The Business Case for Investing in Employee Health and Productivity Management

Healthy Outcomes Conference 2008
Engaging Employees in the Promotion of their Health
Toronto, Canada – April 9-11, 2008

Ron Z. Goetzel, Ph.D.
Emory University and Thomson Healthcare
ron.goetzel@thomson.com

U.S. Business Concerns About Healthcare

- The United States spent $2.1 trillion in healthcare in 2006—$7,092 for every man, woman, and child.
- Employers pay over one-third of these costs.
- National health expenditure growth trends are expected to average about 7% per year through 2015.
- Health expenditures as percent of GDP:
  - 15.3 percent in 2003
  - 16.0 percent in 2006
  - 19.6 percent in 2016 (est)
  - 25.0 percent by 2030 (est)

Source: Poisal et al., Health Affairs, 21 February 2007
Annual Per Employee Costs for Active Employees

Includes all medical, dental, and other health benefits for all covered employees and dependents. Includes employer and employee contributions.

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost 1</th>
<th>Cost 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>$3,653</td>
<td>$3,703</td>
</tr>
<tr>
<td>1996</td>
<td>$3,594</td>
<td>$3,653</td>
</tr>
<tr>
<td>1997</td>
<td>$3,817</td>
<td>$3,817</td>
</tr>
<tr>
<td>1998</td>
<td>$4,097</td>
<td>$4,097</td>
</tr>
<tr>
<td>1999</td>
<td>$4,430</td>
<td>$4,430</td>
</tr>
<tr>
<td>2000</td>
<td>$5,646</td>
<td>$5,646</td>
</tr>
<tr>
<td>2001</td>
<td>$5,215</td>
<td>$5,215</td>
</tr>
<tr>
<td>2002</td>
<td>$5,079</td>
<td>$5,079</td>
</tr>
<tr>
<td>2003</td>
<td>$7,089</td>
<td>$7,089</td>
</tr>
<tr>
<td>2004</td>
<td>$7,523</td>
<td>$7,523</td>
</tr>
<tr>
<td>2005</td>
<td>$7,982</td>
<td>$7,982</td>
</tr>
<tr>
<td>2006</td>
<td>$7,982</td>
<td>$7,982</td>
</tr>
<tr>
<td>2007*</td>
<td>$7,982</td>
<td>$7,982</td>
</tr>
</tbody>
</table>

* Projected

Other business forces

- The new employee is a knowledge worker
- Productivity is at an all time high – holding steady after years of impressive gains
- But, $260B is spent each year in the U.S. on health-related productivity losses

What else is going on:

- Outsourcing, downsizing, layoffs, reductions in force
- Mergers, acquisitions, consolidations
- Global competition
- Pressure for innovation, adaptation, reengineering
- Increased reliance on technology
- Information overload

A renewed emphasis on increasing worker productivity

- Introduce new technology
- Get workers to work more hours
- Make sure workers show up for work
- Make sure workers are mentally at work (presenteeism)
- Increase motivation to achieve at peak performance
The fallout from a push for higher productivity

- Increased job demands
- Detachment and depersonalization
- Increased health care usage
- Increased absenteeism
- Low job morale
- Increased disability rates
- On the job accidents
- Work-life imbalance
- High stress

Increased Health and Productivity Risks

**Medical**
- Chest/back pain, heart disease, GI disorders, headaches, dizziness, weakness, repetitive motion injuries

**Psychological**
- Anxiety, aggression, irritability, apathy, boredom, depression, loneliness, fatigue, moodiness, insomnia

**Behavioral**
- Accidents, drug/alcohol abuse, eating disorders, smoking, tardiness, "exaggerated" diseases

**Organizational**
- Absence, work relations, turnover, morale, job satisfaction, productivity
What To Do?

- Manage disease
- Manage disability and absence
- Manage health and demand
- Manage stress
- Strengthen employee assistance programs
- Re-engineer
- Reorganize
- Create incentives
- Cut pharmacy benefits

What To Do – National Business Group On Health

Ten Steps to Easing Health Care Costs

1. Use coinsurance and point-of-care cost sharing
2. Provide members tools & information to become better consumers
3. Aggressively manage prescription drug use
4. Offer high deductible plan
5. Promote health improvement programs
6. Consolidate plans and audit providers – re-bid contracts
7. Manage utilization
8. Insist on transparency – buy on performance
9. Audit eligibility
10. Carefully analyze Medicare Part D options
Convince me…

Why should a business invest in the health and well-being of its workers?

It seems so logical…

…if you improve the health and well being of your employees…
  …quality of life improves
    …health care utilization is reduced
      …disability is controlled
        …productivity is enhanced
The Logic Flow:

- A large proportion of diseases and disorders from which people suffer is preventable;
- Modifiable health risk factors are precursors to many diseases and disorders, and premature death;
- Many modifiable health risks are associated with increased health care costs and diminished productivity within a relatively short time window;
- Modifiable health risks can be improved through effective health promotion and disease prevention programs;
- Improvements in the health risk profile of a population can lead to reductions in health costs and improvements in productivity;
- Well-designed and well-implemented programs can be cost/beneficial – they can save more money than they cost, thus producing a positive return on investment (ROI).

