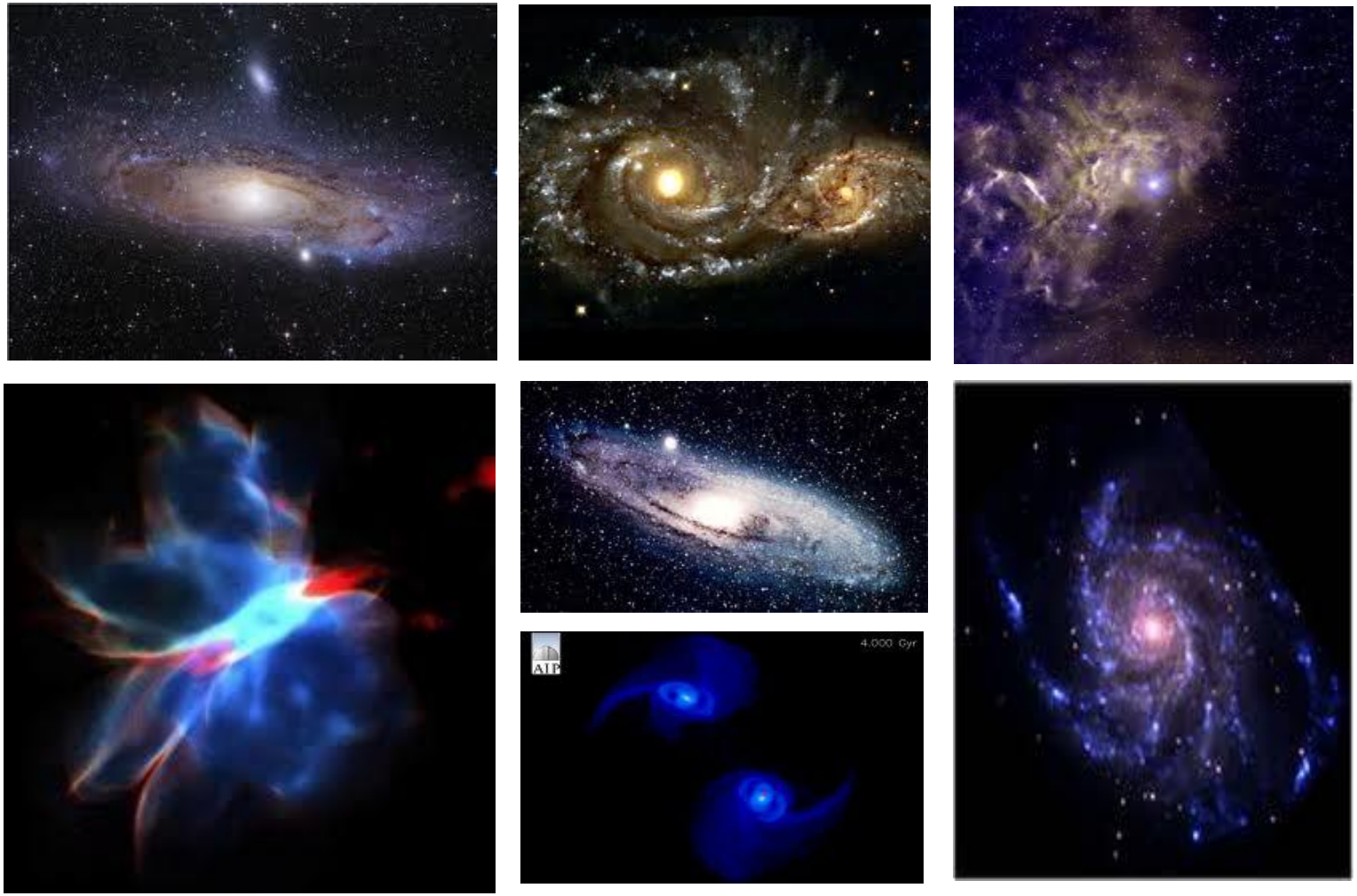
津波

The New Metaphor: Galaxy Formation ~ Information Organization

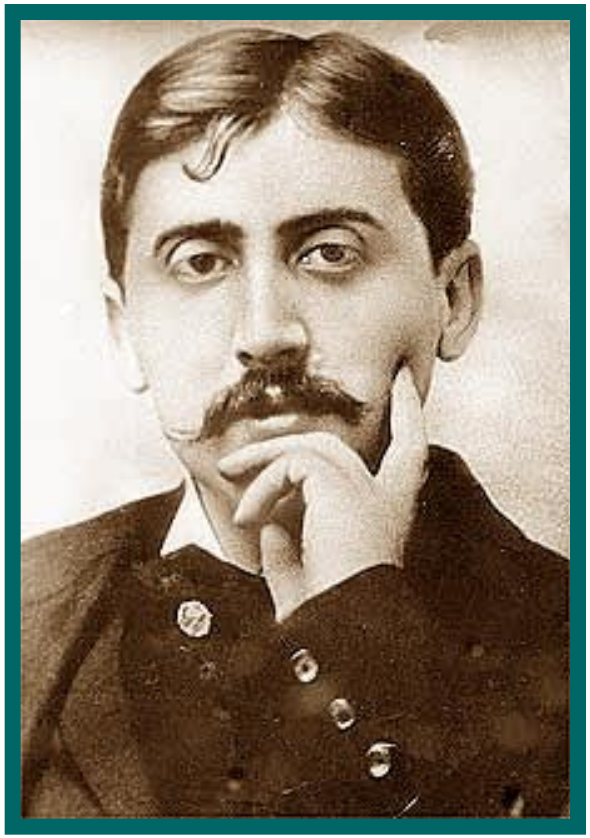


The truth is that we don't understand star formation at a fundamental level.

Abraham Loeb
Harvard Center for Astrophysics

The New Metaphor…

- Move from homogenous mix of amorphous material that includes gases, matter and dark matter
- Primordial fluctuations ultimately create structure by creating the gravitational pull that integrates gases, dark matter and matter
- Galaxies eventually cluster across a web of filaments that can cause gravitational interaction which shifts the pace and breadth of expansion and formation
- Many galaxies in the universe are gravitationally bound to other galaxies, that is to say they will never escape the pull of the other galaxy



"The real voyage of discovery consists not of finding new lands but of seeing the territory with new eyes.“

- Marcel Proust

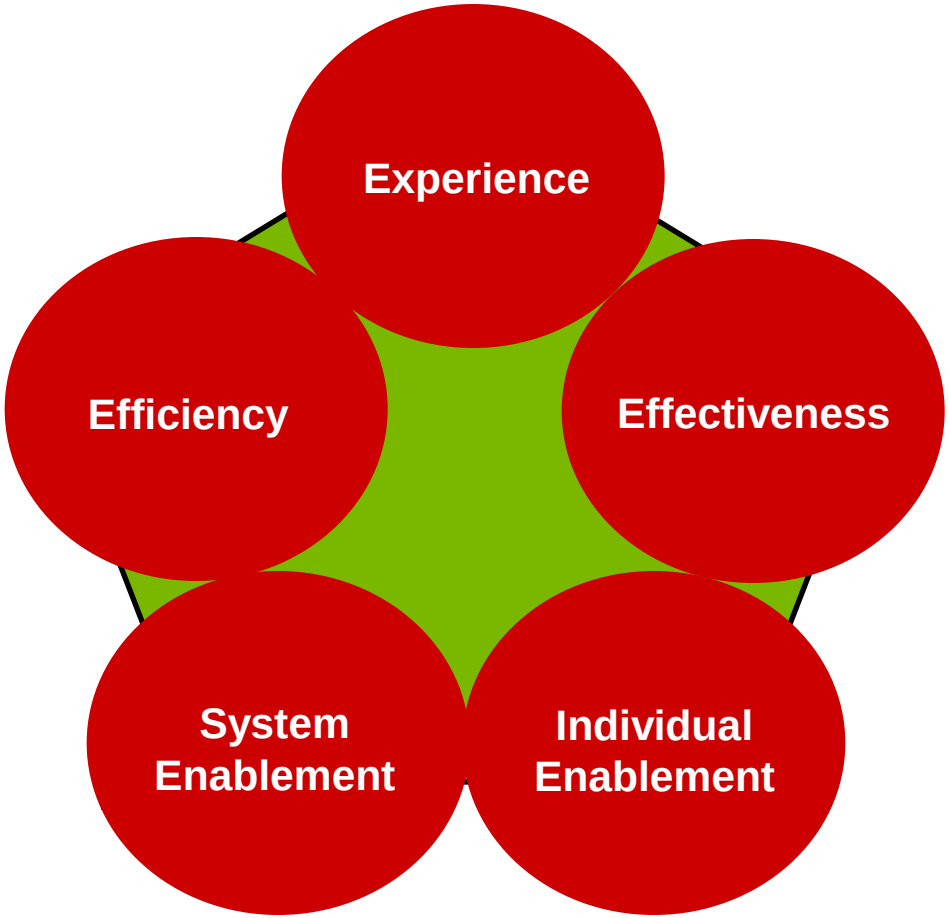
I never make predictions, especially about the future.

