Smart Healthcare and Innovation

IBM the Employer, Workforce Health and the Healthcare Market

Almaden Institute 2010

M-J. Sepúlveda, MD FACP
IBM Fellow & Vice President
- **Why innovate**
  - IBM healthcare experience
  - smart people
  - smart purchasing
  - smart care

- **What innovations**
  - total health management, virtual fitness
  - childhood obesity
  - personalized medicine
  - hepatitis B virus
  - delivery system and primacy of primary care

- **Where next**
  - health Impact Pyramid: social determinants of health
Innovation Imperative

HEALTH CARE COSTS
- Medical claims
- Pharmacy claims
- Behavioral health
- Care management costs
- Admin. costs

ABSENTEEISM
- Short term disability
- Long term disability
- Unplanned vacation
- Dependent care

PRESENTEEISM
- Cognition
- Distraction
- Interruption
- Engagement
- Resilience
- Flexibility

Medical claims
Pharmacy claims
Behavioral health
Care management costs
Admin. costs

Short term disability
Long term disability
Unplanned vacation
Dependent care

Cognition
Distraction
Interruption
Engagement
Resilience
Flexibility
Why Innovate                  Affordability

Average Health Insurance Premiums and Worker Contributions for Family Coverage, 1999-2009

$13,375

$5,791
$4,247
$1,543

131% Premium Increase
128% Worker Contribution Increase

$9,860
$3,515

1999
2009

Note: The average worker contribution and the average employer contribution may not add to the average total premium due to rounding.


Annual Changes in Health Care Spend, Workers’ Earnings and Overall Inflation (1998-2008)

- Total Private Expenditures
- Workers’ Earnings
- Overall Inflation

Percent Change (%)

Note: 2007 figure used for workers’ earnings because 2008 figure is not available.

**Why Innovate**

**Outlook**

**Figure 2**

*Illustrative Health Insurance Premium Projections for Family Coverage, Assuming Average Growth Rate of 6.1% from 2004-2009*

Note: Health insurance premiums projected for 2010-2019 assuming that the average growth in premiums between 2004 and 2009 (6.1%) continues.

IBM Developed New Approach to Health Care

Vision: Healthy people for high performance

IBM Health Care Strategy …

- Value (quality and cost)
- Meaningful choice
- Sustainable cost structures
- Prevention
- Primary Care
- Smart decisions
- Privacy & HIT

- We investment in health care to realize the productivity and innovation of people
- Recognizes the importance of health care partnerships and accountability

Examples:
- Helping employees take responsibility for healthy behavior
- Employee involvement in treatment decisions
- Information that helps individuals choose health plans that offer optimal value and improve efficiency in the system.
- Technology-enabled, smart delivery of innovative health care services
Total Health Management & Patient-Centered Primary Care

Health Support

Health Status

Low
Healthy
Family History
Lifestyle Issues
Acute
Persistent
Chronic
Catastrophic

High
Terminal

Palliative
Care Advocacy, Complex Case Management
Care Coordination & Disease Management
Health & Medical Decision Support
Screening and Secondary Prevention, Healthy Living Rebates
Education and Information Sharing, Web-based Tools & Resources
Health Promotion, Wellness and Primary Prevention

Where It All Comes Together

Patient-Centered Primary Care & Trusting Relationships → Behavior Change Rx
HIT with Clin Decision Support, Analytics & Practice-based Learning, Patient Access
IBM’s Virtual Fitness Center

VFC Offerings Since 1999

- Year-round support for an active lifestyle
- Participate on a team or alone
- Set activity goals
- Log physical activity
- Receive motivational email messages
- Interact with fitness professionals

Build muscle, build bones.

About 10 million Americans have low bone mass known as osteoporosis, and one in two women over 50 will have a related bone break, says the National Osteoporosis Foundation. Although nutrition plays a large role, weight-bearing activities, such as walking and resistance training, can help reduce the rapid loss of bone density.

For processing of the final rebates, all activity must be completed and logged by December 6, 2005. Be sure to log activity regularly, since you can only backlog activity up to five weeks prior to the current date.
Lower Healthcare Claims Costs Seen With Moderate Levels of Physical Activity

2003 IBM Claims Costs*  

<table>
<thead>
<tr>
<th>Sessions of Physical Activity per Week**</th>
<th>2003 IBM Claims Costs*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (N=6,452)</td>
<td>$2,889</td>
</tr>
<tr>
<td>1-2 (N=8,369)</td>
<td>$2,711</td>
</tr>
<tr>
<td>3 (N=10,645)</td>
<td>$2,364</td>
</tr>
<tr>
<td>4+ (N=10,877)</td>
<td>$2,408</td>
</tr>
</tbody>
</table>

*2003 IBM paid medical and pharmacy claims costs.