The Evidence

- Modifiable health risks can be improved through workplace sponsored health promotion and disease prevention programs (Wilson et al., 1996, Heaney & Goetzel, 1997, Pelletier, 1999).
- Improvements in the health risk profile of a population can lead to reductions in health costs (Edington et al., 2001, Goetzel et al., 1999).
Table 1
Source: Mokdad et al., JAMA, 291:10, March, 2004

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>No. of Deaths</th>
<th>Pct.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart disease</td>
<td>710,760</td>
<td>30%</td>
</tr>
<tr>
<td>Malignant neoplasm</td>
<td>553,091</td>
<td>23%</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>167,661</td>
<td>7%</td>
</tr>
<tr>
<td>Chronic lower respiratory tract disease</td>
<td>122,009</td>
<td>5%</td>
</tr>
<tr>
<td>Unintentional injuries</td>
<td>97,900</td>
<td>4%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>69,301</td>
<td>3%</td>
</tr>
<tr>
<td>Influenza/pneumonia</td>
<td>65,313</td>
<td>3%</td>
</tr>
<tr>
<td>Alzheimers</td>
<td>49,558</td>
<td>2%</td>
</tr>
<tr>
<td>Nephritis</td>
<td>37,251</td>
<td>2%</td>
</tr>
<tr>
<td>Septicemia</td>
<td>31,224</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>499,283</td>
<td>21%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,403,351</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Risk factors for 10 leading causes of death in the United States

<table>
<thead>
<tr>
<th>Causes of Death</th>
<th>Risk factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Disease</td>
<td>smoking, hypertension, hypercholesterolemia, lack of exercise, diabetes mellitus, obesity, stress</td>
</tr>
<tr>
<td>Cancer</td>
<td>smoking, alcohol, diet, environmental carcinogens, obesity</td>
</tr>
<tr>
<td>Stroke</td>
<td>hypertension</td>
</tr>
<tr>
<td>Accidents</td>
<td>alcohol, failure to use seatbelts</td>
</tr>
<tr>
<td>Chronic obstructed lung disease</td>
<td>smoking</td>
</tr>
<tr>
<td>Pneumonia and influenza</td>
<td>smoking, alcohol</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>obesity</td>
</tr>
<tr>
<td>Suicide</td>
<td>stress, alcohol, drug use</td>
</tr>
<tr>
<td>Cirrhosis</td>
<td>alcohol</td>
</tr>
<tr>
<td>Atherosclerosis</td>
<td>smoking, hypercholesterolemia</td>
</tr>
</tbody>
</table>

(Jemal et al, JAMA, 2005;294:1255-1259)

- Overall death rates have declined from:
  - 1242/100,000 in 1970 to 845/100,000 in 2002
- Big declines in:
  - Stroke
  - Heart disease
  - Accidents
- But, big increases in:
  - COPD
  - Diabetes

Source: Mokdad et al., 2004
Diseases Caused (at Least Partially) by Lifestyle

- **Alcohol Use**: Liver Damage, Alcohol Psychosis, Pancreatitis, Hypertension, Cerebrovascular Disease, and Cancers (Breast, Esophagus, Larynx, Liver)
- **Stress, Anxiety, Depression**: Coronary Artery Disease, Hypertension
- **Obesity**: Choleystitis/Cholelithiasis, Coronary Artery Disease, Diabetes, Hypertension, Lipid Metabolism Disorders, Osteoarthritis, Sleep Apnea, Venous Embolism/Thrombosis, and Cancers (Breast, Cervix, Colorectal, Gallbladder, Biliary Tract, Ovary, Prostate)
- **Lack of Exercise**: Coronary Artery Disease, Diabetes (non-insulin dependant), Hypertension, Obesity, and Osteoporosis
- **Poor Nutrition**: Cerebrovascular Disease, Constipation, Coronary Artery Disease, Diabetes, Diverticular Disease, Hypertension, Oral Disease, Osteoporosis, and Cancers (Breast, Colorectal, Prostate)
- **Tobacco Use**: Cerebrovascular Disease, Coronary Artery Disease, Osteoporosis, Peripheral Vascular Disease, Asthma, Acute Bronchitis, COPD, Pneumonia, and Cancers (Bladder, Kidney, Urinary, Larynx, Lip, Oral Cavity, Pharynx, Pancreas, Trachea, Bronchus, Lung)
- **Uncontrolled Hypertension**: Coronary Artery Disease, Cerebrovascular Disease, and Peripheral Vascular Disease
- **Uncontrolled Lipids**: Coronary Artery Disease, Lipid Metabolism Disorders, Pancreatitis, and Peripheral Vascular Disease

Poor Health Costs Money

**Drill down...**

- Medical
- Absence/work loss
- Presenteeism
- Risk factors
**Top 10 Physical Health Conditions**

Medical, Drug, Absence, STD Expenditures (1999 annual $ per eligible), by Component

- Angina Pectoris, Chronic Maintenance
- Essential Hypertension, Chronic Maintenance
- Diabetes Mellitus, Chronic Maintenance
- Acute Myocardial Infarction
- Chronic Obstructive Pulmonary Dis.
- Trauma to Spine & Spinal Cord
- Mechanical Low Back Dis.
- Back Dis. Not Specified as Low Back
- Sinusitis
- Dis. of ENT or Mastoid Process NEC

$ per eligible employee


---

**The Big Picture: Overall Burden of Illness by Condition**

Using Average Impairment and Prevalence Rates for Presenteeism ($23.15/hour wage estimate)

Incremental Impact of Ten Modifiable Risk Factors on Medical Expenditures

Percent Difference in Medical Expenditures: High-Risk versus Lower-Risk Employees


Population Risk and Cost Impact

Per Capita Cost of High-Risk Status

- High stress generates annual per capita cost of $136 (1996 dollars)
- $428 per capita for assessed areas
- 24.9% of health care costs

Quiz:
How many Americans lead healthy lifestyles?

