National Business Group on Health

LightenUP: The Dow Chemical Company's Approach to Promoting Healthy Weight Management

NHLBI: 5 R01 HL079546-05

Reducing Costs, Improving Quality, and Cultivating a Culture of Health

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GOOD HEALTH For The Whole Self

WORKPLACE Health Group
University of Georgia

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The World's Largest Chemical Company

- Sales exceeding $40 billion
- Global - 65 manufacturing sites in 37 countries
- Founded 1897 in Midland, Michigan
- 43,000 employees globally
- 54 percent of all employees are in manufacturing roles
- Half of all Dow jobs are in the U.S.
- Ratio of male to female is 3 to 1

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Dow Health Strategy

(Endorsed by Office of Chief Executive, 2004)

VISION

We optimize health, human performance, and the long-term value for Dow by offering an array of health programs and services for employees, retirees, and dependents as part of being an employer of choice.

PURPOSE

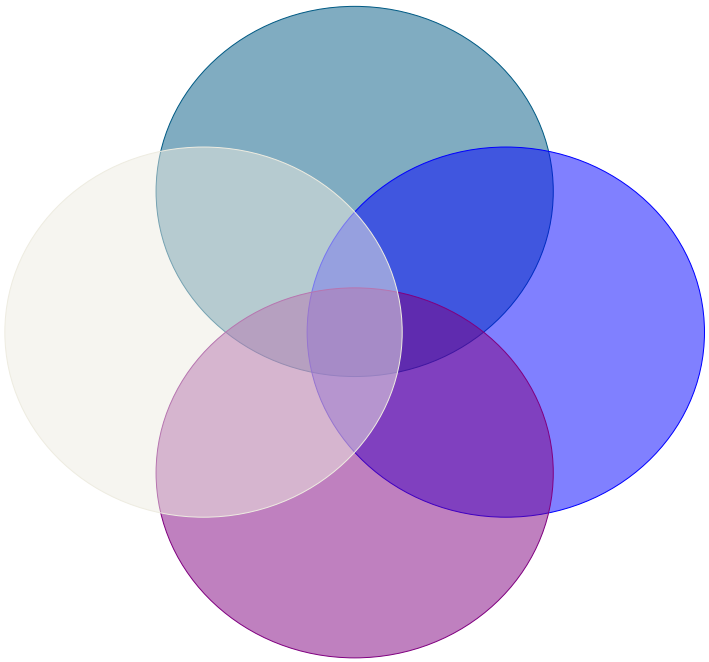
To ensure that Dow “Total Health” related programs & services are established, prioritized, leveraged and implemented on a global basis, in the most cost effective and efficient way, resulting in improved health, reduction of health risks, management of health-related costs of Dow People, and improved employee performance.

Dow Health Strategy

Vision Elements

Quality & Effectiveness

Prevention
"LightenUP"



Health Care System Management

Advocacy

aligned incentives

communication

A Strategic Approach to Building a Culture of Health

"I believe we need a sustained focus on prevention to maintain and improve the health of our people. Prevention has the power to make a real and lasting difference in our individual quality of life...

…Our analysis shows that prevention can improve both our direct and indirect health related costs. Our profit potential is inextricably linked to the capability and performance of our employees….

…We have recently strengthened our commitment to this effort by adopting a strategic approach to building a culture of health with prevention as a major pillar in our overall plan."

Andrew N. Liveris, President and CEO

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Prevention Element

Purpose:

Dow provides the optimal array of "best practice" programs and services globally to minimize and/or reduce health risks and enhance the overall health of Dow people and company performance.