**Self-reported physical activity on 2004 IBM HRA (No response=71) (Total N=36,414 of 54,072 HRA participants matched to claims costs).
As Physical Activity Increases Health Risk Decreases

Physical Activity Minutes Logged on the Virtual Fitness Center

<table>
<thead>
<tr>
<th>Health Risk Area</th>
<th>Percent Change (Yr1 to Yr2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Inactivity</td>
<td>-16.1%  -51.8%  -57.7%  -63.2%  -73.3%</td>
</tr>
<tr>
<td>BMI &gt;27.5</td>
<td>1.9%  1.6%  0.0%  0.9%  -3.3%</td>
</tr>
<tr>
<td>Number of Risks</td>
<td>-1.5%  -10.4%  -10.3%  -7.4%  0.7%</td>
</tr>
</tbody>
</table>

© 2009 IBM Corporation
Impact of Childhood Overweight (BMI > 85th percentile) on Adult Obesity (BMI > 30)

- 17% are obese and 15% are overweight
- 25% obese adults were overweight children
- 4.9 BMI unit difference in severity in adult if obesity carried over from childhood
- 50% of adults with BMI > 40 were obese as children
- Onset ≤ 8y more severely obese as adults (BMI = 41.7 vs 34.0)
- Costs due to obesity U.S.

<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cost obesity U.S.</td>
<td>78.5B</td>
<td>$147B</td>
</tr>
<tr>
<td>% U.S. Total medical costs</td>
<td>6.5%</td>
<td>9.1%</td>
</tr>
</tbody>
</table>

Freedman et al, Pediatrics 2001; 108: 712
The Framework Of Parent-Child Interactions Potentially Affecting Employers

- Parents promote obesity in children
- Obese children beget 1 of 4 obese adults
- Both incur high costs in health care
- Caregiving for physical and psychosocial needs consume adult time and energy from work
The Direct Financial Impact on Employers

- Average claims costs for obese adults as well as obese children are nearly twice that of the non-obese.

- Average claims cost of children with type II diabetes exceeds the average claims cost of adult type II diabetics.

Children’s Health Rebate

Set Family Action Goals

Setting actionable goals is one key to achieving success. We recommend setting these goals with your family, to be most meaningful.

Please choose at least 3 goals total among the 4 focus areas below, to target over the next 12 weeks. You can even type your own goal(s) in the text boxes provided.

Make Your Selections...

Healthy Eating: (Click "Next" to proceed to the next focus area)

- Fruits/Vegetables:
  - Eat at least 5 servings of fruits and/or vegetables per child per day.
  - Eat at least 3 servings of fruits and/or vegetables per child per day.

Your Family Action Goals

The personalized family action plan below is provided for use by you and your family. It can be printed using the link below:

<table>
<thead>
<tr>
<th>Focus Areas</th>
<th>Family Action Goals</th>
<th>Goal Tracking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy Eating</td>
<td>Buy fresh fruits and vegetables each week.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plan healthy meals in advance for the upcoming week.</td>
<td></td>
</tr>
<tr>
<td>Physical Activity</td>
<td>Walk children to school, church, library, or other destination you would normally drive to at least once per week.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Make active indoor and outdoor choices the children’s or whole family’s responsibility (eg, vacuuming, mowing) each week.</td>
<td></td>
</tr>
<tr>
<td>Screen Time</td>
<td>Create alternatives to entertaining screen time during free time.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Limit TV time to 1 hour per child per day.</td>
<td></td>
</tr>
<tr>
<td>Role Modeling</td>
<td>Participate with your children at sports practices each week.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manage family free time without excess screen time (sharing responsibility of this with children).</td>
<td></td>
</tr>
</tbody>
</table>
What we’ve learned so far ....

- **Families engage, 11.7K earn rebate in 2008 – many add own goals**
  
  “Kids write what fruits and veggies they want”  
  “No parents’ TV or computer between 6 & 9 PM”  
  “Start with smaller portions and have kids ask for seconds”  
  “Both parents in the pool during children’s swim lessons”  
  “Adults watch portion sizes on desserts”

- **Families change behavior, some change is harder than others**

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Beginning of Program</th>
<th>End of program (12 weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children eat healthy breakfast 5+days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children eat healthy dinner 5+days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family eats/prepares healthy meals 5+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children get physical activity 5+days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family is physically active 3+days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children have &lt;1hr entertainment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults have &lt;1hr entertainment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children eat only healthy snacks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children eat 5+ fruits/veggies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Families value program, IBM**

Source: IBM, 2008 Children’s Health Rebate Earners
Personalized Medicine

Use of genetic and non-genetic molecular information to individualize prevention, diagnosis, treatment and prognosis for each person with greater precision.

