European Network of “Enterprise for Health”
October 29, 2001 – Berlin, Germany

The Financial Impact of Corporate Health Policy
Results from the USA

Ron Z. Goetzel, Ph.D.
The MEDSTAT Group
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Agenda

- Overview of The MEDSTAT Group
- Health and Productivity Management (HPM) Movement in the USA
- Financial Impact of Health and Productivity Management Initiatives
- Discussion
MEDSTAT Overview

- Founded in 1981
- Information and decision support services for managing healthcare
  - Databases
  - Methods
  - Systems
  - Support
- Multiple products and markets
- Competitive strategy based on product/service leadership and innovation
- Headquartered in Ann Arbor, Michigan
- Approximately 750 people in 9 office locations
- A Thomson Healthcare Information Company
Focus of The MEDSTAT Group

• Totally Focused on:
  – Healthcare information
  – Data warehousing, decision support, and executive information

• Our Mission:
  To be the clear leader in providing information products and related services for managing the cost, quality, and access to healthcare
MEDSTAT Customer Profile

- Large Employers
  Approximately 70 employers representing over 3 million employees and healthcare expenditures of over $12 billion

- Managed Care Plans
  Approximately 100 plans representing over 40 million lives

- Medicaid Programs
  14 state programs representing over $60 billion in healthcare expenditures

- Federal Government
  HCFA, AHCPR, CDC, NCI, SAMHSA, etc.

- Hospitals and Provider Systems
  Over 1200 hospitals

- Pharmaceutical companies
  Virtually all major U.S.- based organizations
Health and Productivity Management -- An Expanding View

1980s

Group Health
Indemnity

1990 to 1995

Group Health, Disability, Workers’ Comp, Attendance, Health Risk, Employee Morale/Attitudes
HMO, POS, PPO, Indemnity

1996 - Future

Group Health
Indemnity
Turning Back the Clock...
What worked in the 1980’s:

*Healthcare Utilization and Cost Management*

- Cost Shifting
- Benefit Plan Re-Design
- Negotiating Discounts
- Utilization Management
Recent trends in health care:

- Greater attention directed at the quality of health care and health outcomes
- Growing recognition of the link between health and productivity
- Renewed interest in prevention and health promotion

But…
Barriers to Health Promotion

- Cost impact of prevention/health promotion is unclear
- Can’t distinguish between poorly designed programs and well designed programs that don’t work
- Risk reduction programs are offered “off-site” rather than part of routine care
- Purchasers are not pushing health plans to incorporate programs contractually – they assume the programs are already “built in”

Source: Center for the Advancement of Health, Health Behavior Change: A Status Report 1/14/00
Health and Productivity Management

**WHAT IS IT?**

...an emerging business strategy
...based on integrated information
...aimed at improving the
...total value of
...human resource investments
Health and Productivity Management: Establishing The Link Between People, Health, and Profits

Today’s Business Climate  People/Operational Challenges  Impact on Health and Productivity
The Context for HPM

- The U.S. was close to full employment
- The new employee is a knowledge worker
- Productivity is at an all time high – holding steady after years of impressive increases
The Context for Health & Productivity Management

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

• Manage your own career
• Learn new skills in order to remain “marketable”
• Share in the costs
• Take ownership of the organization’s success
• Survival of the fittest
How do you achieve greater productivity?

- Improve technology
- Get workers to work more hours
- Make sure workers show up for work
- Make sure workers are mentally at work
- Increase motivation to perform at peak (optimal) performance
What about the fallout from the productivity movement?

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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Think workload is excessive</td>
<td>37%</td>
<td>41%</td>
<td>44%</td>
</tr>
<tr>
<td>Frequently worry about being laid off</td>
<td>22%</td>
<td>25%</td>
<td>46%</td>
</tr>
<tr>
<td>Worry a lot about company’s future</td>
<td>36%</td>
<td>40%</td>
<td>55%</td>
</tr>
<tr>
<td>Feel sure that job is secure if perform well</td>
<td>73%</td>
<td>66%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Source: International Survey Research Corp., WSJ, 10/2/96
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 disability
- Manage healthcare
- Manage Health/Demand/Disease
- Manage stress
- Strengthen EAP
- Re-engineer
- Reorganize
- Create Incentives
- Penalize
- Cut pharmacy benefits
Component Based Cost Management

- Disability
- Hospital
- Physicians
- Mental Health
- Substance Abuse
- OPD Care
- Absence
- RX
- ER
The Reality: Life is getting very complicated

Workers’ Compensation

Environmental Health & Safety

Organization Development

Health Insurance

Performance Management

Pharmaceutical Benefits

STD/LTD

Health /Demand/ Disease Management

Employee Assistance Program
Common Approach - Individual Program Management

- Environmental Health and Safety
- Compensation Programs
- Workers’ Compensation
- Demand and Disease Management
- Health Promotion
- EAP
- Disability
- Absence
- Group Health
HPM—Putting the Pieces Together

- EAP
- Group Health
- Compensation Programs
- Absence
- Environmental Health and Safety
- Health Promotion
- Workers’ Compensation
- Demand and Disease Management

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Sounds good in theory…

…. HOW DOES IT WORK IN REAL LIFE?
It’s A Process….