……..The LightenUP Project: Studying Environmental Approaches to Obesity Prevention and Management at The Dow Chemical Company:

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LightenUP Study Project Team

Emory University Institute for Health and Productivity Studies (IHPS) – Washington, DC

Thomson Reuters (formally known as Medstat) – Washington, DC

University of Georgia – Athens, GA

The Dow Chemical Company – Midland, MI

National Business Group on Health – Washington, DC

Study Objectives

Primary:

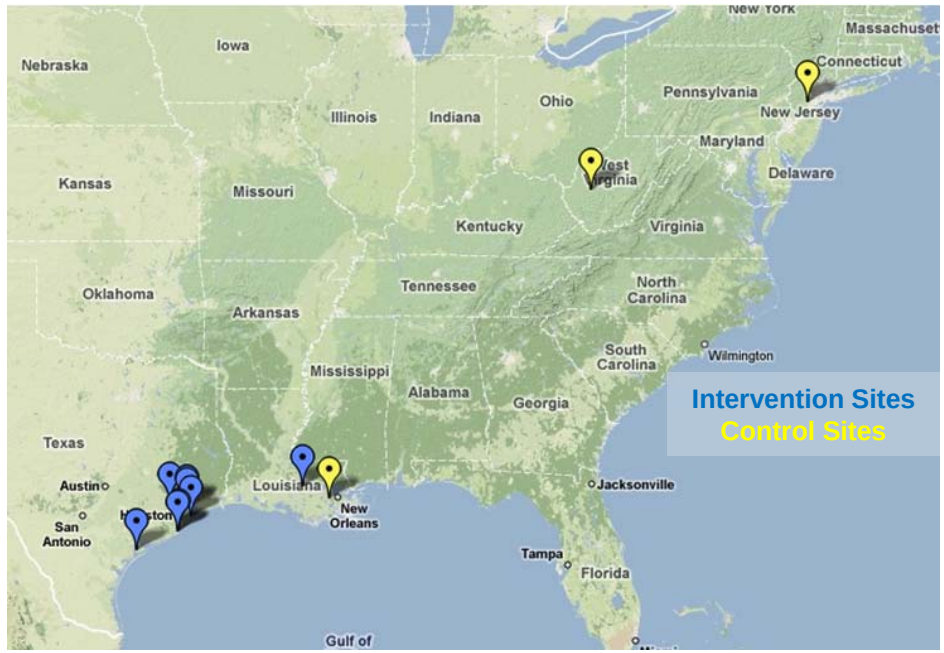
- Design, implement, and evaluate innovative, evidence-based approaches to organizational / supportive **environmental interventions** aimed at reducing the prevalence of obesity and overweight among Dow employees

Secondary:

- Test the multifaceted hypothesis that, relative to individual interventions, environmental interventions:
  - reduce the prevalence of obesity and overweight,
  - reduce the prevalence of other weight-related risk factors,
  - improve health,
  - reduce healthcare utilization and expenditures, and
  - improve an array of indicators known to be related to employee productivity
- Test whether savings outweigh program expenses, thus producing a positive return-on-investment (ROI)

Dow LightenUP Study Design

- Quasi-experimental – treatment vs. control/pre vs. post (3 data points – baseline, year 1, year 2)
- 12 Dow Chemical Company worksites received environmental/ecological interventions at varying levels of intensity
  - Intervention sites*: Texas (8) and Louisiana (1)
  - Control sites: New Jersey (1), West Virginia (1), and Louisiana (1)
- Other Dow sites in US providing benchmark/comparison data



*One intense site was part of a business unit that was sold to another company. Data from this site were not included in any process evaluations but were included in other evaluations.