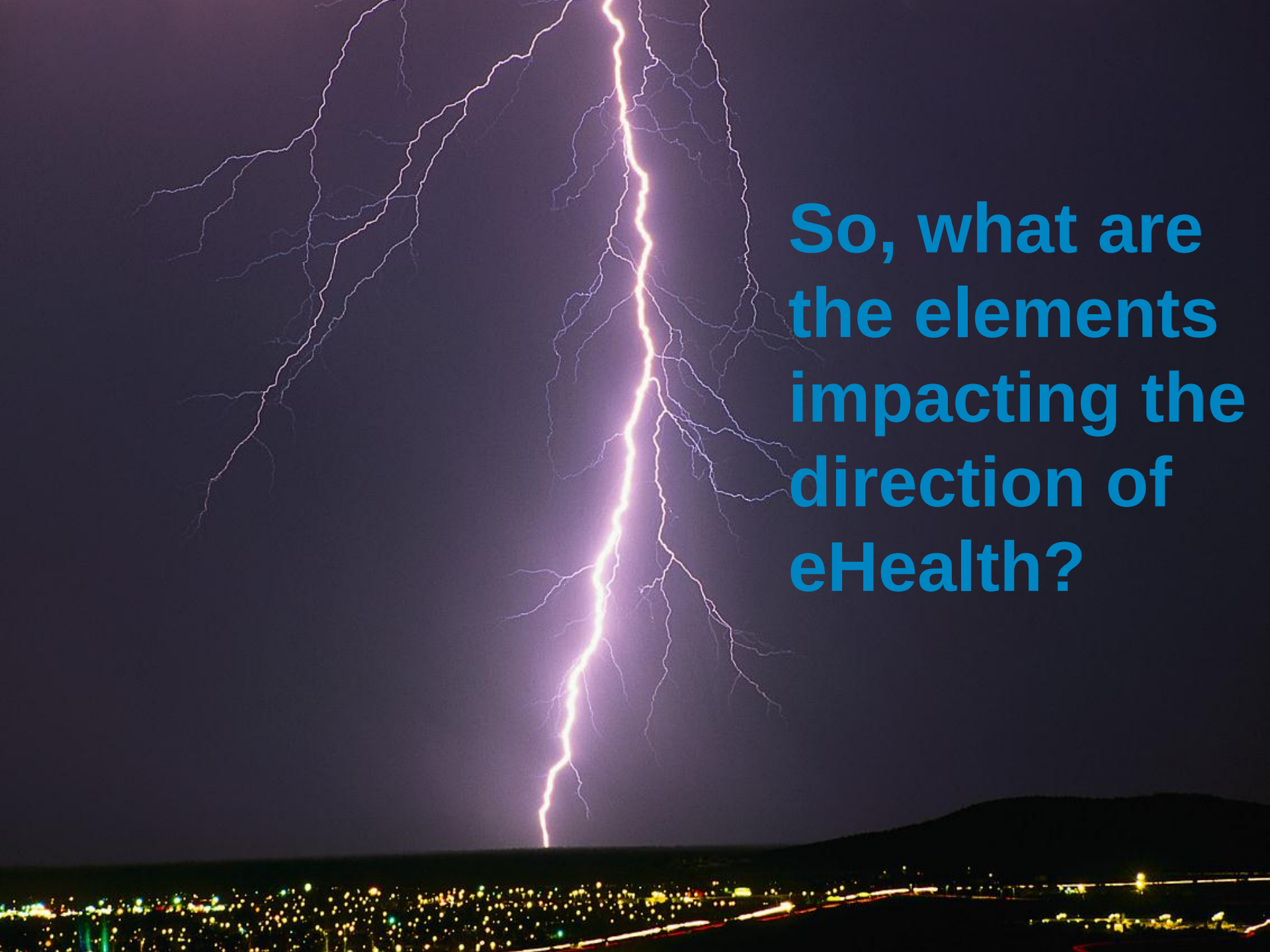
Yogi Bera

The Reality Check…

- Philip Tetlock, Ph.D. – a psychologist at the University of California has studied “pundits” and “opinion makers” for the last 25 years.
- Focused on 284 prominent economists, foreign-policy specialists, and journalists and evaluated 82,000+ predictions
- His finding? – the vast majority of experts perform “worse than random” with an accuracy rate of less than 50% and liberals, moderates and conservatives were “equally ineffective” in their predictions.
- Conclusion: “*Our political discourse is driven in large part by people whose opinions are less accurate than a coin toss.”*

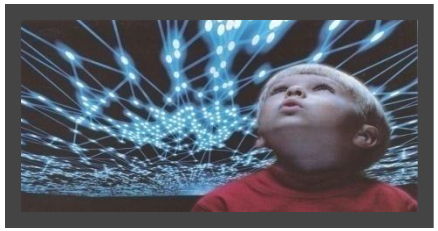
Five Drivers: eHealth…

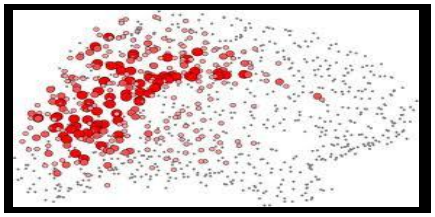



So, what are the elements impacting the direction of eHealth?

Elements of eHealth…

- The Genome
- The Connectivity
- The Network
- The Diffusion
- And, Transparency

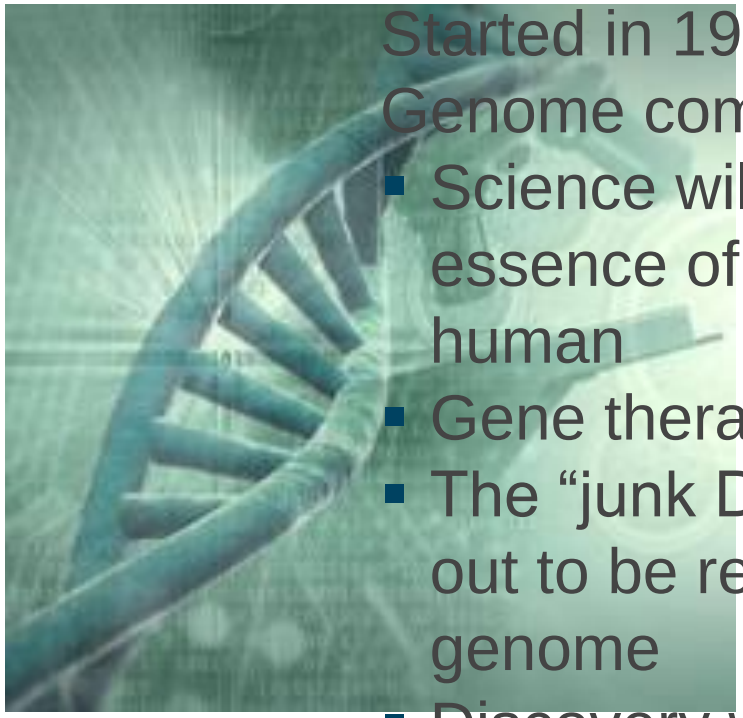




The Future of Healthcare…

The Genome

The Pace of Genomic Discovery…



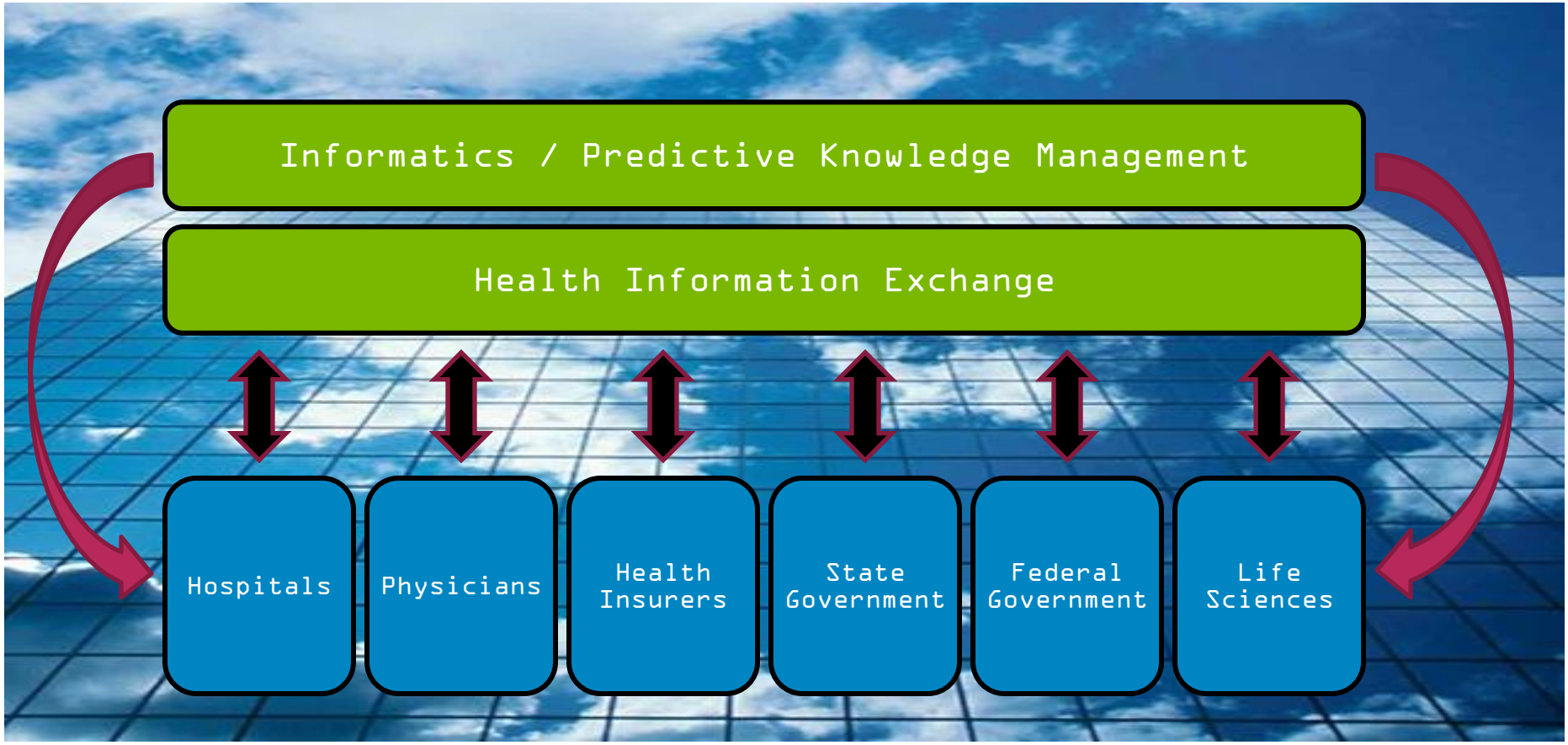
Started in 1990 with the Human Genome completed in 2003

- Science will determine the essence of what it means to be human
- Gene therapy will cure disease
- The “junk DNA” will likely turn out to be regulator of the genome
- Discovery will extend beyond the confines of science