The HPM Journey

Phase I
Diagnosis

Phase II
Strategic and Tactical Planning

Phase III
Intervention

Phase IV
Measurement
The HPM Journey

Global: Benchmarking
Specific: Baseline Diagnostic Analysis

Cross functional team
Review options
Tap into integrated database
Project ROI
Finalize business case

Phase I Diagnosis

Care management
Health promotion/disease prevention
Workplace environment
Corporate culture/organizational health

Phase II Strategic & Tactical Planning

Standard tracking, report cards, monitoring, dashboards

Phase III Intervention

Rigorous evaluation studies

Phase IV Evaluation

INFORMATION
Phase I: Diagnosis

- Global: Benchmarking Study
  (using survey methods)

- Detailed: Baseline Risk Assessment
  (using claims and/or other administrative data)
Survey Participants:

- 3M Corporation
- Abbott Labs
- Anheuser-Busch
- BiState Development Agency
- Blue Cross and Blue Shield of Kansas City
- Boston University
- Brown Shoe Company, Inc.
- Chevron Corporation
- City of Buffalo
- City of Phoenix
- City of Portland
- City of Seattle
- City of Tucson
- The Coca-Cola Company
- CPI Corporation
- Daimler Chrysler Corporation
- The Doe Run Company
- The Dow Chemical Company
- Fidelity Investments
- G E, Industrial Systems
- Hewlett-Packard Company
- Hughes Electronics
- Iowa Department of Personnel
- Kellogg’s
- Lockheed Martin
- Lucent Technologies
- Merck and Company, Inc.
- Nortel Networks
- Pitney Bowes, Inc.
- PNC Bank Corporation
- PPG Industries, Inc.
- Pratt & Whitney
- Public Service, Electric & Gas
- Puget Sound Energy
- QUALCOMM, Inc.
- Ryder System, Inc.
- St. Louis County Government
- United Health Care Corporation
- University of Texas Medical Branch
  -- Galveston
- US West, Inc.
- Westvaco (Biokinetics, Inc.)
- Xerox Corporation
Profile of Consortium Survey Participants: Employees

<table>
<thead>
<tr>
<th>Total Survey Employee Population = 946,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization Size</td>
</tr>
<tr>
<td>Average Age</td>
</tr>
<tr>
<td>Female &amp; Male Distribution</td>
</tr>
</tbody>
</table>

- **Hourly**: 48%
- **Salaried**: 52%
- **Part-time**: 2%
- **Full-time**: 98%
Data Collection and Integration

Health Insurance  Workers’ Comp  Absenteeism  STD  LTD

Demographic Data  Employee Surveys  Work/Life

HRA Data
Quantify Program Risks

Target
Acceptable
Questionable

Unscheduled Absence
Non-occup Disability
Health Insurance
Workers’ Comp
Employee Satisfaction
Disease & Demand Mgmt.

-yellow diamond = Actual
Median HPM Costs Per Eligible Employee for All Survey Participants

<table>
<thead>
<tr>
<th>Category</th>
<th>Cost</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers’ Compensation</td>
<td>$310</td>
<td>3%</td>
</tr>
<tr>
<td>Non-Occupational</td>
<td>$513</td>
<td>5%</td>
</tr>
<tr>
<td>Absence</td>
<td>$810</td>
<td>8%</td>
</tr>
<tr>
<td>Turnover</td>
<td>$3,693</td>
<td>37%</td>
</tr>
<tr>
<td>Group Health</td>
<td>$4,666</td>
<td>47%</td>
</tr>
</tbody>
</table>

The sum of median 1998 HPM costs across programs was $9,992 per eligible employee.
Median HPM Opportunity Per Eligible Employee for All Survey Participants

- The sum of the median 1998 HPM opportunity costs across programs was $2,562 per eligible employee, a 26% reduction opportunity in total per employee HPM costs.