Study Timeline

5-Year Study: September 30, 2004 – September 29, 2009

- **Year 1**: Planning and formative research – *Completed*
- **Years 2-3**: Intervention program implementation directed at obesity and overweight at the worksite – *Completed*
- **Year 4-5:** Final measurement and evaluation – *In Progress*

Intervention Activities – All Sites

Access to healthy food choices

- Cafeterias, vending, catering (Dow meetings, overtime meals)
- Education
- Labeling
- Promotional pricing (at High Intensity Sites only)

Access to physical activity

- Walking paths/routes
- Weight management tracking program: “Why Weight (YW8) Challenge”

Work group healthy culture focal points – local “ambassadors/champions”

- Intervention promotion and implementation
- Interventions advocate
- Employee recognition

Enhanced Communication Strategy

Intervention Activities – High Intensity Sites

All moderate intensity interventions, plus…

Goal setting (by site leadership) and alignment with departments

- Health screenings, weight management tracking program, leadership training
- Increased role for healthy culture focal points

Site leaders' increased accountability to senior management

Site leaders' training and regular feedback sessions

Rewards and recognition for site leaders, cross-discipline teams, healthy culture focal points and work groups

Data Collection Overview

Data Sources:

- Process measures: Site visits, observations, interviews, surveys/questionnaires
- Health Information: Health Risk Assessment (HRA), biometric data, questionnaires
- Administrative claims data

Data Collection Time Points

- Baseline: 2004 (process evaluation data only)
- Time 1 (T1) HRA Measurement: 2006 – COMPLETED
- Time 2 (T2) HRA Measurement: 2007 – COMPLETED
- Time 3 (T3) HRA Measurement: 2008 – COMPLETED

Process Evaluation Timeline

Process Evaluation Tools	Formative	T1 *Intervention Year 1*	T2 *Intervention Year 2*	T3 *Post-Intervention*
Environmental Assessment Tool (EAT)	Apr – May 2005	May – Jun 2006	May – Jun 2007	May – Jun 2008
Cafeteria Audit	Feb 2006	Apr, Jul, Dec 2006	May 2007	July – August 2008
Vending Assessment	Apr – May 2005	May – Jun 2006	May – Jun 2007	May – Jun 2008
Site Contact Interviews	n/a	Jun 2006	May – Jun 2007	May – Jun 2008
Leading By Example Survey	Apr – May 2005	May – Jun 2006	May 2007	Jun 2008
Cross-Discipline Team Survey	n/a	Aug 2006	n/a	n/a
Healthy Culture Focal Point Survey	n/a	Nov 2006	Oct 2007	Jun 2008
Employee Satisfaction Survey	n/a	Nov 2006	Aug 2007	Jul 2008

LBE & EAT Scores
High Intensity and Control Sites

	Formative	T1	T2	T3	Change (T3-Formative)
High Intensity Sites					
LBE Total Score^	3.1	3.7	3.6	3.5	0.4
EAT Total Score (100 pts)	39.7	47.9	50.4	54.2	14.5
Access to Physical Activity (32 pts)	7.8	9.0	9.8	10.0	2.2
Nutrition & Weight Mgmt (32 pts)	11.5	18.7	17.6	23.2	11.7
Org Characteristics & Support (36 pts)	20.4	20.2	23.0	21.0	0.6
Control Sites					
LBE Total Score^	3.3	3.2	3.4	3.5	0.2
EAT Total Score (100 pts)	35.6	31.9	30.3	26.8	-8.8
Access to Physical Activity (32 pts)	12.0	13.3	10.4	10.0	-2.0
Nutrition & Weight Mgmt (32 pts)	2.5	3.6	2.8	2.7	0.2
Org Characteristics & Support (36 pts)	21.0	15.0	17.0	14.0	-7.0

^1-5 scale; 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent

LBE & EAT Scores
Moderate Intensity and Control Sites

	Formative	T1	T2	T3	Change (T3-Formative)
Moderate Intensity Sites					
LBE Total Score^	3.0	3.4	3.5	3.5	0.5
EAT Total Score (100 pts)	32.6	41.4	43.1	46.1	13.5
Access to Physical Activity (32 pts)	11.2	12.1	13.4	14.7	3.5
Nutrition & Weight Mgmt (32 pts)	5.1	12.6	10.6	14.7	9.6
Org Characteristics & Support (36 pts)	16.3	16.8	19.0	16.8	0.5
Control Sites					
LBE Total Score^	3.3	3.2	3.4	3.5	0.2
EAT Total Score (100 pts)	35.6	31.9	30.3	26.8	-8.8
Access to Physical Activity (32 pts)	12.0	13.3	10.4	10.0	-2.0
Nutrition & Weight Mgmt (32 pts)	2.5	3.6	2.8	2.7	0.2
Org Characteristics & Support (36 pts)	21.0	15.0	17.0	14.0	-7.0