The Future of Healthcare…

The Connectivity

The Evolving Healthcare Platform…

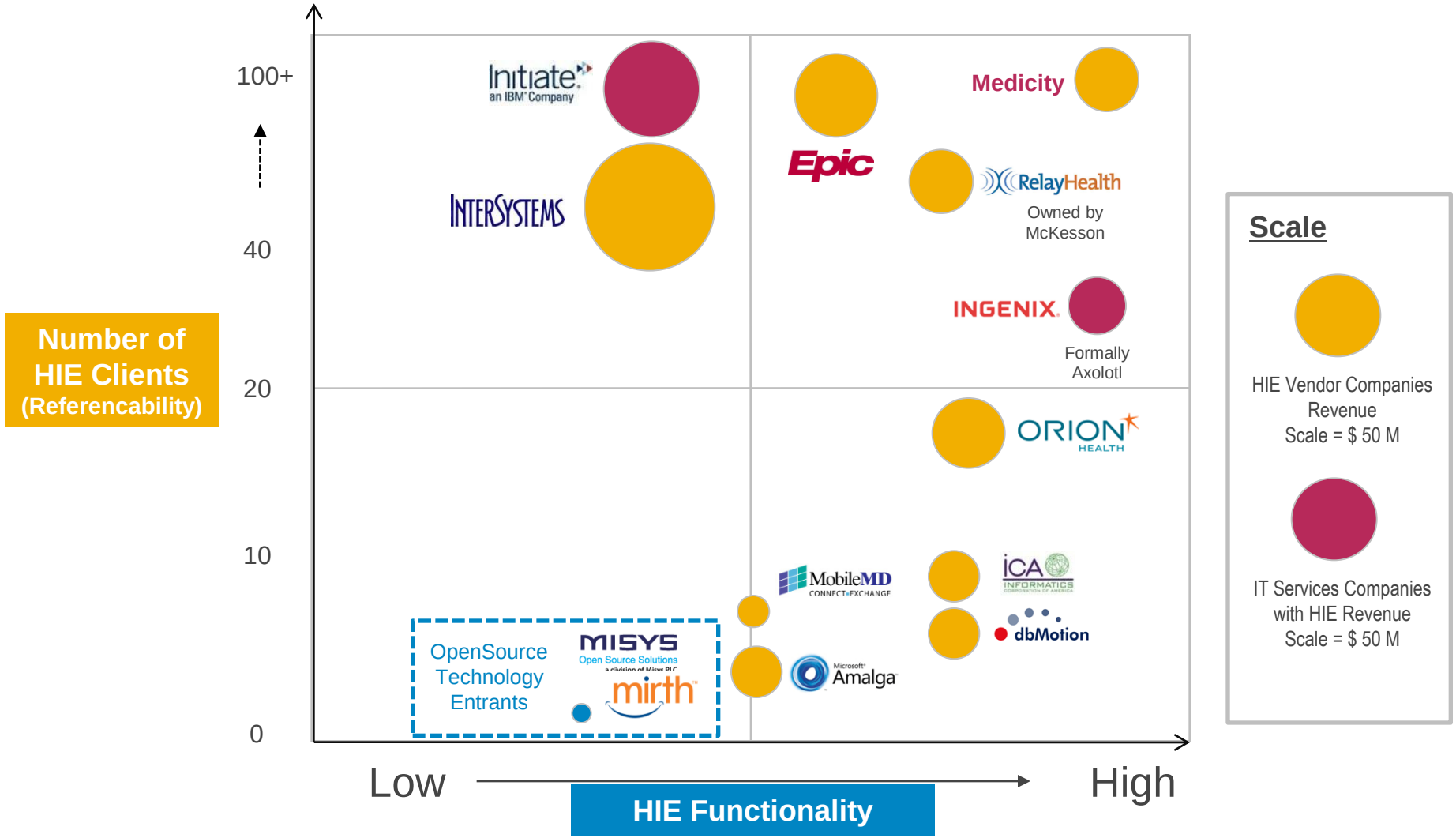


Adaptive Public Health Coaching
Crowd Sourced Research
Biologic Previews

Diagnosing the Pre-Sick
Therapeutic Health Information Patterns
Optimized Health Patterns

Health Information Exchange - Competitive Environment

Pure HIE Vendors are beginning to consolidate into Services or EMR organizations creating increased competition

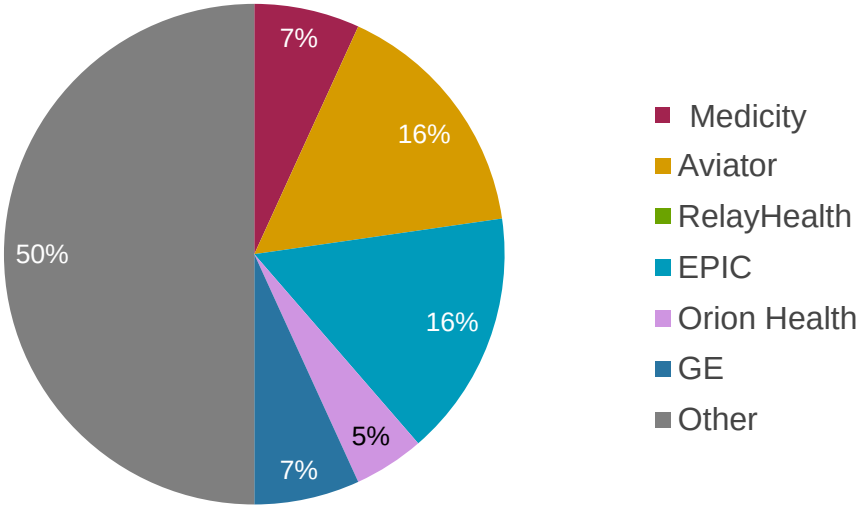


*Source: IDC Health Insights, 2010

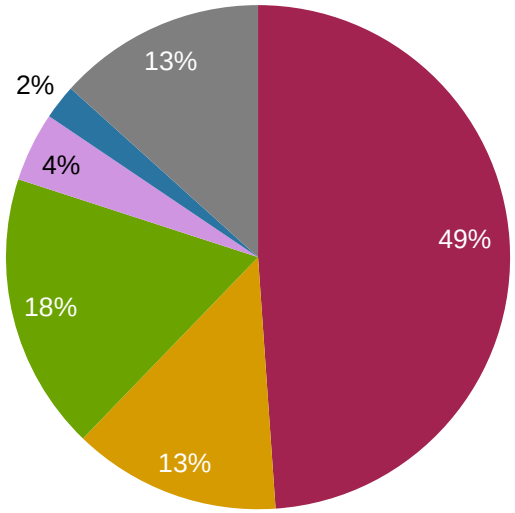
HIE Deployments

According to a 2009 KLAS study, Medicity was the egment leader among active HIEs in the Acute-to-Ambulatory HIE space with over 49% of HIE deployments

# of live Acute-to-Acute HIEs



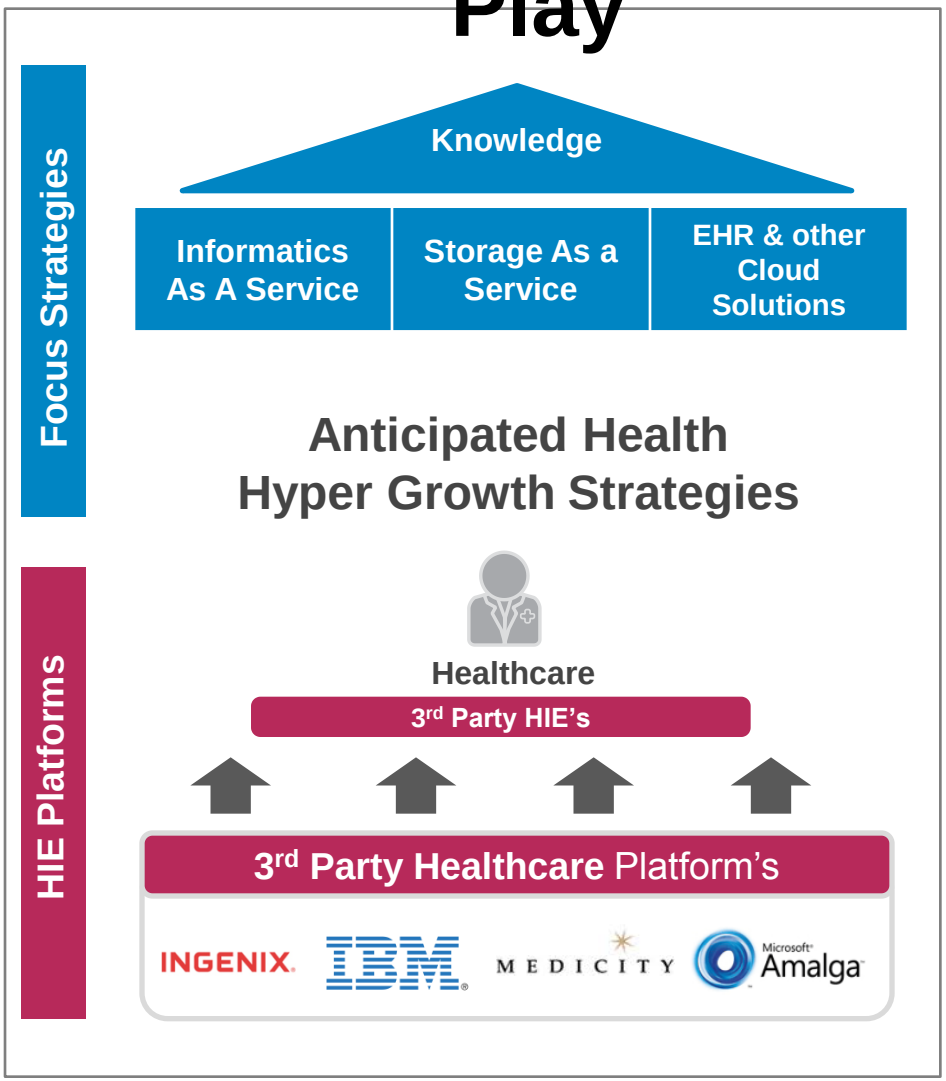
# of live Acute-to-Ambulatory HIEs



Note: Relative contribution to the HIE segment is based on active HIEs, not revenue