1. Non-smokers
2. Healthy weight (BMI of 18.5-25.0)
3. Consume 5+ fruits/vegetable per day
4. Exercise regularly (30 min – 5 days/week)

Bottom Line: practice healthy lifestyle across all four categories

Health and Risk Reduction Outcomes of Multi-Component Worksite Health Promotion Programs – Literature Review

Purpose: Critically review evaluation studies of multi-component worksite health promotion programs.

Methods: Comprehensive review of 47 CDC and author generated studies covering the period of 1978-1996.

Findings:
- Programs vary tremendously in comprehensiveness, intensity & duration.
- Providing opportunities for individualized risk reduction counseling, within the context of comprehensive programming, may be the critical component of effective programs.

Evaluation of Worksite Health Promotion Programs -- February 2007 Analysis

Worksite Health Promotion Team
Robin Soler, PhD
David Hopkins, MD, MPH
Sima Razi, MPH
Kimberly Leeks, PhD, MPH
Matt Griffith, MPH

Summary Results and Team Consensus

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Body of Evidence</th>
<th>Consistent Results</th>
<th>Magnitude of Effect</th>
<th>Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Use</td>
<td>7</td>
<td>Yes</td>
<td>Variable</td>
<td>Sufficient</td>
</tr>
<tr>
<td>Fruits &amp; Vegetables</td>
<td>7 11</td>
<td>No</td>
<td>0.16 serving +8%</td>
<td>Insufficient</td>
</tr>
<tr>
<td>% Fat Intake</td>
<td>17</td>
<td>Yes</td>
<td>+12.7%</td>
<td>Sufficient</td>
</tr>
<tr>
<td>% Change in Those Physically Active</td>
<td>22 23 (9)</td>
<td>Yes</td>
<td>−2.2 pct pt 3.5 pct pt</td>
<td>Strong</td>
</tr>
<tr>
<td>Tobacco Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prevalence Cessation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seat Belt Non-Use</td>
<td>10</td>
<td>Yes</td>
<td>−35.4%</td>
<td>Sufficient</td>
</tr>
</tbody>
</table>
### Summary Results and Team Consensus

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Body of Evidence</th>
<th>Consistent Results</th>
<th>Magnitude of Effect</th>
<th>Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diastolic blood pressure</td>
<td>16</td>
<td>Yes</td>
<td>Diastolic: -1.9 mm Hg</td>
<td>Strong</td>
</tr>
<tr>
<td>Systolic blood pressure</td>
<td>18</td>
<td>Yes</td>
<td>Systolic: -3.0 mm Hg</td>
<td>Strong</td>
</tr>
<tr>
<td>Risk prevalence</td>
<td>11</td>
<td>Yes</td>
<td>-3.4 ppt pt</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>6</td>
<td>Yes</td>
<td>-0.5 pt BMI</td>
<td>Insufficient</td>
</tr>
<tr>
<td>Weight</td>
<td>12</td>
<td>No</td>
<td>-0.56 pounds</td>
<td></td>
</tr>
<tr>
<td>% body fat</td>
<td>4</td>
<td>Yes</td>
<td>-2.2% body fat</td>
<td></td>
</tr>
<tr>
<td>Risk prevalence</td>
<td>5</td>
<td>No</td>
<td>-2.2% at risk</td>
<td></td>
</tr>
<tr>
<td>Total Cholesterol</td>
<td>18</td>
<td>Yes</td>
<td>-5.0 mg/dL (total)</td>
<td>Strong</td>
</tr>
<tr>
<td>HDL Cholesterol</td>
<td>7</td>
<td>No</td>
<td>+1.1 mg/dL</td>
<td></td>
</tr>
<tr>
<td>Risk prevalence</td>
<td>11</td>
<td>Yes</td>
<td>-6.6 ppt pt</td>
<td></td>
</tr>
<tr>
<td>Fitness</td>
<td>5</td>
<td>Yes</td>
<td>Small</td>
<td>Insufficient</td>
</tr>
</tbody>
</table>

### Summary Results and Team Consensus

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Body of Evidence</th>
<th>Consistent Results</th>
<th>Magnitude of Effect</th>
<th>Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Risk</td>
<td>15</td>
<td>Yes</td>
<td>Moderate</td>
<td>Sufficient</td>
</tr>
<tr>
<td>Healthcare Use</td>
<td>6</td>
<td>Yes</td>
<td>Moderate</td>
<td>Sufficient</td>
</tr>
<tr>
<td>Worker Productivity</td>
<td>10</td>
<td>Yes</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
</tbody>
</table>
**Cost-Benefit Primer**