^1-5 scale; 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent

Data Description

Health Review

- A self-report questionnaire (HRA)
  - Health behaviors
  - Health risk
  - Emotional health
  - Preventive screening behaviors
  - Stages of Change and self-efficacy
- Biometric data

  Collected by Quest Diagnostics
  - Weight
  - Blood pressure
  - Blood glucose
  - Cholesterol

•Cohort Sample: Consists of only those participants who completed an HRA and biometric screening at Time 1 (2006) and Time 3 (2008)

•Categorical levels of risk were created for each participant for the lifestyle and biometric risk factors (high, moderate, low).

•Based on U.S. Preventive Services Task Force Guidelines

•Invalid or improbable values for biometric values were removed based on criteria provided by one of Thomson Reuters' Medical Directors.

Health Risk Definitions

Health Review Questions	DEFINITION OF HIGH RISK
Poor nutrition	4 or more fast food meals per week OR 2 or more sweetened beverages per day OR 3 or fewer fruit and vegetable servings per day
Poor physical activity	Does not engage in moderate or strenuous activity at least once per week
Tobacco use	Currently using tobacco
High alcohol use	Men- 3 or more drinks per day OR 15+ drinks per week
	Women- 2 or more drinks per day OR 8+ drinks per week
High stress	Reported being in high stress over the past four weeks and having poor ability to deal with stress
Biometric Measures	
Obese	Body Mass Index (BMI) greater than or equal to 30
Overweight	Body Mass Index (BMI) between 25 to 29.9
High blood pressure	Blood Pressure 160/100 or higher
High cholesterol	Total cholesterol 240 mg/dl or higher
High blood glucose	Blood glucose 126 mg/dl or higher

Health Review Participation – T1-T3 Cohort Population

	Intervention	High Intensity	Moderate Intensity	Control
Biometric Screening				
Eligible Employees	N=8,013	N=6,619	N=1,396	N=2,268
Respondents	N=1,139	N=926	N=213	N=382
Participation Rate	14.2%	14.0%	15.3%	16.8%
HRA				
Eligible Employees	N=8,013	N=6,619	N=1,396	N=2,268
Respondents	N=1,902	N=1,520	N=382	N=529
Participation Rate	23.8%	23.0%	27.4%	23.3%

Health Behaviors (T1 – T3): High Risk Category

Cohort Data

	HIGH RISK			
RISK FACTOR	**T1**	**T3**	**% Change**	**DID**
Health Review Questions				
Intervention Sites N= 1,912				
Poor nutrition	78.4%	69.3%	-9.0%***	-6.4%***
Poor physical activity	10.2%	7.2%	-3.1%***	-3.2%**
Tobacco use	11.8%	11.5%	-0.2%**	-1.2%
High alcohol use	6.4%	5.7%	-0.7%*	-0.7%
High stress	2.7%	2.0%	-0.7%*	0.5%
Control Sites N= 517				
Poor nutrition	74.2%	71.6%	-2.6%***	
Poor physical activity	5.3%	5.4%	0.1%**	
Tobacco use	7.4%	8.3%	0.9%	
High alcohol use	2.4%	2.3%	0.0%*	
High stress	2.0%	0.8%	-1.2%***	

Statistically significant *p<0.05, **p<0.01 ***p<0.001

Biometric Values: (T1 – T3)