Source: KLAS 2009 HIE Study

Supporting Solution Play



Health Information Exchange – International Markets

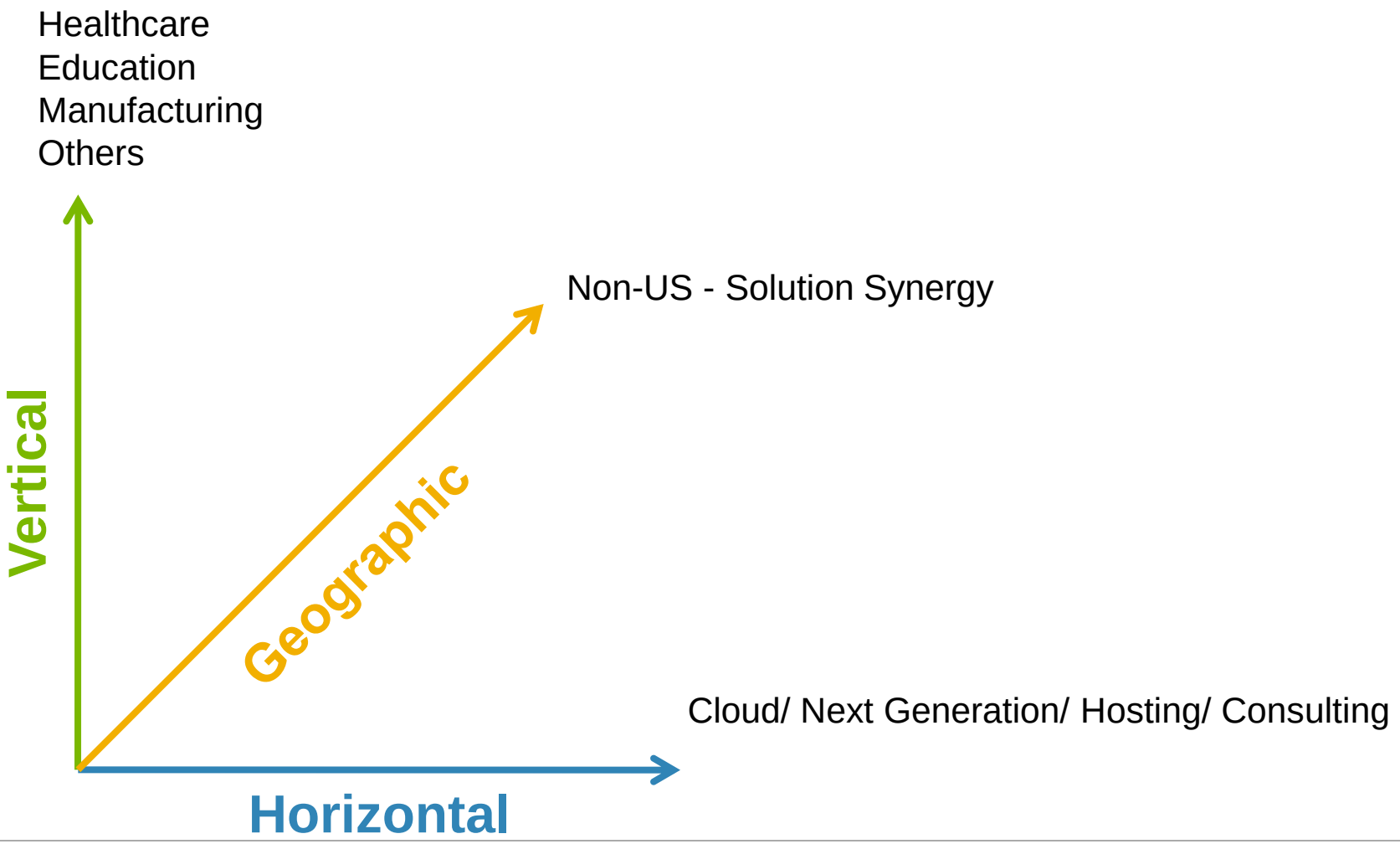
Geography	HIE Investment/Analysis	HIE Spend Analysis	HIE Opportunity 2010-2015
China	• China announced a $124 B stimulus package over three years to fundamentally reshape the healthcare sector. A key element of the plan is to modernize healthcare services with digital hospitals, electronic medical records, and next generation information networks. • HIE spending concentrated on establishing Regional Healthcare Information Networks (RHIN)	China will allocate 1.2% to 1.8 % of the $124 B stimulus budget toward healthcare IT, or approximately $1.45 B to $2.6 B	
Germany	• Germany's national e-health project aims at connecting 2,200 hospitals, 100, 000 GP's, 21,000 pharmacies and 200 public health insurance companies • Seven Pilot Regions with 10,000 patients each. • Germany has suspended its e-health project, with a review to be carried out of security and confidentiality	Overall project cost is to be about €14.4bn by 2017	
UK	• Summary Care Record: The Electronic Patient Record initiative, part of the National Health Service (NHS) National Program for IT. • Majority of implementation was suspended by the Department of Health this year	$19.1 B initiative to computerized the NHS in England	
Canada	• Canada Health Infoway - Federally funded organization tasked with accelerating the development of Electronic Health Record across Canada. • Ongoing investment in Infoway is expected to continue based on Government Focus	Alberta spend = $1.4B on EHR/HIE. Ontario and BC expected to mirror spending over the next 3 years	
Middle East	• UAE: •UAE healthcare system supported heavily with state funding and vision • Privatization initiatives high (DHCC) • Saudi Arabia: $4.5 billion to spend on new hospital infrastructure	Middle East healthcare expenditure is expected to grow at a CAGR of 13% during 2007-2012	

Low High

Health Information Exchange – International Markets

Geography	HIE Investment/Analysis	HIE Activity/Spend Analysis	HIE Opportunity 2010-2015
Australia	• December, 2009:finalized national strategy for e-health adoption • Strong HIE focus /prospect through the National Shared Individual EHR	Projected to spend $467 Million over the next two years, in order to provide every Australian with an electronic health record by 2012	
Brazil	• 1999: National Health Card Project (NHCP) was initiated for the Public Sector to create a national patient identification and information system for the Brazilian Unique Healthcare System • Main goal of the NHCP: Collect information on patient treatments in a national repository of health records. The system was first deployed in São Paulo • Private Sector: The TISS project is focused on integrating healthcare information nationwide in accordance with the National Health Care Project	HIE Market expected to start in FY13/ FY14	
Mexico	• E-Health Program in Mexico established which will focus on developing a country wide HIE	Currently in procurement for 1st HIE . Additional HIE tenders are expected in the next 18 months	

Considerations in the HIE Space…



The Network

Strategic Value of Community Based Networks

HIE market drivers

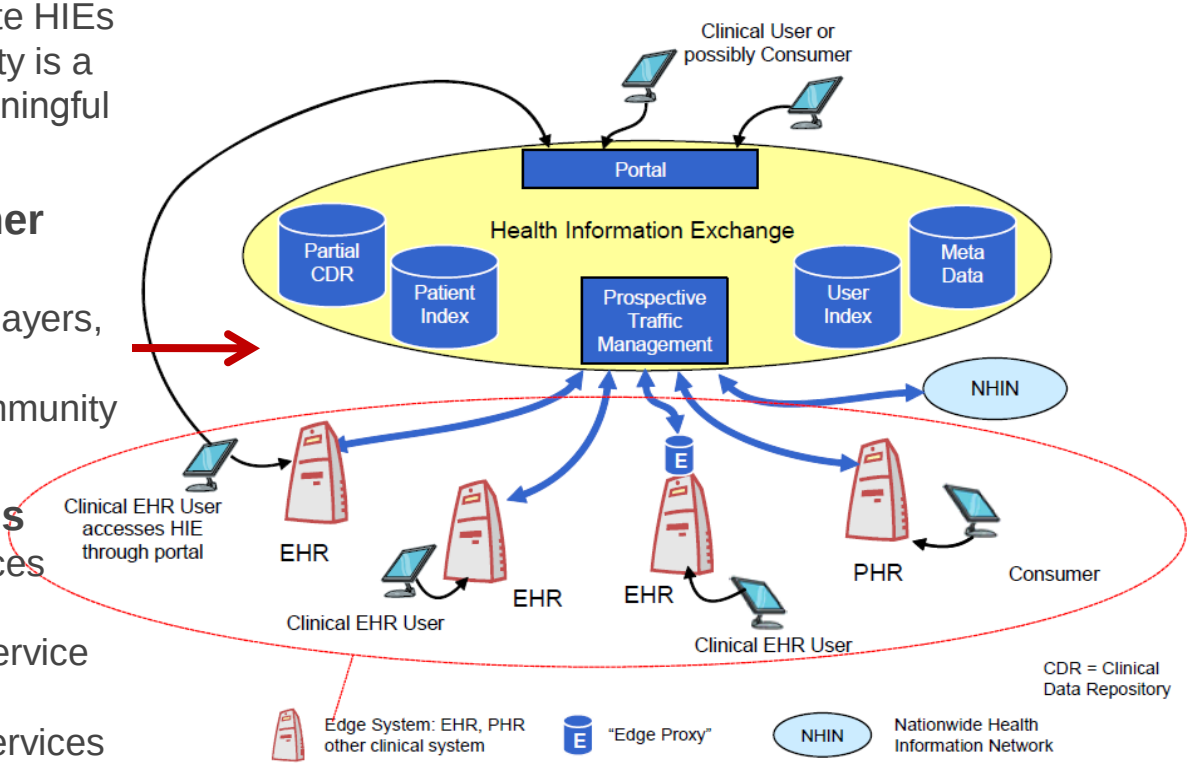
- HIE's provide the connectivity infrastructure required to achieve longitudinal electronic health records - an unmet market requirement
- ARRA stimulus package released $564M in FY11 to fund the creation of State HIEs
- Health information interoperability is a requirement for EMR/EHR "Meaningful Use"

HIE Operators have customer access

- Access to dozens of hospitals, payers, clinics, hundreds of physicians, thousands of patients at the community level

HIEs enable new businesses

- Longitudinal health record services
- Healthcare informatics
- Medical Image Archiving as a Service
- Clinical & business consulting
- Health reform technology and services
- Integrated health management
- Other consumer based services