The paradigm of personalized medicine, PMC
personalizedmedicinecoalition.org
THE DNA AGE
Fear of Insurance Trouble Leads Many to Shun or Hide DNA Tests

Katherine Anderson, seen in a checkup last week, developed a blood clot last year partly due to an undiagnosed genetic condition.

By AMY HARMON
Published: February 24, 2008
Warfarin

- >600,000 new patients starts/yr. (/2M total ); >31M scripts/yr to >60M proj. by 2015
- Narrow therapeutic window, wide inter-individual variability, dosing empiric, INR ratio without significant impact on reduction major bleeding
- #1 cause of adverse drug event related death & hospitalizations, #2 ER visits US
- Major hemorrhage: 3-16%; minor hemorrhage 25-27%
- Robust evidence base for genetic polymorphisms impact on pharmacodynamics
Warfarin Gene Guided Rx

- Free Allelic Testing VKORC1, CYP2C9
- New to Warfarin Users Only
- PBM & Lab Project
- Patient & Physician Decide
- Strong Privacy Protections
- Fall 2007-March 2008
  - >3700 eligible
  - 786 Patient-MD Accepts
  - 430 Results Completed
    - Normal Response 28%
    - Diminished Response 28%
    - Heightened Response 44%

CYP2C9

Inactivates S-Warfarin Isomer

VKORC1

Activates Vit. K Essential for Clotting
- **Infected worldwide**: 2 Billion
- **Chronically infected**:
  - Worldwide: 350-400 Million (v. 33M HIV)
  - Worldwide: 1 in 10 Asians (10% Asian Americans)
  - 2 of 3 not aware
- **Transmission mother to child**: 40-50% of the cases in Asia
- **HBV mortality**:
  - Deaths per year: 500K to 1.2M
  - Liver cancer deaths per year: 300-400K of all HBV deaths
  - China: HBV deaths = deaths from TB/HIV AIDS/Malaria combined
- **Vaccine available for over 25 years; first “Anti-Cancer” vaccine**
Hepatitis B Infection A Workplace Issue China

- 2007 CFHPV Internet Survey 10,352 HBV
  - 69% M.I. employment discrimination HBV/HIV

- 2007 Survey 10 Cities China, 3,500 surveyed
  - 49% unwilling to have chronic HBV co-worker
  - 55% would not hire them

- 2008 CFHPC 96 Global Corporations in China
  - 34% US, 24% European, 21% Japanese
  - Only 5 companies did NOT test for HBV

www.cfhpc.org

84 % HBV Testing
44% Reject HBV+
Understanding brings hope, Education helps life!

- IBM late 1990’s
  - Late 1990’s eliminated HBV in hiring process China, Asia
  - Instituted education and training
  - Created HBV vaccination program
  - Health exams:
    - voluntary: serologic testing, liver function
    - ultrasound as indicated
    - Beijing IBM pop’n 2005 to 2009 69% anti-HBsAb-/anti-HBc- to 15.6%

- Hep B virus carriers can work happily in a company
  Интервью с IBM Физицистом Др. Тонг Чен из IBM China
Hepatitis and Liver Cancer

A National Strategy for Prevention and Control of Hepatitis B and C
## Lack of awareness and associated deaths U.S.

<table>
<thead>
<tr>
<th>Virus</th>
<th>Prevalence</th>
<th>% of Population Unaware of Infection Status</th>
<th>Deaths in 2006 Related to Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBV</td>
<td>800,000 – 1.4 million</td>
<td>About 65%</td>
<td>3,000</td>
</tr>
<tr>
<td>HCV</td>
<td>2.7 – 3.9 million</td>
<td>About 75%</td>
<td>12,000</td>
</tr>
<tr>
<td>HIV</td>
<td>1.1 million</td>
<td>About 21%</td>
<td>14,016</td>
</tr>
</tbody>
</table>

- Over 150,000 deaths due to hepatitis B and hepatitis C are projected to occur in next 10 years

Sources: CDC; Lin et al., 2007; Hagan et al., 2006
Lack of Public Resource Allocation

Domestic HIV 69%
STD 15%
Hepatitis 2%

$1 Billion Total

National Center for HIV/AIDS, Viral Hepatitis, Sexually Transmitted Disease, and Tuberculosis Prevention Funding

Source: CDC
The Consequences

- Morbidity and Mortality related to hepatitis B and hepatitis C

Lack of Public Awareness

Lack of Public Resource Allocation

- At-risk people do not know how to prevent becoming infected
- At-risk people may not have access to preventive services
- Chronically infected people do not know that they are infected
- Providers do not screen people
- Providers do not know how to manage infected patients
- Inadequate access to testing and medical management
- Inadequate disease-surveillance systems
The Recommendations

- Morbidity and Mortality related to hepatitis B and hepatitis C

Lack of Public Awareness  Lack of Provider Awareness

Lack of Public Resource Allocation

The Consequences

Improved Disease Surveillance  Improved Provider and Community Education  Integration and Enhancement of Viral Hepatitis Services
President Obama and IBM CEO Conversation

There is little benefit in merely converting individual doctor’s offices from paper to computer… more important is the effect that IT investment will have on the care provided to individual patients.