Cohort Data

	Intervention Sites N= 1,142					Control Sites N= 374					
	T1		T3		Change	T1		T3		Change	Difference -in- Difference
	Mean	SD	Mean	SD		Mean	SD	Mean	SD		
Weight (lbs)	189.4	42.5	189.0	41.3	-0.3	187.9	38.5	189.2	39.9	1.3**	-1.6**
BMI (kg/m^2)	28.3	5.3	28.2	5.2	-0.1	28.0	4.6	28.2	5.0	0.2**	-0.3**
Systolic BP (mm Hg)	124.4	14.1	122.3	13.3	-2.1***	123.1	12.2	128.1	12.6	4.9***	-7.0***
Diastolic BP (mm Hg)	80.3	9.1	78.2	8.8	-2.1***	79.6	8.5	79.1	8.9	-0.5	-1.6**
Cholesterol (mg/dL)	196.1	35.5	192.8	34.6	-3.2***	193.3	36.4	193.7	37.8	0.4	-3.6*
Blood glucose (mg/dL)	94.3	18.3	96.2	18.5	1.9***	95.1	13.6	95.8	21.4	0.7	1.2

Statistically significant *p<0.05, **p<0.01 ***p<0.001

Current On-Site Activities

- The study interventions officially ended on *March 31, 2008.*
- LUP resources and tools have been incorporated into Health Services core program/menu offerings. Regions/sites globally have opportunity to select and implement processes and resources as appropriate.
- All considerations for future LUP interventions leveraging will be incorporated in Dow Health Strategy (DHS) Prevention Element planning.
- LUP integration progress:
  - **Incorporated:** Physical activity options (walking paths, fitness centers, etc.)
  - **In progress:** Y-W8, access to healthy choices, Healthy Cultural Focal Points, health messages, employee recognition
  - **In progress at select sites:** Site goals, leadership reporting
  - **For future consideration:** Leadership learning & training, recognition

Dissemination

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Estimating the Return-on-Investment From Changes in Employee Health Risks on The Dow Chemical Company's Health Care Costs

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Ronald J. Ozminkowski, PhD
Catherine M. Baase, MD, FAAFP, FACOEM
Gary M. Billotti, MS

Learning Objectives

- Recall the risk factors evaluated in the company's health assessment program, and the effects of advancing age over the 10-year study period on employees' risk factor profiles.
- Relate the degree of risk reduction to the company's health care expenditures under three scenarios: a large and a modest impact of risk reduction efforts on health risk, and a "break-even" condition in which the company saves the same amount it invests.
- Conclude whether health risk reduction efforts are worthwhile to companies in terms of the financial pay back.

Abstract

Objective: *We sought to estimate the impact of corporate health-management and risk-reduction programs for The Dow Chemical Company by using a prospective return-on-investment (ROI) model.* ***Methods:*** *The risk and expenditure estimates were derived from multiple regression analyses showing relationships between worker demographics, health risks, and medical expenditures.* ***Results:*** *A "break-even" scenario would require Dow to reduce each of 10 population health risks by 0.17% points per year over the course of 10 years. More successful efforts at reducing health risks in the population would produce a more significant ROI for the company.* ***Conclusions:*** *Findings from this study were incorporated into other components of a business case for health and productivity management, and these supported continued investments in health improvement programs designed to achieve risk reduction and cost savings.* (J Occup Environ Med. *2005;47: 759–768*)

From Medstat and Cornell University, Washington, DC (Dr Goetzel); The Dow Chemical Company, Midland, Michigan (Dr Baase, Mr Billotti); and Medstat and Cornell University, Ann Arbor, Michigan (Dr Ozminkowski).

Supported by the Dow Chemical Company.

The opinions expressed in this work are the authors' and do not necessarily reflect the opinions of The Medstat Group, Inc., Cornell University, or The Dow Chemical Company.