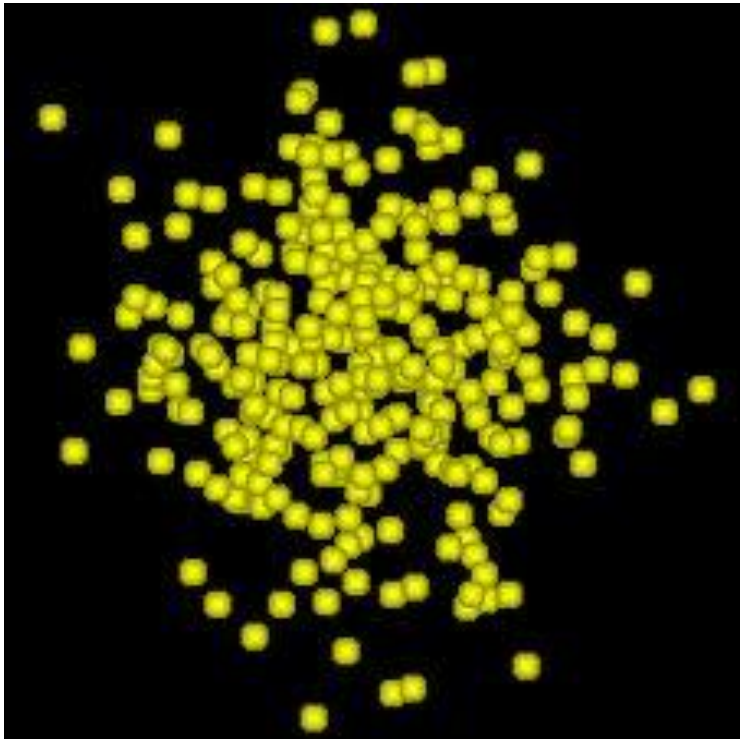
The Network in Support of Personalized Medicine

- Best Practices
- Communities of Practice
- Precise Diagnostics
- Real-time Therapeutics
- Decision Support
- Knowledge Dispersion

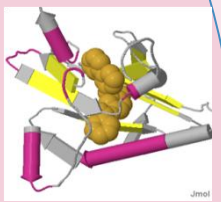
The only sustainable competitive advantage is the ability to learn faster than the competition

Peter Senge

The Diffusion



Information Technology Makes Healthcare Personal ... Again

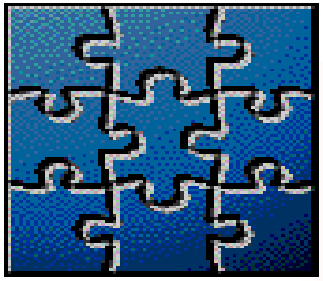


Diagnosis

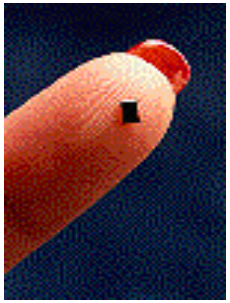
Treatment

Transparency

Predictive Knowledge Management…



Standardization



Peripheral Intelligence

CaaS

Artificial Intelligence

Knowledge Management

Pattern Recognition

Data Mining

Decision-Support

Dashboards

Benchmarking

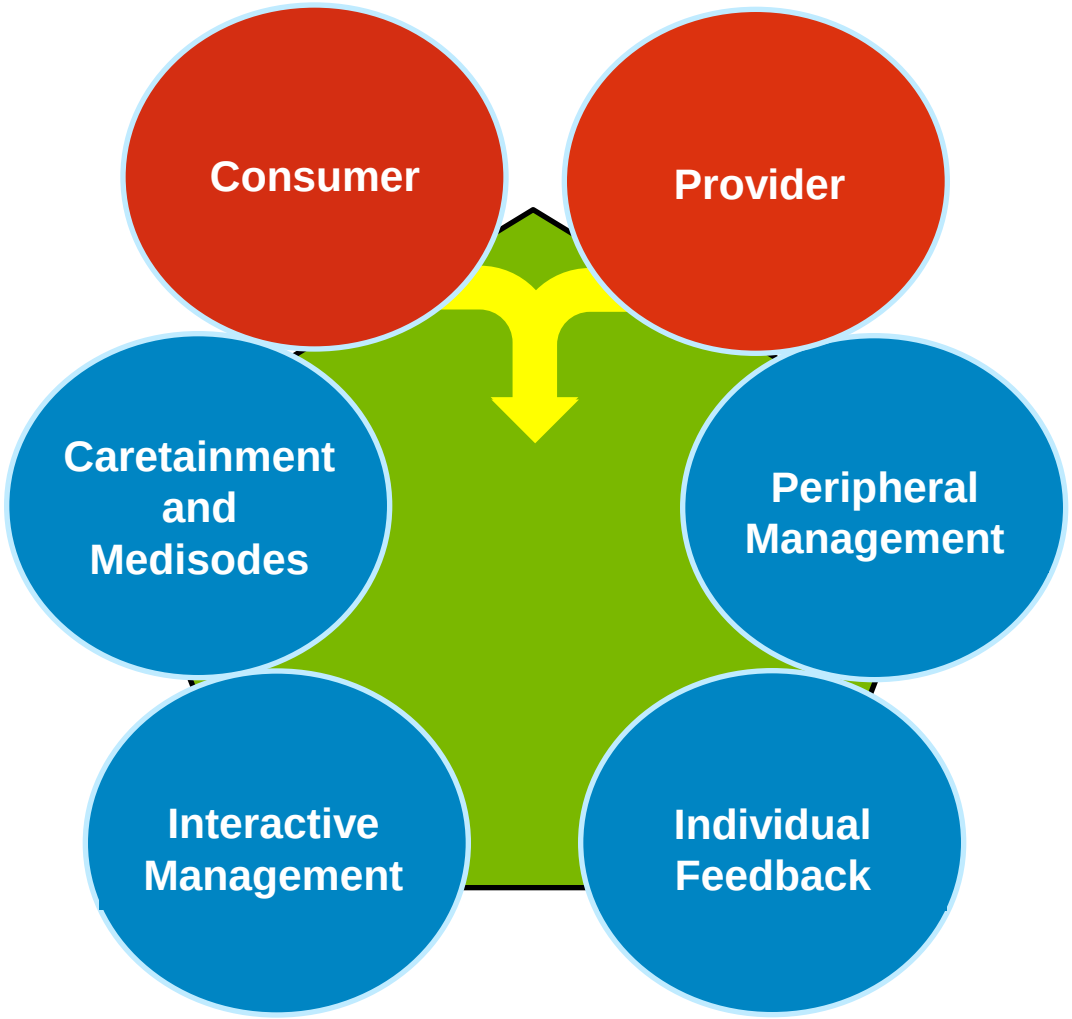
Personalization

In May, 2010 *Lancet Neurology* published a study showing that the generic drug lithium did nothing to slow the course of amyotrophic lateral sclerosis (ALS

In December, 2008, PatientsLikeMe, a for-profit patient networking site and data aggregator based in Cambridge, MA, came to a similar conclusion, more quickly and at much less cost.

So, how does eHealth become a reality?

The Future of Healthcare…

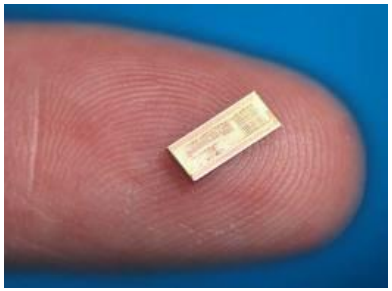


Peripheral Management

The basis for success is not how much you know but how fast you can learn.

Jeffrey Immelt, CEO
General Electric

Making Small Smaller…



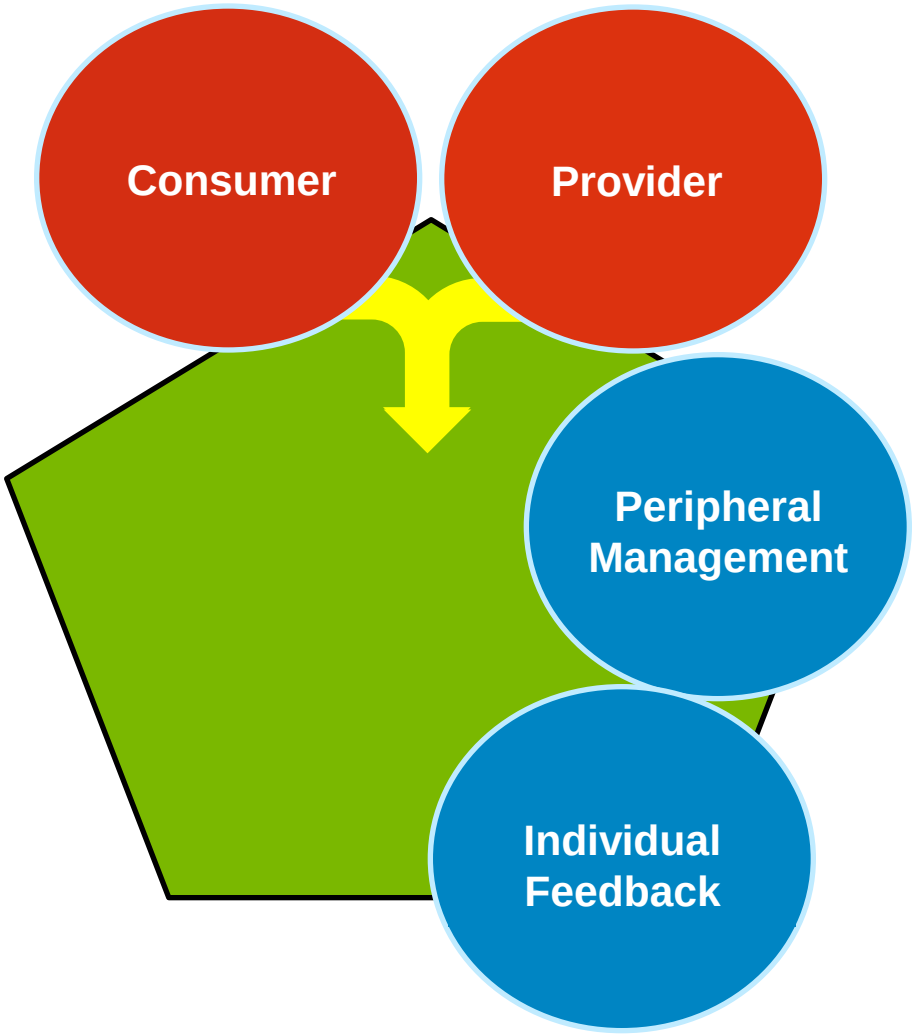
- Embedded Chips = Intel “Atom Chips”
  - @ $10B market with only $1B generated in 2009
  - Not as powerful as PC-based chips but economical
  - Examples
    - Nautilus – Embedded in treadmills to stream your favorite video when you show up at the gym
    - LG Electronics – Placing in signs that will recognize your age, gender and other characteristics as you pass by creating customized messaging
    - India – banks are placing in handheld terminals that serve rural areas off the electricity grid so that when an itinerant teller visits a village, it allows locals access to loans and other banking services