- Return on Investment (ROI) is a financial measure.
  - Can be estimated **prospectively** or **retrospectively**
- What is ROI?
  - How much you (expect to) save, compared to how much you (expect to) spend or (have) spent
  - Expressed as a ratio (e.g., 2:1)
  - ROI and savings are not the same:
    - Savings reflect differences in $ with vs. without the intervention
    - ROI = Savings / program costs, in today’s dollars
    - NPV = Savings minus program costs, in today’s dollars
- ROI can be low but savings can be high
Prospective ROI – The Dow Chemical Company


Basic Framework for Prospective ROI Calculation

- Employee Demographic Characteristics
- Prevalence of Risk Factors
- Medical and Related Expenditures
- ROI Effects
- Program Investments
Dow Econometric Forecasting Model:

Modeling different risk reduction scenarios – based on the organization’s ability to reduce employee health risks:

1. No program in place – demographics drive risk profile
2. Program lowers risk .1% per year (1% over ten years)
3. Program lowers risk 1% per year (10% over ten years)

Methods

Step 1: Estimate Dow’s Demographic Profile: 2001 - 2011

• Start with Dow’s demographics for 2001:

  ⇒ Population: 25,828 employees*
  ⇒ Mean Age: 43
  ⇒ Male: 75%
  ⇒ White: 82%
  ⇒ Professional/Managerial: 44%

• Project 2002 – 2011
Methods

Step 2: Estimate the Risk Profile of Dow Employees: 2001 – 2011

Summary of Adjusted Probabilities of Being at High Risk Over Time

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor Exercise Habits</td>
<td>23%</td>
<td>24%</td>
<td>25%</td>
<td>26%</td>
<td>27%</td>
<td>28%</td>
</tr>
<tr>
<td>Poor Eating Habits</td>
<td>20%</td>
<td>17%</td>
<td>16%</td>
<td>15%</td>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>Obesity</td>
<td>40%</td>
<td>41%</td>
<td>42%</td>
<td>43%</td>
<td>44%</td>
<td>45%</td>
</tr>
<tr>
<td>Current Smoker</td>
<td>15%</td>
<td>18%</td>
<td>18%</td>
<td>18%</td>
<td>18%</td>
<td>18%</td>
</tr>
<tr>
<td>Former Smoker</td>
<td>31%</td>
<td>31%</td>
<td>31%</td>
<td>31%</td>
<td>31%</td>
<td>31%</td>
</tr>
<tr>
<td>High Cholesterol</td>
<td>14%</td>
<td>15%</td>
<td>17%</td>
<td>18%</td>
<td>20%</td>
<td>21%</td>
</tr>
<tr>
<td>High Blood Glucose</td>
<td>7%</td>
<td>8%</td>
<td>9%</td>
<td>11%</td>
<td>12%</td>
<td>14%</td>
</tr>
<tr>
<td>High Blood Pressure</td>
<td>2%</td>
<td>2%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>High Stress</td>
<td>7%</td>
<td>7%</td>
<td>7%</td>
<td>7%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Depression</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Heavy Alcohol Use</td>
<td>4%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>2%</td>
</tr>
</tbody>
</table>


Dow Chemical
Projected Health Care Costs for 2001 - 2011 (inflation-adjusted)
### Methods


Comparison of 1% and .1% Annual Reductions in Risk vs. Reference Group, 2001 - 2011 (Inflation-Adjusted)

<table>
<thead>
<tr>
<th>Year</th>
<th>Ref Gp</th>
<th>1% Reduction</th>
<th>.1% Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$0</td>
<td>$0.76</td>
<td>$1.00</td>
</tr>
<tr>
<td>2</td>
<td>$17,094,174.26</td>
<td>$14,324,879.51</td>
<td>$13,434,028.14</td>
</tr>
<tr>
<td>3</td>
<td>$15,426,671.88</td>
<td>$11,705,745.61</td>
<td>$988,059,428.40</td>
</tr>
<tr>
<td>4</td>
<td>$15,426,671.88</td>
<td>$15,426,671.88</td>
<td>$556,469,544.50</td>
</tr>
<tr>
<td>5</td>
<td>$15,426,671.88</td>
<td>$15,426,671.88</td>
<td>$598,059,428.40</td>
</tr>
<tr>
<td>6</td>
<td>$15,426,671.88</td>
<td>$15,426,671.88</td>
<td>$598,059,428.40</td>
</tr>
<tr>
<td>7</td>
<td>$15,426,671.88</td>
<td>$15,426,671.88</td>
<td>$598,059,428.40</td>
</tr>
<tr>
<td>8</td>
<td>$15,426,671.88</td>
<td>$15,426,671.88</td>
<td>$598,059,428.40</td>
</tr>
<tr>
<td>9</td>
<td>$15,426,671.88</td>
<td>$15,426,671.88</td>
<td>$598,059,428.40</td>
</tr>
<tr>
<td>10</td>
<td>$15,426,671.88</td>
<td>$15,426,671.88</td>
<td>$598,059,428.40</td>
</tr>
</tbody>
</table>

### Results Obtained from Dow Application

<table>
<thead>
<tr>
<th>Year</th>
<th>Reference Case: Total Expenditures with demographics and risk shifting as forecasted</th>
<th>Scenario 2: Total Expenditures with 10% decrease in risk over 10 years (1% per year) and demographics change as forecasted</th>
<th>Scenario 3: Total Expenditures with 1% decrease in risk over 10 years (0.1% per year) and demographic s change as forecasted</th>
<th>Scenario 4: Break-Even (Reduce Risks by 0.17% per Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>$17,094,174.26</td>
<td>$14,324,879.51</td>
<td>$13,434,028.14</td>
<td>$15,426,727.88</td>
</tr>
<tr>
<td>2011</td>
<td>$15,426,671.88</td>
<td>$15,426,671.88</td>
<td>$598,059,428.40</td>
<td>$598,059,428.40</td>
</tr>
</tbody>
</table>