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Medical directors often need to build a business case for investing in health promotion as part of a comprehensive health management strategy. Their business case can be greatly strengthened if it includes a projected return-on-investment (ROI). How to best formulate a compelling ROI analysis has been a challenge, and several investigators have commented on the topic.[1–6] This article illustrates an approach used by staff at The Dow Chemical Company (Dow) to develop a credible ROI estimate as a component of their a business case for ongoing investment in the health and well-being of Dow's employees.

This analysis demonstrates how such investment can bring about medical cost savings for the company. With dramatic recent increases in company health care costs as a backdrop, many medical directors and corporate human resource executives are introducing innovative health and productivity-management (HPM) intervention programs. For these programs to be accepted and maintained, they must be supported by credible financial projections.

To formulate a financial argument for continued investment in health improvement and risk reduction programs for employees, the Dow's Health and Human Performance (H&HP) staff applied several strategies. These staff first quantified the large sums of money that the company was spending in several areas to address the broad impact that illness may have. Using methods developed as part

Using Formative Research to Develop Environmental and Ecological Interventions to Address Overweight and Obesity

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Abstract

WILSON, MARK G., RON Z. GOETZEL, RONALD J. OZMINKOWSKI, DAVE M. DEJOY, LINDSAY DELLA, ENID CHUNG ROEMER, JENNIFER SCHNEIDER, KAREN J. TULLY, JOHN M. WHITE, AND CATHERINE M. BAASE. Using formative research to develop environmental and ecological interventions to address overweight and obesity. *Obesity*. 2007;15(Suppl 1): 37S–47S.

Objective: This paper presents the formative research phase of a large multi-site intervention study conducted to inform the feasibility of introducing environmental and ecological interventions.

Research Methods and Procedures: Using mixed methods that included an environmental assessment, climate survey, leadership focus groups and interviews, and archival data, information was collected on employee health and job factors, the physical environment, social-organizational environment, and current health programs.

Results: Results show that 83% of employees at the study sites were overweight or obese. Leadership was very supportive of health initiatives and felt integrating the strategies into organizational operations would increase their likelihood of success. Environmental assessment scores ranged from 47 to 19 on a 100-point scale. Health services personnel tended to view the organizational climate for health more positively than site leadership (mean of 3.6 vs. 3.0, respectively).

Discussion: Intervention strategies chosen included increasing healthy food choices in vending, cafeterias, and company meetings, providing a walking path, targeting messages, developing site goals, training leaders, and establishing leaders at the work group level.

Key words: environment, intervention, formative research

Introduction

Approximately 119 million or two-thirds of all Americans are overweight or obese (1), accounting for approximately 400,000 deaths per year (2). Being overweight or obese increases an individual's chances for developing chronic health problems, including type 2 diabetes, cardiovascular disease, stroke, musculoskeletal disorders, certain cancers, depression, sleep apnea, gallbladder disease, fatty liver disease, and other preventable health conditions (3,4). The national medical cost burden attributable to obesity and overweight is estimated to be $117 billion (in direct and indirect costs), or 5.7% to 9.1% of U.S. spending on healthcare (5,6). Obesity may increase inpatient hospital costs by 36% and medication costs by 77% (7). For employers, the annual medical costs for obese or overweight employees are 21% higher than for those not overweight. Obesity is estimated to cause 39 million lost workdays and 239 million restricted activity days (8).

Business leaders are becoming increasingly aware of the human and economic toll that poor health imposes on their workers and their companies' competitiveness. Many employers have invested in health promotion and disease prevention programs aimed at reducing the prevalence of obesity in the workplace through encouragement of physical activity, healthy diet, and improved management of health risk factors (9). Employers continue to seek innovative and evidence-based interventions that can be imported into the workplace to address a growing public health epidemic that also adversely affects worker productivity (10). A large

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Design Characteristics of Worksite Environmental Interventions for Obesity Prevention

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Abstract

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Objective: This paper describes the design characteristics of the National Heart, Lung, and Blood Institute (NHLBI)-funded studies that are testing innovative environmental interventions for weight control and obesity prevention at worksites.