- **Consider the possibilities for healthcare…**

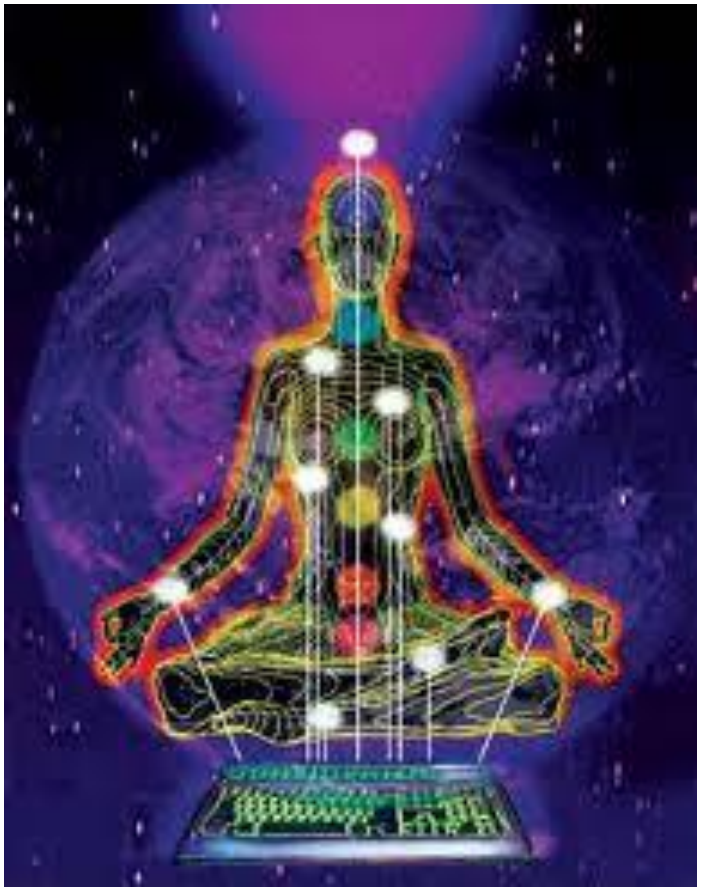
Peripheral Management: CHF

- Remote monitoring of homebound heart failure reduces hospital admissions
- > 5 million people affected in the USA with incidence increasing
- CHF hospitalizations have tripled in the last three decades
- ~ $37+ billion in direct costs
- Non-pharma interventions can have a huge impact
- Signs and symptoms frequently start before ER admission

The Future of Healthcare…



Individual Feedback

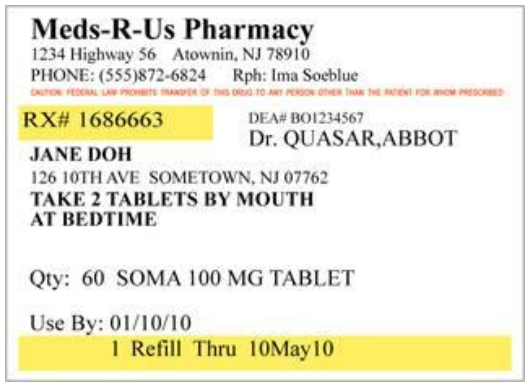


Feedback is the breakfast of champions.

Ken Blanchard

Twitter Example – Medication Reminders

Direct Message: **d + username + message**



Meds-R-Us Pharmacy
1234 Highway 56 Atownin, NJ 78910
PHONE: (555)872-6824 Rph: Ima Soeblue

RX# 1686663
DEA# BO1234567
Dr. QUASAR,ABBOT

JANE DOH
126 10TH AVE SOMETOWN, NJ 07762
TAKE 2 TABLETS BY MOUTH AT BEDTIME

Qty: 60 SOMA 100 MG TABLET

Use By: 01/10/10
1 Refill Thru 10May10

twitter

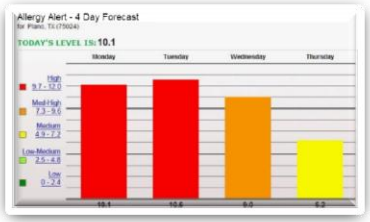
(sent at 8pm local time)

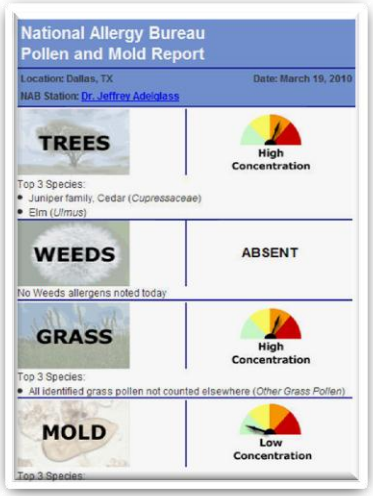
d JaneDoh Reminder to take 2 -100mg SOMA tablets

Other ideas include discharge instructions, immunization reminders (on patient's birthday), etc.

Twitter Example – Creating Allergy & Ozone Alerts

Data Providers





Allergy Patients

twitter

Generic Alert

#AllergyAlert #HighPollenCount - Los Angeles - May-2010

+

#NWS Inversion Alert #Ozone Level - Los Angeles

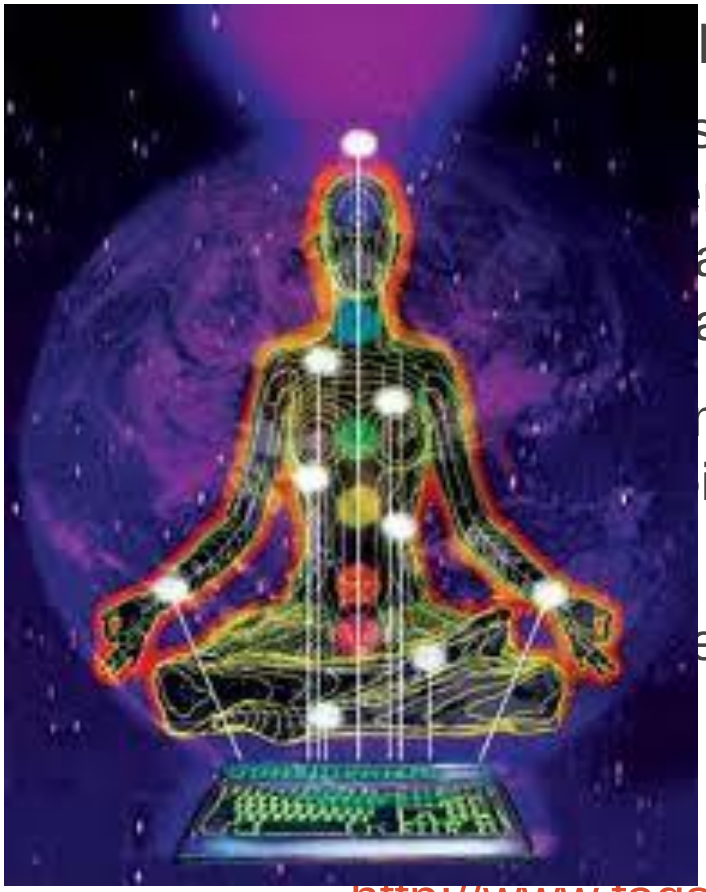
Specific Alerts

d JaneDoh #HighPollenCount Los Angeles - May-2010 take <med_name>

d JohnDoh #HighPollenCount Los Angeles - May-2010 wear mask outside

An Example: Biofeedback for Pain

- A Biofeedback treatment device for pain management



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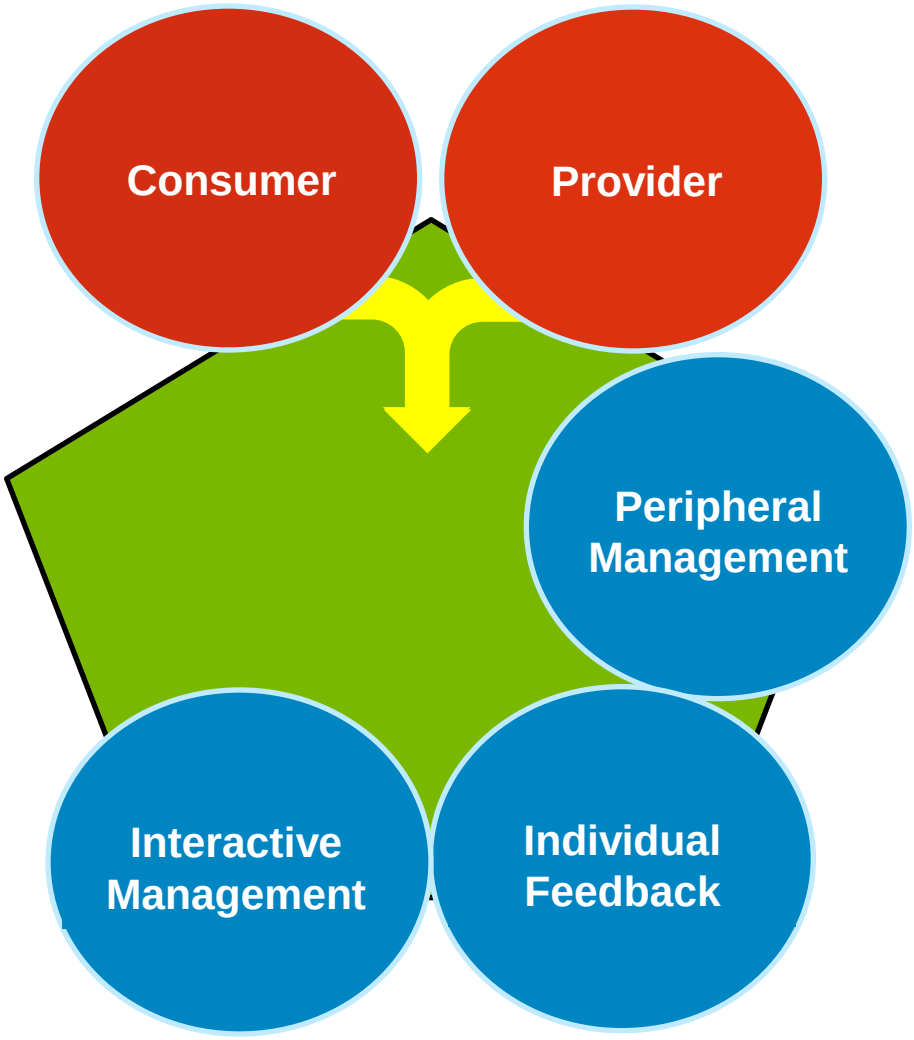
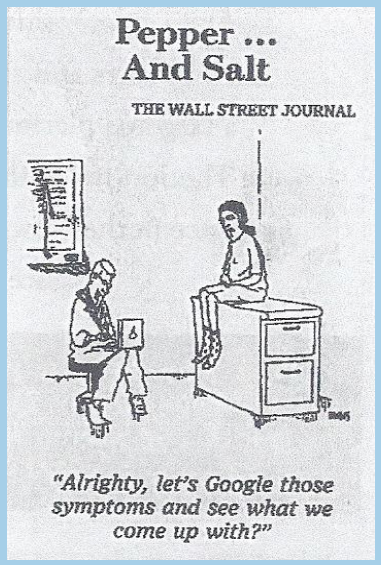
The Future of Healthcare…