<table>
<thead>
<tr>
<th>Category</th>
<th>Median Cost</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover</td>
<td>$1,247</td>
<td>49%</td>
</tr>
<tr>
<td>Group Health Absence</td>
<td>$617</td>
<td>24%</td>
</tr>
<tr>
<td>Unscheduled Absence</td>
<td>$435</td>
<td>17%</td>
</tr>
<tr>
<td>Non-Occupational Disability</td>
<td>$143</td>
<td>6%</td>
</tr>
<tr>
<td>Workers’ Compensation</td>
<td>$120</td>
<td>4%</td>
</tr>
</tbody>
</table>
# HPM: The Key to Success — Integrated Information

## Cross-Program Views

<table>
<thead>
<tr>
<th>Programs</th>
<th>Individuals</th>
<th>Providers</th>
<th>Conditions</th>
<th>Plans</th>
<th>Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Occupational Disability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absenteeism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Promotion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workers’ Compensation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescription Drugs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Focused Investigation:

In-Depth Diagnosis

- Medical
- Absence/work loss
- Presenteeism
“Top 10” Most Costly Physical Health Conditions Confronting American Business

1. Coronary artery disease
2. GI disorders
3. Hypertension
4. Vaginal deliveries
5. Osteoarthritis
6. Back disorders
7. ENT disorders
8. Diabetes
9. Cerebrovascular disease
10. Gall bladder disease


Source: 1996 MEDSTAT MarketScan Fee for Service Database, N=4,106,124 lives

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“Top 10” Most Costly Mental Health Conditions
Confronting American Business

1. Bipolar disorder – depression episode
2. Specific neurotic personality disorder
3. Depression
4. Alcoholism
5. Anxiety disorder
6. Bipolar disorder – manic episode
7. Drug dependence
8. Schizophrenia
9. Nonspecific neurotic personality
10. Psychoses

Source: 1996 MEDSTAT MarketScan Fee for Service Database, N=4,106,124 lives
# Top Six Conditions

## Disease Condition Information for Corporation XYZ

<table>
<thead>
<tr>
<th>Disease Conditions Variations</th>
<th>Cost</th>
<th>Prevalence</th>
<th>Median Work Loss</th>
<th>Disease Management</th>
<th>Practice Guidelines</th>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischemic Heart Disease</td>
<td>High</td>
<td>Moderate</td>
<td>High</td>
<td>High</td>
<td>Some</td>
<td>Yes</td>
</tr>
<tr>
<td>Arthritis</td>
<td>High</td>
<td>Moderate</td>
<td>High</td>
<td>Moderate</td>
<td>All</td>
<td>No</td>
</tr>
<tr>
<td>Diabetes</td>
<td>High</td>
<td>Moderate</td>
<td>High</td>
<td>High</td>
<td>All</td>
<td>Yes</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Low</td>
<td>Some</td>
<td>No</td>
</tr>
<tr>
<td>Uncomplicated Hypertension</td>
<td>Moderate</td>
<td>High</td>
<td>Moderate</td>
<td>High</td>
<td>All</td>
<td>Yes</td>
</tr>
<tr>
<td>Depression</td>
<td>High</td>
<td>High</td>
<td>Moderate</td>
<td>High</td>
<td>All</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Productivity Metrics

- Typically, productivity is measured in terms of what workers cannot do:
  - **absenteeism** (can’t go to work due to illness)
  - **disability program use** (can’t work due to disabling physical or mental health problems)
  - **workers compensation program use** (can’t work because of a work-related injury or illness)

- Sometimes productivity is measured in terms of the inability to function at a workstation (e.g., error rate, decline in piece rate, failure to meet a production standard (e.g., claims processed)).

- Lower productivity while still at work due to health problems is often referred to as **presenteeism**, which can be difficult to measure outside manufacturing environments (Burton, et al, 1999).
Presenteeism Measure

Work Productivity Short Inventory (WPSI)
Percent of Respondents with Selected Conditions

- **High Stress** (N=248): 44%
- **Allergies** (N=230): 41%
- **Migraine** (N=148): 26%
- **Respiratory Infection** (N=133): 24%
- **Anxiety** (N=65): 12%
- **High Blood Pressure** (N=59): 11%
- **Arthritis** (N=48): 9%
- **Depression** (N=41): 7%
- **Heart Disease** (N=27): 5%
- **Diabetes** (N=13): 2%

Percent of respondents who reported experiencing selected conditions in the past 12 months

*Sample Size=563*
Average Number of Unproductive Hours in a Typical Eight-Hour Work Day, by Condition*

- Heart Disease (N=3): 4.3
- Respiratory Infection (N=51): 4.1
- Diabetes (N=5): 4.0
- Migraine (N=77): 3.4
- High Blood Pressure (N=11): 3.4
- Arthritis (N=10): 3.2
- Allergies (N=105): 2.8
- High Stress (N=131): 2.3
- Anxiety (N=31): 2.2
- Depression (N=16): 2.2

Average number of unproductive hours in a typical 8-hour day reported by workers with selected conditions. Sample Size=563

* On days when affected by the condition
Total Annual Cost of Lost Productivity for All Affected Respondents, by Condition

Overall costs per year due to lost productivity for selected conditions (for all respondents reporting any lost productivity due to the condition). Sample Size=563

Cost = Mean Hours of Productivity Loss * Value of Lost Hour of Work * (Mean Number of Days with Condition-Mean Number of Days Absent with Condition) * 236.5/365 * Number of Respondents Indicating Lost Productivity Due to the Condition
Research Involving Productivity Metrics

- Several studies have attempted to account for productivity-related outcomes in the treatment of:
  - Seasonal allergies
  - Depression
  - Migraine
  - Asthma
  - Anxiety
  - Smoking (cessation programs)

- Studies have also focused on methodological and regulatory issues.
Some Early Findings ...