Increase in Expenditures From 2001 - 2011: $13,434,028.14

Percent change between first and last years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Increase in Expenditures</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>$17,094,174.26</td>
<td>35.48</td>
</tr>
<tr>
<td>2011</td>
<td>$15,426,671.88</td>
<td>27.88</td>
</tr>
</tbody>
</table>

Sum of Total Expend.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>$17,094,174.26</td>
</tr>
<tr>
<td>2011</td>
<td>$15,426,671.88</td>
</tr>
</tbody>
</table>

Potential Benefits of Risk Management (with a 3% discount rate):

<table>
<thead>
<tr>
<th>Year</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>$49,512,590.66</td>
</tr>
<tr>
<td>2011</td>
<td>$11,705,745.61</td>
</tr>
</tbody>
</table>

Dow Investment (also with a 3% discount rate):

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>$15,426,671.88</td>
</tr>
<tr>
<td>2011</td>
<td>$15,426,671.88</td>
</tr>
</tbody>
</table>

Return on Investment:

<table>
<thead>
<tr>
<th>Year</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>$3.21</td>
</tr>
<tr>
<td>2011</td>
<td>$0.76</td>
</tr>
<tr>
<td>2012</td>
<td>$1.00</td>
</tr>
</tbody>
</table>

Return on Investment is calculated relative to scenario in which demographics and risk shift as according to pre-existing trends.

Dow Investment based on $70.02 per person per year for 10 years, all in 2001 Year Dollar Equivalents, then discounted by 3% per year to adjust for the changing value of money over time.
Other ROI Projections

- Motorola:
  - Break even achieved if the program reduces risk of employees by .67% to 1.15% per year, depending upon company’s investment.
- Union Pacific Railroad:
  - Break even achieved if the program reduces risk of employees by 0.49% per year

Sources:
Program Evaluation
What are the critical steps to success?

- Awareness
- Participation
- Increased knowledge
- Improved attitudes
- Behavior change
- Risk reduction
- Reduced utilization
- Financial Impact/ROI

Citibank, N.A.
Health Management Program Evaluation

- **Title:** Citibank Health Management Program (HMP)
- **Industry:** Banking/Finance
- **Target Population:** 47,838 active employees eligible for medical benefits
- **Description:**
  - A comprehensive multi-component health management program
  - Aims to help employees improve health behaviors, better manage chronic conditions, and reduce demand for unnecessary and inappropriate health services,
  - And, in turn, reduce prevalence of preventable diseases, show significant cost savings, and achieve a positive ROI.
- **Citations:**
Program Components

60% Low Risk
Timeline (months)
Letter/Report 1
Self-Care Materials

Questionnaire 1
(Program Entry and Counseling beginning January 1994)

3 months
High-Risk
Letter/Report 1

8 months
High-Risk
Questionnaire Letter/Report 2

9 months
High-Risk
Questionnaire Letter/Report 3

20% High Cost Risk

High-Risk
Letter/Report 2

Books, Audiotapes, Videotapes

High-Risk
Letter/Report 3

Books, Audiotapes, Videotapes

High-Risk
Letter/Report 4

Books, Audiotapes, Videotapes

Citibank High Risk Program Modules

- Arthritis
- Back pain
- Smoking
- Diabetes
- Obesity
- High BP
- Heart conditions and other chronic conditions
- Combinations of risky behaviors
**Program Participation**

- All 47,838 active employees were eligible to participate.
- The participation rate was 54.3 percent.
- Participants received a $10 credit toward Citibank’s Choices benefit plan enrollment for the following year.
- Approximately 3,000 employees participated in the high risk program each year it was offered.

---

**Citibank Results: Number and Percent of Program Participants at High Risk at First and Last HRA by Risk Category (N=9,234 employees tracked over an average of two years)**

Percentages represent the proportion of total participants for whom data are available, by category. * Statistically significant at the p<0.05 level (McNemar Chi-square).

**Citibank Results: Impact of Improvement in Risk Categories on Medical Expenditures per Month**

<table>
<thead>
<tr>
<th>Net Improvement*</th>
<th>Unadjusted Impact**</th>
<th>Adjusted Impact**</th>
</tr>
</thead>
<tbody>
<tr>
<td>at least 1 category versus others (N = 1,708)</td>
<td>-$1.86†</td>
<td>-$1.91</td>
</tr>
<tr>
<td>at least 2 categories versus others (N = 391)</td>
<td>-$5.34</td>
<td>-$3.06</td>
</tr>
<tr>
<td>at least 3 categories versus others (N = 62)</td>
<td>-$146.87†</td>
<td>-$145.77 ‡</td>
</tr>
</tbody>
</table>

*Net Improvement refers to the number of categories in which risk improved minus number of categories in which risk stayed the same or worsened.