Interactive Management

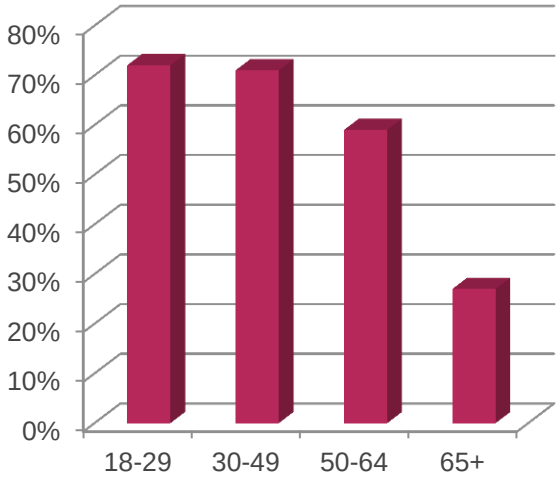


Who seeks Health Information Online?

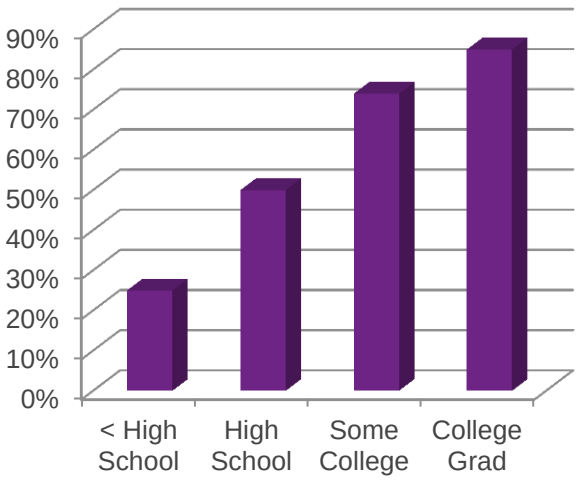
The majority are those who ….

Income >$50K

Age Group 18-50



Highly Educated



Source: Pew Internet & American Life Project Survey, November-December 2008. N=2253. Interviews conducted in English or Spanish. Margin of error is ±2%.

The Virtual Physician-Patient Relationship…

The Academic Perspective:

- http://hsc.unm.edu/som/telehealth/ = Center for Telehealth and Cybermedicine Research
- http://www.amda.com/about/mission.cfm = American Medical Directors Association

The Commercial Perspective:

- MDLiveCare.com = primary care services
- SpecialistsOnCall.com = specialty services
- NuPhysicia.com = primary and specialty services
- *YouChoseYourFavoriteVirtualHealthcareWebsite.com* = ???

The New Social Media

Human speech is the first social media. The new technologies simply extend our voice…

- Social media are simply a new way of staying connected with those we want to be connected with – it's just that the scope and breadth have changed.
- We don't totally understand the impact of social media.
- Communications are about relationships not, technology.
- If you have nothing to say, it doesn't make any difference what medium you use. It will still be irrelevant.
- The power of the simultaneity of conversations beyonds our grasp.
- Fear of the future never got us there…

Three Examples: The CDC

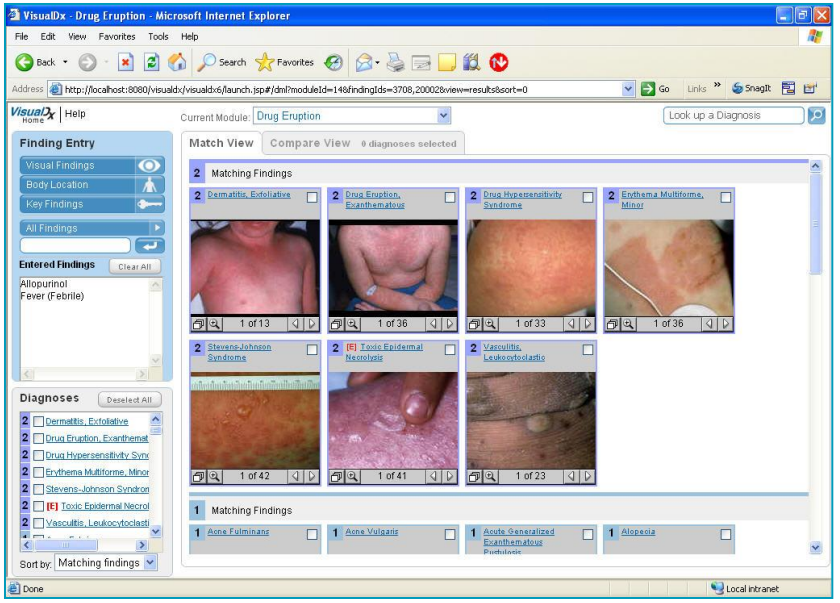
- Use “eCards” – send messages as a friendly reminder from a *trusted source* to get screenings (e.g. mammography, colonoscopy, etc.) + much more effective than a public service announcement
- Partnered successfully with Whyville (a virtual world) for youths aged 12-14 to present messages on seasonal flu
  - In 2007, some 41,000 visitors to the site had their avatars vaccinated against the fictitious Why flu in the virtual world
  - 1,800 seniors who play the game online with their grandchildren
- Pilot HIV/AIDs prevention campaign that uses videos made by college students sent via cell phones to friends…Smoking cessation next.

An Example: Logical Images

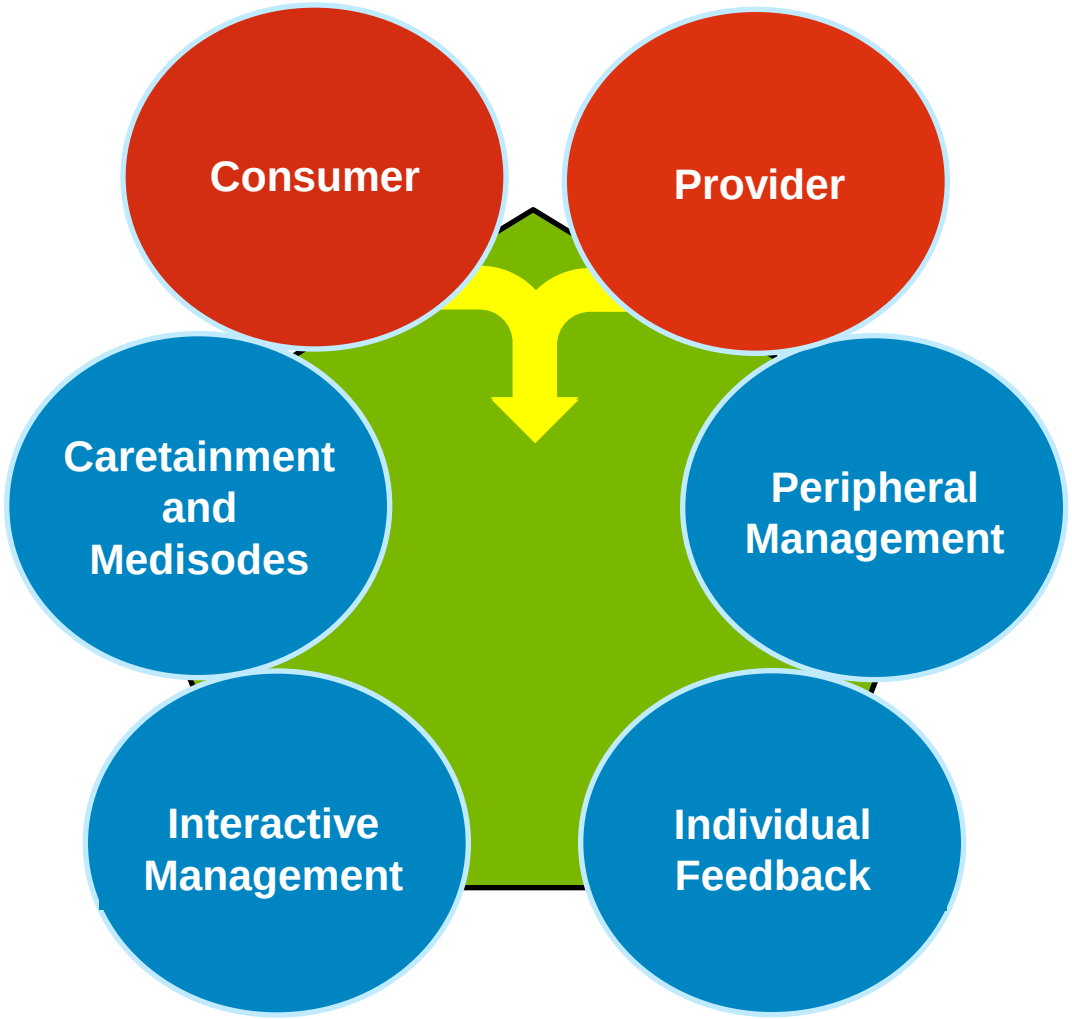
- Used by 1,300 health care sites nationwide & six state public health departments have licensed VisualDx for every hospital in their respective states
- 30+ medical schools have integrated VisualDx
- Integrates into telemedicine