- An increase in pollen has been associated with a reduction in productivity for workers with allergies, and medication helps reduce productivity loss (Burton, et al., 2001).

- Disease management programs can help patients with asthma use better medications (e.g., inflammation controllers), which may enhance productivity (Burton, et al., 2001).

- Anxiety disorders (e.g., PTSD and panic disorder) accounted for about $42.3 billion in total costs in 1990 (54% for medical, 10% for workplace costs) (Greenberg, et al., 1999).

- Treatment for depression can reduce absenteeism (Claxton, et al., 1999) and improve work performance, with 2/3 of improvement occurring in only 4 weeks of treatment (Berndt, et al., 1998).
More Early Findings ...

- Using information from two national surveys, depressed workers were found to have 1.5 - 3.2 more short-term work disability days in a 30-day observation period, compared to non-depressed workers (Kessler, et al., 1999).

- The value of this loss in productivity was about equal to the cost of treating depression (Kessler, et al., 1999).

- Productivity-related costs of migraine are substantial (Fishman and Black, 1999), and treatment can reduce at-work productivity loss (Schulman, et al., 2000).

- Work loss days and work cut-back days are related to, and vary according to, several chronic conditions (Burton, et al., 1999; Kessler, et al., 2001).
References


References (cont’d.)


Allergy Cost of Illness Study

- **Objective**
  - To assess the direct and indirect costs (days of lost work, activity limitation and bed days) associated with allergic rhinitis in a working population

- **Findings**
  - Reduced productivity associated with the use of sedating over-the-counter (OTC) antihistamines was estimated at $2.4–$4.6 billion.

Source: Crystal-Peters J, Crown WH, Goetzel RZ, Schutt DC. The productivity costs of allergic rhinitis. American J Managed Care, March 2000
Allergy Cost of Illness Study: Results

Productivity Loss and Work Loss Costs (in Millions) as a Percentage of Total Indirect Costs of Allergic Rhinitis on the Workplace

- Primary Diagnosis
  - Productivity Loss: 497.54
  - Work Loss: 606.38
- Sedating Antihistamine Use
  - Productivity Loss: 103.66
  - Work Loss: 4,624.42
Absenteeism Among Employees Treated for Depression

• Objective
  – To describe the impact of antidepressant treatment on absenteeism among workers diagnosed and treated for depression

• Study Design
  – Retrospective cohort study comparing absenteeism from work among depressed subjects with a prescription for an antidepressant: a TCA or one of three SSRIs (fluoxetine, sertraline, or paroxetine)

Source: Claxton et.al, Absenteeism among employees treated for depression. Journal of Occupational and Environmental Medicine, 41, 605-611, 1999
Average Monthly Absenteeism by Drug Type

- **TCA**
- **All SSRIs**

Day

Month
Norms & Benchmarks

- HPM Benchmarking Database
- HPM MarketScan Database
- Presenteeism Database
MEDSTAT HPM Normative Database

- Years: 1997-1999 (Soon to be updated)

- Database Elements:
  - Medical/Rx - 880,000 Lives
    - 340,000 Employees
  - Short Term Disability & Worker’s Comp
    - 225,000 Employees
  - Absence - 112,000 Employees (1999)
Phase II: Strategic & Tactical Planning

- Establishment of an HPM leadership group
- Review HPM diagnostic data
- Review intervention options
  - cost
  - practicality/acceptability
  - effectiveness
  - numbers affected
  - potential impact
  - side effects/secondary gains
  - time constraints
  - potential partners
- Estimate ROI
- Finalize business plan
Phase III: Intervention

- Care Management
  - Acute/chronic disease management
  - Work related injury and illness management
  - Disability management
  - Medical case management
 Phase III: Intervention  

- Health Promotion/Disease Prevention
  - Primary, secondary and tertiary prevention programs
  - Immunizations
  - Screenings
  - Behavioral health intervention
  - Self care, consumerism, demand management
Phase III: Intervention 3 of 4

- Workplace Environment
  - Occupational & environmental medicine
  - Ergonomics
  - Job design
  - Safety
  - Medical surveillance
  - Return to work
  - Job accommodation
Phase III: Intervention