**Impact = change in expenditures for net improvers minus change for others. Negative values imply program savings, since expenditures did not increase as much over time for those who improved, compared to all others

† p < 0.05, ‡ p < 0.01

---

**Citibank: Medical Savings-Adjusted Mean Net Payments**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>All Participants n=11,219</th>
<th>Non-Participants n=11,714</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-HRA</td>
<td>$170</td>
<td>$212</td>
</tr>
<tr>
<td>Post-HRA</td>
<td>$257</td>
<td>$212</td>
</tr>
</tbody>
</table>

Total savings associated with program participation for 11,219 participants over an average of 23 months post-HRA is $8,901,413*

* Based on $34.03 savings and 23.31054 months post-HRA for 11,219 participants
Citibank Health Management Program ROI

- Program costs = $1.9 million*
- Program benefits = $8.9 million*
- Program savings = $7.0 million*

**ROI = $4.7 in benefits for every $1 in costs**

Notes:
- 1996 dollars @ 0 percent discount
- Slightly lower ROI estimates after discounting by either 3% or 5% per year.
- Results very similar to RCT conducted of same Healthtrac program, by Fries, et al.

---

Johnson & Johnson

Health and Wellness Program Evaluation

- **Title:** J & J Health and Wellness Program (H & W)
- **Industry:** Healthcare
- **Target Population:** 43,000 U.S. based employees
- **Description:**
  - Comprehensive, multi-component worksite health promotion program
  - Evolved from LIVE FOR LIFE in 1979
- **Citations:**
Lifestyle Benefit Incentive

- All employees offered Health Profile
- Employees assessed to be at risk for smoking, blood pressure or cholesterol were invited to participate in a health management program
- Health care prices discounted by $500
- Employees not participating in Health Profile or follow-up health improvement program lose the $500 discount
- Result: 94% Participation Rate

Health & Wellness Program Impact on Employee Health Risks (N=4,586)

After an average of 2½ years, risks were reduced in eight categories but increased in four related categories: body weight, dietary fat consumption, risk for diabetes, and cigar use.
Johnson & Johnson (N=18,331 – Ozminkowski et al, 2002)
Health & Wellness Program Impact on Medical Costs
Annual Savings for Johnson & Johnson -- $8.6 - $8.8 Million

$224.66
$118.67
$70.89
$45.17
($10.87)

$225 Annual Medical Savings/Employee/Year since 1995

Inpatient Days
Mental Health Visits
Outpatient/Doctor Office Visits
ER Visits
OVERALL SAVINGS

Utilization Type

($50.00) $0.00 $50.00 $100.00 $150.00 $200.00 $250.00

INFORMATION SOLUTIONS

Copyright 2008 Thomson Medstat

Inflation-Adjusted, Discounted Health and Wellness Program
Cumulative Savings Per Employee Per Year, 1995 – 1999 -- Weighted by sample sizes that range from N = 8,927 – 18,331, depending upon years analyzed

IP days
MH visits
OP visits
ER visits

$500.00
$400.00
$300.00
$200.00
$100.00
$

$(100.00)

$-

Years Post Implementation

Copyright 2008 Thomson Medstat
Overall, the Health and Wellness Program resulted in **annual** savings of about $8.55 - $8.77 million for the company.

Procter & Gamble:
Total Annual Medical Costs For Participants and Non-Participants In Health Check (1990 - 1992) (N=8,334)

![Bar chart showing annual medical costs for participants and non-participants in Procter & Gamble's Health Check program from 1990 to 1992.](chart.png)

- **Adjusted for age and gender; Significant at p < .05**
- *In year 3 participant costs were 29% lower producing an ROI of 1.49 to 1.00*

The Impact of the Highmark Inc. Employee Wellness Programs on Four-Year Healthcare Costs

Barbara L. Naydeck, MPH, Janine Pearson, Ph.D., Ronald J. Ozminkowski, Ph.D., Brian Day, Ed.D., Ron Z. Goetzel, Ph.D.


Overview

• Objective. Determine the return on investment (ROI) for the Highmark Inc. (Highmark) employee wellness programs.

• Methods. Wellness programs implemented in 2002. Compared medical claims for participants and risk-matched non-participants for years 2001 through 2005. The difference between groups used to define savings.

• Results. Estimated healthcare expenses for program participants were $176 lower per year than for non-participants, resulting in an ROI of $1.65 for every program-cost dollar spent.
Setting – Highmark

- Approximately 12,000 workers
- Headquartered in Pittsburgh, with a major operating facility in Camp Hill, PA and other locations in Johnstown, Erie, and Williamsport, PA.
- Worksite Health Promotion Program (introduced in 2002)
  - health risk assessments (HRAs)
  - online programs in nutrition, weight management and stress management
  - tobacco cessation programs
  - on-site nutrition and stress classes
  - individual nutrition and tobacco cessation coaching
  - biometric screenings
  - six- to twelve-week campaigns to increase fitness participation and awareness of disease prevention strategies
  - state-of-the-art fitness centers (Pittsburgh and Camp Hill, PA)

Selection of Participants for Analysis

Highmark Employee Participants 2002-2005
N=9,666
- Claims Data Available N=8,813
- Completed an HRA in 2002, Not in Medicare N=4,084
- Participants In Study N=1,802

Highmark Employee Non-participants N=2,010
- Claims Data Available N=332,942
- Matched Non-Participants N = 1,802