Research Methods and Procedures: Seven separate studies that have a total of 114 worksites (~48,000 employees) across studies are being conducted. The worksite settings include hotels, hospitals, manufacturing facilities, businesses, schools, and bus garages located across the U.S. Each study uses its own conceptual model drawn from the literature and includes the socio-ecological model for health promotion, the epidemiological triad, and those integrating organizational and social contexts. The interventions, which are offered to all employees, include environmental- and individual-level approaches to improve physical activity and promote healthful eating practices. Environmental strategies include reducing portion sizes, modifying cafeteria recipes to lower their fat contents, and increasing the accessibility of fitness equipment at the workplace. Across all seven studies about 48% (N = 23,000) of the population is randomly selected for measurements. The primary outcome measure is change in BMI or body weight after two years of intervention. Secondary measures include waist circumference, objective, and self-report measures of physical activity, dietary intake, changes in vending machines and cafeteria food offerings, work productivity, healthcare use, and return on investment.

Discussion: The results of these studies could have important implications for the design and implementation of worksite overweight and obesity control programs.

Key words: environmental-level interventions, individual-level interventions, physical activity, dietary intake

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Introduction

Overweight and obesity in the U.S. population have reached epidemic proportions, with about 66% of U.S. adults being overweight or obese (1). The dramatic increase in prevalence of obesity over the past two decades cannot be explained by genetic changes, but by environmental factors that encourage increased energy intake and decreased energy expenditure (2). Environmental, community, and societal factors influence dietary and physical activity behaviors and may foster a positive energy balance (2,3), suggesting that strategies for addressing the obesity epidemic must include environmental approaches.

Environmental approaches use policies, programs, or organizational practices to influence behaviors by, for example, increasing the availability of, and providing access to, healthful food choices and facilities for physical activity,

Development of the Environmental Assessment Tool (EAT) to Measure Organizational Physical and Social Support for Worksite Obesity Prevention Programs

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Learning Objectives

- Summarize estimates of inter-rater reliability, concurrent validity, and predictive validity for the Environmental Assessment Tool (EAT), developed to evaluate those physical and social attributes of the work site that help to prevent or combat obesity.
- Conclude how reliably the EAT measures the environment at the work site as it relates to physical activity, food choices, and weight management.
- List the ways in which practical use of the EAT may be limited.

Abstract

Objective: *To describe the development, reliability, and validity of the Environmental Assessment Tool (EAT) for assessing worksite physical and social environmental support for obesity prevention.* ***Methods:*** *The EAT was developed using a multistep process. Inter-rater reliability was estimated via Kappa and other measures. Concurrent and predictive validity were estimated using site-level correlations and person-level multiple regression analyses comparing EAT scores and employee absenteeism and health care expenditures.* ***Results:*** *Results show high inter-rater reliability and concurrent validity for many measures and predictive validity for absenteeism expenditures.* ***Conclusions:*** *The primary use of the EAT is as a physical and social environment assessment tool for worksite obesity prevention efforts. It can be used as a reliable and valid means to estimate relationships between environmental interventions and absenteeism and medical expenditures, provided those expenditures are for the same year that the EAT is administered.* (J Occup Environ Med. *2008;50:126–137*)

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None of the authors have affiliations with products or companies mentioned in this article, with the exception of the last author, Karen Tully, who is an employee of Dow Chemical, where the data were collected.