- Corporate culture and organizational health
  - Organizational values
  - Work-life
  - Work climate, morale, employee attitudes
  - Coordinated policies and procedures
  - Benefit plan design
  - Workplace stress reduction
Phase IV: Measurement and Evaluation

- Standard, periodic tracking and monitoring systems
  - Executive information reporting
  - Dashboards
  - Report cards
  - On-line decision support systems
  - Other descriptive studies: employee surveys, targeted analyses, trend reports, etc.
Financial Measures of Program Success --
Key questions for employers:

- Do individuals at high risk cost more?
- Can you change the risk profile of the population?
- If you change risks, will costs follow?
- What is the cost/benefit ratio for all this effort?
The Relationship Between Modifiable Health Risks and Health Care Expenditures: An Analysis of the Multi-Employer HERO Health Risk and Cost Database

Ron Z. Goetzel, Ph.D
David R. Anderson, Ph.D.
R. William Whitmer, M.B.A.
Ronald J. Ozminkowski, Ph.D.
Rodney L. Dunn, M.S.
Jeffrey Wasserman, Ph.D.
HERO Research Committee
Six Large Employers:

- Chevron Corporation
- HCA/Health Trust
- Hoffmann-La Roche Inc.
- Marriott
- State of Michigan
- State of Tennessee
HERO Database - Data Sources

- Data collected for six-year period: 1/1/90 - 12/31/95
- Medical Claims (transaction level)
- Health Plan Enrollment
- Health Risk Assessment: self-report & biometric
- N = 46,026 employees, 113,963 person-years
### Description of Database -- Percentage of Population at High Risk

<table>
<thead>
<tr>
<th>High Risk Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor Exercise Habits</td>
<td>32%</td>
</tr>
<tr>
<td>Former Tobacco User</td>
<td>31%</td>
</tr>
<tr>
<td>Extreme high/low weight</td>
<td>20%</td>
</tr>
<tr>
<td>Poor Nutritional Habits</td>
<td>20%</td>
</tr>
<tr>
<td>High Stress</td>
<td>19%</td>
</tr>
<tr>
<td>Current Tobacco User</td>
<td>19%</td>
</tr>
<tr>
<td>High Cholesterol</td>
<td>19%</td>
</tr>
<tr>
<td>High Blood Glucose</td>
<td>5%</td>
</tr>
<tr>
<td>High Alcohol Use</td>
<td>4%</td>
</tr>
<tr>
<td>High Blood Pressure</td>
<td>4%</td>
</tr>
<tr>
<td>Depression</td>
<td>2%</td>
</tr>
</tbody>
</table>
HERO Study: Results

- Expenditures were highest for:
  - High risk persons in 7 of 10 risk groups
  - Expenditure differences were greatest for high risk persons with
    - Depression
    - High Stress

- Subjects with multiple risk factors associated with:
  - Heart Disease
  - Psychosocial problems
  - Stroke
Percent Difference in Medical Expenditures:

High-Risk vs. Lower-Risk Employees

![Bar chart showing percent difference in medical expenditures for high-risk vs. lower-risk employees after adjustment for various factors such as depression, stress, glucose, weight, tobacco use, blood pressure, exercise, cholesterol, alcohol, and eating.]
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

Health care expenditures - 1996 dollars
Independent effects after adjustment
But...Can You Change Risks? Can You Affect Costs?

Citibank Results: Number and Percent of HMP Participants at High Risk at First and Last HRA by Risk Category

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).

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>First HRA</th>
<th>Last HRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber*</td>
<td>8325 (95%)</td>
<td>825 (93%)</td>
</tr>
<tr>
<td>Stress*</td>
<td>2775 (33%)</td>
<td>2565 (31%)</td>
</tr>
<tr>
<td>Exercise*</td>
<td>2506 (32%)</td>
<td>2023 (26%)</td>
</tr>
<tr>
<td>Seatbelt*</td>
<td>1906 (21%)</td>
<td>1326 (15%)</td>
</tr>
<tr>
<td>BMI*</td>
<td>1654 (18%)</td>
<td>1732 (19%)</td>
</tr>
<tr>
<td>Cigarettes*</td>
<td>1058 (12%)</td>
<td>1009 (12%)</td>
</tr>
<tr>
<td>Fat*</td>
<td>316 (4%)</td>
<td>195 (2%)</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>114 (18%)</td>
<td>125 (20%)</td>
</tr>
<tr>
<td>Salt*</td>
<td>238 (3%)</td>
<td>169 (2%)</td>
</tr>
<tr>
<td>Diastolic BP*</td>
<td>25 (1%)</td>
<td>15 (1%)</td>
</tr>
<tr>
<td>Alcohol</td>
<td>12 (0%)</td>
<td>19 (0%)</td>
</tr>
</tbody>
</table>

Health and Productivity Outcomes of Multi-Component Worksite Health Management Programs

Literature Review:

- **Purpose:** Critically review evaluation studies of health related effects of multi-component worksite health management 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.