An Example: Logical Images

- Search by patient factors
- Develop a ***visual*** differential diagnosis
- Desktop and Laptop
- Iphone, Ipad, Itouch
- Droid (Nov 2010)



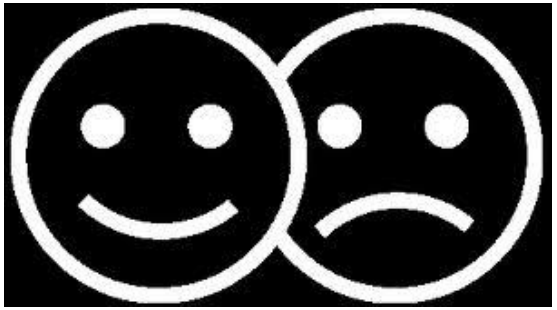
The Future of Healthcare…

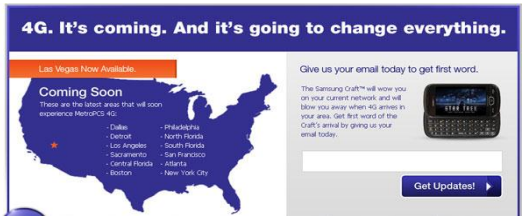


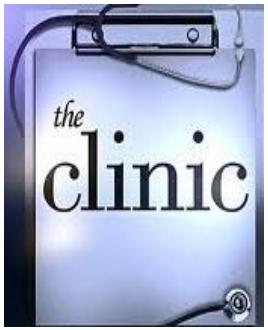
“I would rather entertain and hope that people learned something than educate people and hope they were entertained.”

Walt Disney

Caretainment







“Medisode”

The Case for Video

- "Pictures…trigger instinct, emotion and impulse" (Bergsma 2002, TV Goes to School)
- People remember:
  - 10% of what they read
  - 20% of what they hear
  - 30% of what they see
  - 50% of what they see and hear

"People generally remember about twice as much when they see and hear something, than when they only see or hear it."

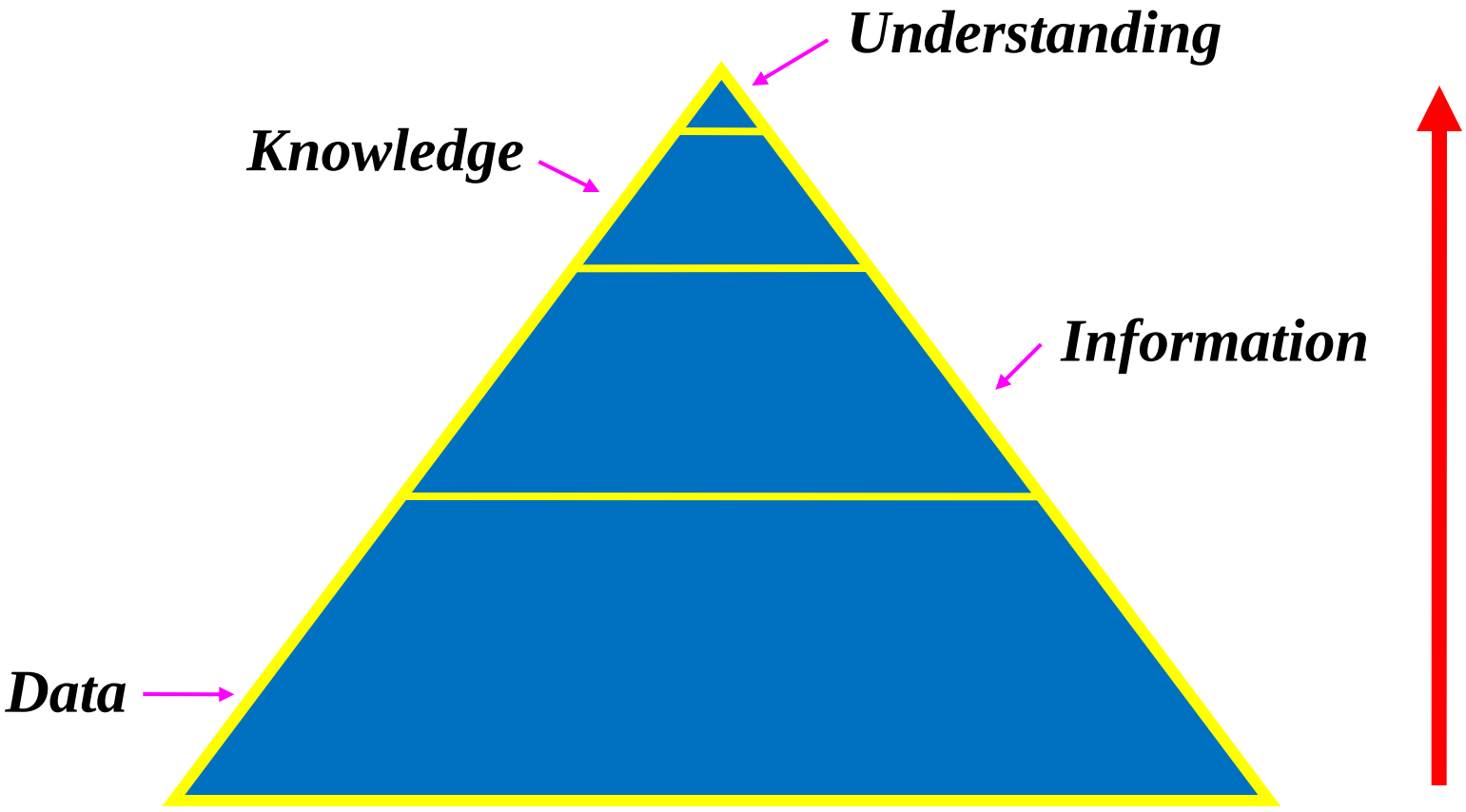
The Case for Video

- Number of American users frequenting online video destinations climbed 339% from 2003-2009
- Time spent on video sites increased 2,000% over the same period
- From 2008-2009
  - number of video streams grew 41%
  - streams per user grew 27%
  - total minutes engaged with online video grew 71%

An Example: Unity Media or HealthNuts

So, where does the current environment take us?

DIKU Framework



The Next Generation.

Allscripts™

DELL

Genomics

ST. JOSEPH HEALTH SYSTEM

NATIONAL WEATHER SERVICE

Repository of Educational And Community Health (REACH) Information

CVS pharmacy

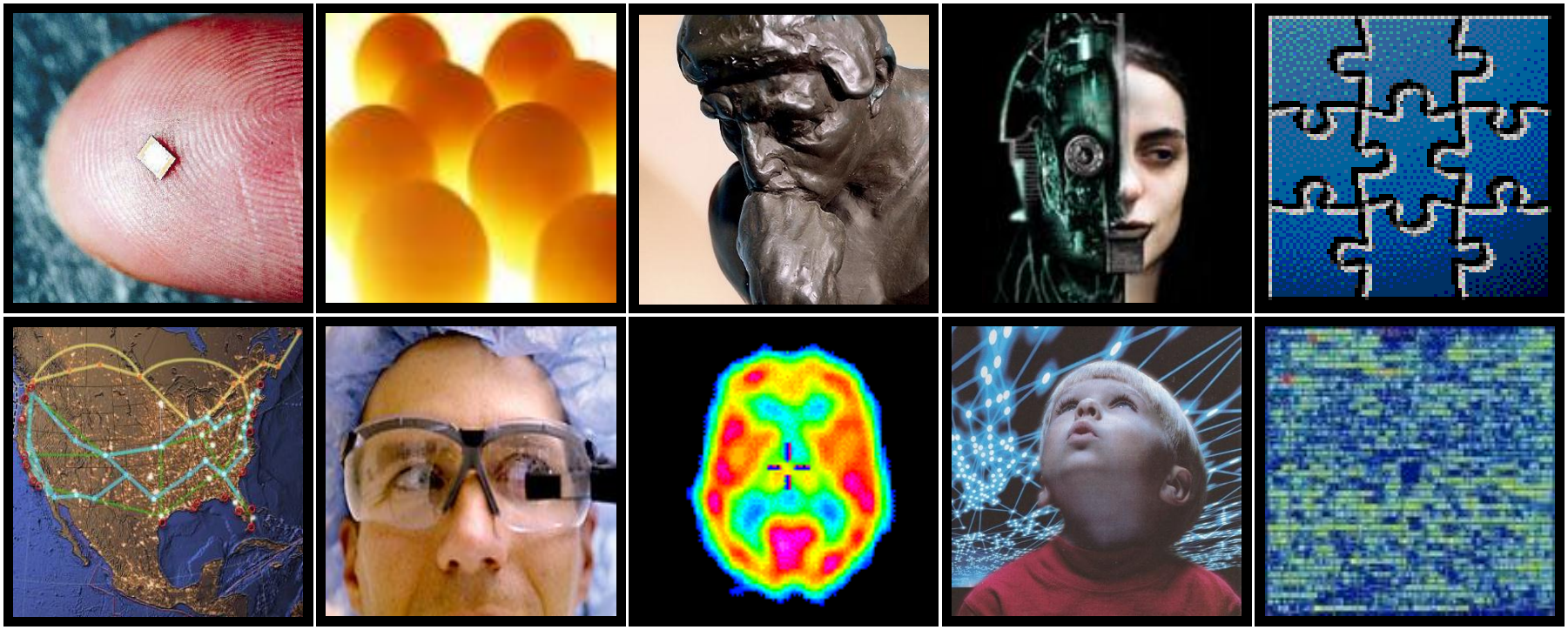
twitter

PayPal

eHealth / Personal Medicine– More than Genes…

- The Genome
- The Connectivity
- The Network
- The Diffusion
- And, Transparency

Satisfaction *– when I want it...*
Outcomes *– with the results I want...*
Value *– at the right cost*



Thank You...

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