With electronic records, primary care doctors will have the knowledge that they need about each patient to make treatment most effective and to coordinate care with specialists, hospitals and the patients themselves.

By focusing on primary care, we can move U.S. health care toward a system that promotes wellness and prevention.

- January 29, 2009
Power of Physician-Employer Partnership

- **2006**
  - October Employer-ACP/AAFP Meeting D.C.
  - Nov 2006 Medicare Auth Act MH demo projects

- **2007**
  - February Joint Principles PCMH
  - February First PCPCC Summit D.C.
  - Pilots launched
  - Principles endorsement: 19 medical societies, NMSA, AAMC, AMSA
  - May 350 of Fortune 500 Educated

- **2008**
  - 307 organization members
  - 4 Centers for Collaboration & Action
  - June: 108 bills 26 legislatures MH; 20 bills MH demos

- **2010**
  - >600 organization members
PCPCC 2010 >600 Organization Members

- Center to Promote Public Payer Implementation
- Center for Multi-Stakeholder Demonstration
- Center for Health Benefit Redesign and Implementation
- Center for eHealth Information Adoption and Exchange

The Patient-Centered Primary Care Collaborative is comprised of broad stakeholder support and participation.

Providers
- Primary care associations (333,000 physicians)
- Associations representing integrated delivery networks, academic medical centers, community hospitals (4,000)

Suppliers
- Pharmaceutical and medical device companies
- Solution providers

Purchasers
- Most Fortune 500 companies
- Many small and medium businesses via local business coalitions
- National Business Coalition on Health
- National Business Group on Health
- The ERISA Industry Committee
- HR Policy Association

Consumer advocates
- Unions
- Special interest groups

Health plans
- Health plans including Aetna, BlueCross BlueShield Association, The Capital District Physicians’ Health Plan, CIGNA, Healthcare Services Corporation, Humana, Medco, Priority Health, Taconic IPA, UnitedHealthcare, WellPoint

Source: Patient-Centered Primary Care Collaborative.

www.pcpcc.net
IBM & UHC Medical Home Pilot Arizona 2008-2011

Expanded Patient-Centric Clinical Services and Capabilities

- **Enhanced Access**
  - Timely Appointment Scheduling
  - Evening, Weekend and Holiday Hours
  - After-Hours Support

- **Care Coordination and Chronic Condition Management**
  - Weekly identification of patients in transition or at risk
  - Specialty Referral Coordination and Tracking
  - Disease and Case Management Enrollment

- **Team Care**
  - Physician-directed team both in and outside of the practice setting
  - Management of Care Transitions across the Health Care Continuum

- **Performance Measurement, Assessment & Improvement**
  - Practice in accordance with clinical evidence
  - Performance Evaluation Based on Medical Best Practices
  - Measurement of Clinical Processes and Outcomes

- **Clinical Information Systems**
  - Care Management
  - Decision Support
  - Electronic Prescription Filling

**Benefits**

- More time for Patients
- Better Care Continuity
- Improved Care Transitions
- Improved Quality of Reporting
- More efficient care delivery
- Enhanced Patient Focus
- Improved Patient Safety
- Improved Practice Profitability and Satisfaction
- Simplified and Coordinated Health Care Experience

**Enabling Technology & Practice Support**

- **Technology & Tools**
  - Personal Health Record
  - Point of Care Information
  - Electronic Prescriptions
  - In-depth reporting

- **Care Coordination Management & Support**
  - Health plan care & disease management
  - Educational Materials
  - Patient Activation Tools

- **Transformation Support**
  - Assigned facilitator
  - Online tools
  - “Boots on the ground” resources

**PRACTICE QUALIFICATIONS (Based on NCQA PCC-PCMH Standards)**

Graphic courtesy United Health Care
Collaboration

Political Complexity

Population Health Value

“Health Impact Pyramid”

INCREASING

INCREASING

INCREASING

INCREASING

Coaching, Counseling, Education

Clinical Interventions

Long Lasting Protective Interventions

Changing Context

Default Decisions Healthy

Socio-environmental Determinants
relationships, institutions, physical environment, income

Culture, people, process and technology

After T. Friedman MD, CDC

© 2009 IBM Corporation
Smart Healthcare and Innovation

IBM the Employer, Workforce Health and the Healthcare Market

Almaden Institute 2010

M-J. Sepúlveda, MD FACP
IBM Fellow & Vice President