- Well conducted, randomized trial studies suggest that providing opportunities for individualized risk reduction counseling for high risk employees, within the context of comprehensive programming, may be the critical component of effective programs.

- Low intensity, short duration programs aimed at increasing awareness of health issues for the entire population may not be sufficient to achieve desired outcomes.

- What we need are programs that are science based, well implemented and properly evaluated.
## Impact of Improvement in Risk Categories on Medical Expenditures per Month

<table>
<thead>
<tr>
<th>Net Improvement* of at least 1 category versus Others (N = 1,706)</th>
<th>Unadjusted Impact**</th>
<th>Adjusted Impact**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Improvement* of at least 2 categories versus Others (N = 391)</td>
<td>- $ 5.34</td>
<td>- $3.06</td>
</tr>
<tr>
<td>Net Improvement* of at least 3 categories versus Others (N = 62)</td>
<td>-$146.87†</td>
<td>- $145.77‡</td>
</tr>
</tbody>
</table>

Total Sample Size = 5,143 employees for whom claims data were available

*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
A Return on Investment Evaluation of the Citibank, N.A. Health Management Program

Source: Ozminkowski, Dunn, Goetzel, Cantor, Murnane and Harrison, AJHP, 14 (1), 1999
Program Components

High-Risk Program

Timeline (months)

80% Low Risk

Questionnaire 1 (Program Entry and Channeling beginning January, 1994)

20% High Cost Risk

High-Risk Letter/Report 1

High-Risk Questionnaire Letter/Report 2

High-Risk Questionnaire Letter/Report 3

High-Risk Questionnaire Letter/Report 4

Books, Audiotapes, Videotapes

Books, Audiotapes, Videotapes

Books, Audiotapes, Videotapes

Books, Audiotapes, Videotapes

Self-Care Materials

Letter/Report 1

3 months

6 months

9 months

20% High Cost Risk

80% Low Risk

Timeline (months)

Self-Care Materials

Letter/Report 1

3 months

6 months

9 months

20% High Cost Risk

80% Low Risk

Timeline (months)

Self-Care Materials

Letter/Report 1

3 months

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Timeline (months)

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9 months

20% High Cost Risk

80% Low Risk

Timeline (months)
Program Participation

- All 47,838 active employees were eligible to participate
- 54.3% participation rate
- 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
Quasi-Experimental Study Design Features

- Pre- vs. post-Program, participant vs. non-participant group design
- Multiple regression used to subtract out the effects of confounders related to age, gender, coverage type, salary/hourly status, business unit, exempt vs. non-exempt status, and length of follow-up
- Savings calculated as differences between participant and non-participant growth in medical and absenteeism costs over time, adjusted for the confounders listed above
Sample Size and Study Period -- Medical

- Months in study ranged from 12 to 45 with mean = 38
  - Pre-HRA months = 6 to 39, mean = 17
  - Post HRA months = 6 to 34, mean = 23
- HMO enrollees excluded

---

51% 11,714
49% 11,219

Participants  Non-participants
• Total savings associated with participation in Health Management for 11,219 participants over an average of 23 months post-HRA is $8,901,413*

* Figure is based on $34.03 savings and 23.31054 months post-HRA for 11,219 participants.
Program Return on Investment (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

* 1996 Dollars @ 0% discount
** Benefits for Indemnity and POS Participants only
What’s the ROI?

A Systematic Review of Return on Investment (ROI) Studies of Corporate Health and Productivity Management Initiatives

Ron Z. Goetzel, Ph.D.
Timothy R. Juday, MPA
Ronald J. Ozminkowski, Ph.D.

AWHP’s Worksite Health, Summer 1999, pp. 12-21
Three Objectives for Our Review

1. Identify well-conducted, rigorous evaluation studies that exemplify best practices in econometric ROI analyses.

2. Document the range of ROI estimates found in these studies.

3. Comment on factors influencing ROI.
The Primary Aim is to Improve Health

- The primary goal of all of these programs is to improve employee health and productivity (not just to save money).

- But program funders often also require a “business case” justification for programs continuation and enhancement.
  - Thus, the need to demonstrate a positive return on investment is still very strong.
Inclusion Criteria

- Studies were extracted from MEDLINE and HSTAR electronic databases, from article reference lists, or from unpublished sources familiar to authors.

- Studies were included in the review if true experimental or strong quasi-experimental designs were used.

- Cost data in these studies needed to be from archival databases (i.e., not self-reported).