Client Employee Non-participants N=330,932
- Post of Potential Non-Participants, Met All Study Criteria N=289,276

Participants In Study N=1,802
Characteristics used in matching subjects – aim is to show participants and non-participants are similar

<table>
<thead>
<tr>
<th>Overall Comparison</th>
<th>Calendar Year 2001</th>
<th>All Participants</th>
<th>Non-participants</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=1890</td>
<td>n=1890</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male, n (%)</td>
<td>484 (25.6)</td>
<td>484 (25.6)</td>
<td>0.98</td>
<td></td>
</tr>
<tr>
<td>Age, 2001 mean years</td>
<td>41.7</td>
<td>41.6</td>
<td>0.94</td>
<td></td>
</tr>
<tr>
<td>Net payments for healthcare expenditures in 2001, mean</td>
<td>$1,414</td>
<td>$1,318</td>
<td>0.94</td>
<td></td>
</tr>
<tr>
<td>Comorbidity Prevalence, %:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart disease, n(%)</td>
<td>183 (9.7)</td>
<td>184 (9.7)</td>
<td>0.99</td>
<td></td>
</tr>
<tr>
<td>Diabetes, n(%)</td>
<td>13 (0.7)</td>
<td>13 (0.7)</td>
<td>0.99</td>
<td></td>
</tr>
<tr>
<td>CCI Group 1 comorbidity, n(%)</td>
<td>849 (44.9)</td>
<td>849 (44.9)</td>
<td>0.98</td>
<td></td>
</tr>
<tr>
<td>CCI Group 2 comorbidity, n(%)</td>
<td>528 (27.9)</td>
<td>528 (27.9)</td>
<td>0.98</td>
<td></td>
</tr>
<tr>
<td>CCI, median (range)</td>
<td>1.75 (0-17)</td>
<td>1.75 (0-18)</td>
<td>0.97</td>
<td></td>
</tr>
</tbody>
</table>

CCI = Charlson comorbidity index; Group 1 comorbidity includes presence of any of these: chronic obstructive pulmonary disease, rheumatologic disease stomach ulcer or dementia, all as coded by using the Charlson index; Group 2 comorbidity includes presence of any of these: cancer, renal failure, liver disease or cirrhosis, autoimmune disease.

Annual growth in net payments – for matched-participants and non-participants over four years – resulting in crude savings of ~$200/employee/year
Estimated annual savings after four years of follow-up -- participants versus non-participants – adjusted for confounders

<table>
<thead>
<tr>
<th>Payments</th>
<th>β Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-964.51†</td>
</tr>
<tr>
<td>All participants, n=1892</td>
<td>-176.47*</td>
</tr>
<tr>
<td>Male gender</td>
<td>467.09‡</td>
</tr>
<tr>
<td>Age, per year</td>
<td>46.05‡</td>
</tr>
<tr>
<td>Heart disease at baseline</td>
<td>576.59‡</td>
</tr>
<tr>
<td>Diabetes at baseline</td>
<td>1704.01‡</td>
</tr>
<tr>
<td>Group 1 comorbidity</td>
<td>1133.20‡</td>
</tr>
<tr>
<td>Group 2 comorbidity</td>
<td>397.80‡</td>
</tr>
</tbody>
</table>

4-year savings estimate from participation (β*n) $333,881

Per person estimate 176.47

Cost-Benefit (ROI) Analysis

<table>
<thead>
<tr>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>GD Total</th>
</tr>
</thead>
<tbody>
<tr>
<td># Used</td>
<td>Total</td>
<td># Used</td>
<td>Total</td>
<td># Used</td>
</tr>
<tr>
<td>HRA &amp; Incentive</td>
<td>1892</td>
<td>$243,731</td>
<td>1303</td>
<td>$143,111</td>
</tr>
<tr>
<td>Online</td>
<td>201</td>
<td>$1,142</td>
<td>247</td>
<td>$1,372</td>
</tr>
<tr>
<td>Group</td>
<td>34</td>
<td>$1,544</td>
<td>56</td>
<td>$3,077</td>
</tr>
<tr>
<td>Nutrition Coaching</td>
<td>2</td>
<td>$66</td>
<td>23</td>
<td>$740</td>
</tr>
<tr>
<td>10,000 Steps</td>
<td>244</td>
<td>$2,441</td>
<td>413</td>
<td>$3,851</td>
</tr>
<tr>
<td>Fitness Center</td>
<td>407</td>
<td>$25,603</td>
<td>495</td>
<td>$29,939</td>
</tr>
<tr>
<td>Highmark Challenge</td>
<td>112</td>
<td>$348</td>
<td>910</td>
<td>$2,766</td>
</tr>
<tr>
<td>Maintain Don’t Gain Newsletter</td>
<td>85</td>
<td>$182</td>
<td>93</td>
<td>$192</td>
</tr>
<tr>
<td>Wellness Program Costs</td>
<td>$246,483</td>
<td>$176,343</td>
<td>$181,000</td>
<td>$204,577</td>
</tr>
<tr>
<td>Cost per participant</td>
<td>$130.28</td>
<td>$135.34</td>
<td>$138.38</td>
<td>$150.98</td>
</tr>
<tr>
<td>Estimated Annual Savings from Model $176.47/person</td>
<td>$333,881</td>
<td>$333,881</td>
<td>$333,881</td>
<td>$1,335,524</td>
</tr>
<tr>
<td>Net Savings (Estimated Savings - Wellness Program Costs)</td>
<td>$87,398</td>
<td>$157,538</td>
<td>$152,881</td>
<td>$129,304</td>
</tr>
</tbody>
</table>

Total Savings Estimated 4 Ye $1,335,524
Total Costs 4 Years $808,403
Return on Investment $1.85

Wellness Program Costs, Highmark, inflation-adjusted to 2005 dollars
Health Promotion Program Studies

- ROI studies of health management programs at:
  - Canada and North American Life
  - Chevron Corporation
  - City of Mesa, Arizona
  - General Mills
  - General Motors
  - Johnson & Johnson
  - Pacific Bell
  - Procter and Gamble
  - Tenneco

- ROI estimates in these nine studies ranged from $1.40 - $4.90 in savings per dollar spent on these programs.

- Median ROI was $3 in benefits per dollar spent on program.

- Sample sizes ranged from 500 - 50,000 subjects in these studies.

Source: Goetzel, Juday, Ozminkowski. AWHP’s Worksite Health, Summer 1999, pp. 12-21
Focus: Peer reviewed journals (English Language) – 196 studies pared down to 72 studies meeting inclusion criteria for review

Scoring Criteria:
- A (experimental design)
- B (quasi-experimental – well controlled)
- C (pre-experimental, well-designed, cohort, case-controlled)
- D (trend, correlational, regression designs)
- E (expert opinion, descriptive studies, case studies)

Health promotion program impact on health care costs:
- 32 evaluation studies examined – Grades: A (4), B (11), other (17)
- Average duration of intervention: 3.25 years
- Positive impact: 28 studies
- No impact: 4 studies (none with randomized designs)
- Average ROI: 3.48 to 1.00 (7 studies)


• Analysis includes a review of 56 peer reviewed studies
• Study methods are scored using 10 criteria
• Median year of publication – 1994
• Number of combined subjects in all studies – 483,232
• Average study duration- 3.66 years
• Primary outcomes examined: health care utilization/cost (28 studies) and absenteeism (25 studies)
• Results:
  – Average reduction in health care costs – 26%
  – Average reduction in absenteeism – 27%
  – Average ROI – 5.81 : 1.00 (22 studies)
Identifying “Best Practices” in Health and Productivity Management: What Works?


Summary:
Health Promotion Programs -- What Works? (1)

**Leadership Commitment**

- Leading by example – with buy-in by middle managers
- “Healthy company” norm/culture
- Explicit connection to the core principles of the organization
- Employee-driven advisory board
- Specific program goals and objectives – with realistic expectations
- Alignment of organizational, HR and health promotion policies/practices
- Sustainability – future orientation
Health Promotion Programs -- What Works? (2)

**Incentives**

- Incentives to participate (not change biometrics)
- Accountability at all levels – linked to rewards
- Effective marketing and communication (multi-channel)

Health Promotion Programs -- What Works? (3)

**Effective Screening and Triage**

- Casting a wide net to identify the highest risk individuals
- Providing “public health” interventions to keep people at low risk
- Triaging individuals into programs that produce greatest impact/payoff
- Protecting confidentiality
- Coordinating with providers and community resources
Health Promotion Programs -- What Works? (4)

State-of-the-Art Intervention Programs

- Theory and evidence-based (e.g., Bandura, Prochaska, Lorig, Strecher, Glasgow)
- Tailored and individualized interventions
- Balancing high touch with high tech
- Environmental/ecological interventions
- Effective, reliable, valid tools

Health Promotion Programs -- What Works? (5)

Effective Implementation

- Integrate programs – insure vendor (stakeholder) engagement
- Accessible/attractive programs
- Start simple – pilot – grow on success
- Multi-component -- variety of topics and engagement modalities
- Integrate staff into the fabric of the organization
- Spend the right amount of money to achieve a desired ROI
Health Promotion Programs -- What Works? (6)

Excellent Evaluation

- Integrated data systems
- Rigorous methods that stand up to peer review
- Measure, manage, and measure again
- Regular communication of results
- Explicit connection of results to core values

What doesn’t work

- HRAs alone
- Low budget, low intensity, low participation rates
- Programs that focus on what’s in it for the organization, not the individual participant
- “Under the radar” initiatives
- NIH (not invented here) philosophy
- Huge incentives that would be better used for programming
So, what is important to employers?

- Financial outcomes
  - Cost savings, return on investment (ROI) and net present value (NPV)
  - Where to find savings:
    - Medical costs
    - Absenteeism
    - Short term disability (STD)
    - Presenteeism

- Health outcomes
  - Adherence to evidence based medicine
  - Behavior change, risk reduction, health improvement

- Quality of life (humanistic) and productivity outcomes
  - Improvement in quality of life
  - Improved “functioning” and productivity

Summary

- Focusing on improving the health and quality of people’s lives will improve the productivity and competitiveness of our workers and citizens.

- A growing body of scientific literature suggests that well-designed, evidence-based Health and Productivity Management Programs can
  - Improve the health of workers;
  - Lower their risk for disease;
  - Save businesses money by reducing health-related losses and limiting absence and disability;
  - Heighten worker morale and work relations;
  - Improve worker productivity; and
  - Improve the financial performance of organizations instituting these programs.