- Appropriate research methods had to be used in the studies (i.e., large sample sizes and long study periods).
How Do Health, Demand and Disease Management Programs Relate?

<table>
<thead>
<tr>
<th>Health Management</th>
<th>Demand Management</th>
<th>Disease Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Prevention</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Secondary Prevention</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tertiary Prevention</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Results re: Health Management Programs

- Corporate health management programs often include:
  - health risk assessment,
  - exercise/fitness facilities/programs,
  - nutrition education,
  - stress reduction programs,
  - disease screening,
  - high risk intervention programs,
  - smoking cessation programs
Health Management Program Studies

- ROI studies of health management programs have been conducted for:
  - 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.
Health Promotion Case Study
Procter & Gamble

Goetzel, R.Z., Jacobson, B.H., Aldana, S.G., Vardell, K., and Yee, L.
"Health Care Costs of Worksite Health Promotion Participants and Non-Participants."
Procter & Gamble:
Total Annual Medical Costs For Participants And Non-participants In Health Check (1990 - 1992)

Adjusted for age and gender; Significant at p < .05
*Participant costs were 29% lower
Procter & Gamble:
Annual Lifestyle Related Medical Costs
By Group (1990 - 1992)

Adjusted for age & gender; Significant at p < .05
*Participant costs were 36% lower
Health Promotion Case Study

Chevron

Goetzel, R.Z., Dunn, R.L., Ozminkowski, R.J., Satin, K., Whitehead, D., and Cahill, K.
“Differences between Descriptive and Multivariate Estimates of the Impact of Chevron Corporation’s Health Quest Program on Medical Expenditures.”
Phase III - Descriptive Analysis
Percentiles of Inpatient & Drug Expenditures - All Plans

Expenditures

$100,000

$10,000

$1,000

$100

$10

$1

Level 3

Level 2

Level 1

NP¹

$241,135

$54,493

$51,264

$12,447

$14

$11

$12

$4

Percentile

$1,000,000

0 10 20 30 40 50 60 70 80 90 100

¹ Never Participated
Phase III-Descriptive Analysis
Impact of Outliers on Inpatient & Drug Expenditures

All data

Data with top 1% of expenditures removed

<table>
<thead>
<tr>
<th>$0</th>
<th>$100</th>
<th>$200</th>
<th>$300</th>
<th>$400</th>
<th>$500</th>
<th>$600</th>
<th>$700</th>
<th>$800</th>
<th>$900</th>
<th>$1,000</th>
</tr>
</thead>
</table>

Participants

Non-Participants
Phase IV-Multivariate Analysis (Two Stage)

Stage 1: Does fitness center participation have an influence on the odds of having any medical expenditures?

Relative expenditure for participants over the entire 2.5 year period for:

<table>
<thead>
<tr>
<th>Method of controlling for Fitness Center Participation</th>
<th>HealthNet HMO (n=5,801)</th>
<th>HealthNet Select (n=1,789)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Those who ever participated</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Each additional FC visit</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Level 1</td>
<td>NS</td>
<td>1.685+</td>
</tr>
<tr>
<td>Level 2</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Level 3</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

NS = Not Significant  
+ = Positive relative expenditure for participants  
1 = Odds ratio for having non-zero medical expenditures
**Phase IV-Multivariate Analysis (Two Stage)**

Stage 2: Among those who incurred medical expenditures, does participation influence the magnitude of expenditure?

*Relative expenditure for participants over the entire 2.5 year period for:*

<table>
<thead>
<tr>
<th>Method of controlling for Fitness Center Participation</th>
<th>HealthNet Inpatient &amp; Drug</th>
<th>All Plans Inpatient &amp; Drug</th>
<th>Kaiser Total Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Level 2</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Level 3</td>
<td>.632*</td>
<td>.701*</td>
<td>.833*</td>
</tr>
</tbody>
</table>

NS = Not Significant  
* = Negative relative expenditure for participants
Results re: Demand Management Programs

- Demand management programs expand use of self-care and give beneficiaries greater control of their healthcare usage.

- Components include:
  - 1-800 nurse call-in or other telephone information services
  - newsletters
  - seminars
  - counseling services
  - self-care books
  - other educational services
Demand Management Program Studies

- ROI studies of demand management programs were conducted for:
  - Blue Cross of California
  - Five California counties
  - Group Health Inc.
  - Rhode Island Group Health Association (2 studies)
  - United Healthcare

- ROI estimates in these six studies ranged from $2.20 - $13.00 in savings per dollar spent on these programs.

- Median ROI was about $4.50 in benefits per dollar spent.

- Sample sizes ranged from 460 - 5,647 subjects in these studies.
Results re: Disease Management Programs

- Disease management programs target disease conditions for which there are effective, evidence-based practice guidelines.

- Components of disease management programs include:
  - educational programs for patients or doctors
  - counseling services
  - care programs based on evidence-based clinical practice guidelines
  - incentives for appropriate utilization of health care services
Disease Management Program Studies

- ROI studies of disease management programs were conducted for:
  - Henry Ford Hospital (asthma)
  - Spohn Memorial Hospital (diabetes)
  - United Behavioral Health (mental health)

- ROI estimates in these three studies ranged from $7.30 to $10.40 in benefits per dollar spent on these programs.

- Median ROI was $9.00 in benefits per dollar spent.

- Sample sizes ranged from 176 - 1,671 subjects in these studies.
Results Re: Multiple Component Programs

- Some programs combined elements of health, demand, and disease management programs.

- Key features included:
  - health risk appraisal surveys to identify people at high risk for poor health
  - triage into risk-appropriate intervention programs
  - tailored communication and health education
  - self-care materials
  - appropriate follow-up to monitor progress
Multiple Component Program Studies

- ROI studies of multiple-component programs were conducted for:
  - The Bank of America
  - California Public Employee Retirement System
  - Citibank, N.A.

- ROI estimates in these three studies ranged from $5.50 - $6.50 in savings per dollar spent on these programs.

- Median ROI was $6.00 in savings per dollar spent.

- ROI for Citibank study dropped from $6.50 to $4.70 per dollar spent when subjects who died during study period were excluded from analyses.

- Sample sizes ranged from 4,700 - 21,700 subjects in these studies.
Summary and Discussion

- ROI estimates ranged from $1.40 - $13.00 in savings per dollar spent on these health, demand, and disease management programs.

- Wide range of ROI estimates may be due to variety in program design features.

- Maximum health impact may come from programs directed at improving organizational health, employee absence patterns, worker disability, and safety. Although most costly, these are likely to also be most cost-beneficial.
Special Issue: (1)

The Financial Impact of Health Promotion
*American Journal of Health Promotion, 15:5, May/June, 2001*

- Introduction – Goetzel
- Methodology
  - Getting closer to the truth – Ozminkowski & Goetzel
- Literature Review
  - Financial impact – comprehensive review – Aldana
  - Financial impact of smoking – Max
  - Shining lights – Golazewski
- Research Applications
  - Emerging research – Edington
  - Expanding health insurance coverage to include smoking cessation – Harris, et al.
Special Issue: (2)

- Corporate Perspectives
  - GlaxoSmithKline – Stave
  - General Electric – Kerr
  - Lucent Technologies – Shoner & Cioffi
  - Dow Chemical – Baase
  - Johnson & Johnson – Isaac & Flynn
  - Chevron – Whitehead
  - Southern California Edison – Schmitz
  - 3M – Anderson & Stolzfus
  - Applied Materials – Webster
  - AT&T/Roche – McCauley

- Federal Government Perspectives
  - Centers for Disease Control & Prevention (CDC) – Harris, et al.
  - Health Care Financing Administration (CMS/Medicare) – Gordon & Lapin

- Policy Perspectives
  - University of California Los Angeles (UCLA) Breslow
  - Robert Wood Johnson Foundation (RWJF) - McGinnis
Financial Impact – Literature Review – Steven G. Aldana, Ph.D.

**Focus:** Peer reviewed journals (English Language) – 196 studies pared down to 72 studies meeting inclusion criteria for review

**Content Areas:**
- Health risks and health costs
- Health risks and absenteeism
- Health promotion programs and financial outcomes
  - Health care costs
  - Absenteeism

**Scoring Criteria:**
- Grade
  - 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)
Results:

**Health risks and financial outcomes:**
- Strongest correlations
  - Stress, obesity, multiple risk and increased health care costs and absenteeism

**Health promotion program on financial outcomes:**
- 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)
- Absenteeism costs:
  - 14 evaluation studies examined – Grades: A (0), B (11), other (3)
  - Positive impact: 14 studies
  - No impact: 4 studies (none with randomized designs)
  - Average ROI: 5.82 to 1.00 (3 studies)
- Health care and absenteeism costs:
  - Average ROI: 4.30 to 1.00 (3 studies)
Turning Back the Clock...
What did work in the 1980’s

Healthcare Utilization and Cost Management

- Cost Shifting
- Benefit Plan Re-Design
- Negotiating Discounts
- Utilization Management
What is different today?

- Attention directed at quality of care and health outcomes
- A recognition that health and productivity are interrelated
- Increased emphasis on prevention and health promotion
Summary

- Component-based management may miss the mark - it may be harmful AND more expensive in the long run.
- Health and Productivity Management, a holistic approach, provides a tool for achieving maximum health improvement and resource consumption.
- Measure & Manage - then, Manage & Measure.