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Obesity is a major public health concern, with recent surveys showing about two-thirds of adults in the United States classified as overweight or obese[1] and consequently at risk for health care problems such as type-2 diabetes, cardiovascular disease, stroke, cancer, osteoarthritis, depression, gallbladder disease, and respiratory disorders.[2,3] The high incidence of obesity and its relationship to other major medical disorders makes it a costly condition, accounting for an estimated 5.5% to 7.0% of US health expenditures between 1986 and 1995.[4] In addition, obese adults have approximately 36% higher medical expenditures than their normal weight counterparts[5] and higher rates of absenteeism and presenteeism.[6–8]

To help control costs and improve the health of their workers, employers are introducing a variety of health promotion and risk reduction programs including those that address the growing problem of overweight and obese workers. Worksite health promotion programs aim to improve the health status of workers by offering individual risk reduction interventions coupled with efforts to address environmental, social, and ecological forces that contribute to unhealthy behaviors. Specifically, employers are taking steps to address the "obesogenic" environment at the workplace that promotes overeating and lack of exercise.[9] Changing the work environment to induce positive health improvements is supported by social-

Measurement Issues

Assessing Management Support for Worksite Health Promotion: Psychometric Analysis of the Leading by Example (LBE) Instrument

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Abstract

Purpose. *Describe the development of the leading by example (LBE) instrument.*

Methods. *A total of 135 responses from employees of a private corporation working at 11 different worksites were factor analyzed in 2005. Exploratory factor analysis was used to obtain an initial factor structure. Factor validity was evaluated using confirmatory factor analysis methods. A second sample was collected in 2006 from the same population (N = 178) and was used to confirm the factor structure via confirmatory factor analysis. Cronbach's α and item-total correlations provided information on the reliability of the factor subscales.*

Results. *Four subscales were identified: business alignment with health promotion objectives, awareness of the health-productivity link, worksite support for health promotion, and leadership support for health promotion. Factor by group comparisons revealed that the initial factor structure was effective in detecting differences in organizational support for health promotion across different employee groups.*

Conclusions. *Management support for health promotion can be assessed using the LBE, a brief, self-report questionnaire. Researchers can use the LBE to diagnose, track, and evaluate worksite health promotion programs. (Am J Health Promot 2008;22[5]:359–367.)*

Key Words: Management Support, Instrument Development, Worksite, Prevention Research. Manuscript format: research; Research purpose: instrument development; Study design: non-experimental; Setting: workplace; Health focus: weight control; Strategy: management support; Target population: adults; Target population circumstances: geographic location, work role

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INTRODUCTION

Traditionally, workplace health promotion programs have focused more on changing individual employee health behaviors than changing environmental factors that impact healthy lifestyles. This historical emphasis on individual behavior change is somewhat surprising given the acknowledged importance of environmental factors in most conceptualizations of health promotion. Green and Kreuter,[1] for example, originally defined health promotion as: "...the combination of educational and environmental supports for actions and conditions of living conducive to health." O'Donnell[2] also acknowledged the interaction of behavioral and environmental factors and further argued that the environment would likely be the most important influence in producing sustained changes in health practices. Within this framework, supportive social and physical environments should be considered essential aspects of comprehensive worksite health promotion programs. Even *Healthy People 2010* references "comprehensive programs" when setting objectives for worksite health promotion.[3]

More recently socioecologic models of health promotion and the use of multilevel interventions that involve combinations of individually and environmentally focused programs have helped shift workplace programs toward more inclusive approaches. This shift toward inclusive approaches has been spurred by the burgeoning practice of translating community-based capacity building concepts to workplace environments. In the literature, Stokols[4] advocated for expanding the health-promotive capacity of environments, and DeJoy and Wilson[5] discussed the merits of organizational health promotion. Additionally, the National Institute for Occupational Safety and Health recently commissioned two position papers on the integration of occupational safety and health and worksite health promotion as part of its *Steps to a Healthier Workforce* initiative.[6,7] These papers further highlighted the environment-behavior interface in terms of employee health and well-being.

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First-Year Results of an Obesity Prevention Program at The Dow Chemical Company

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Learning Objectives

- Review the evidence regarding the effects of the environment on the risk of obesity and overweight, and the rationale for applying environmental modifications to workplace settings.
- Discuss the interim findings of the obesity prevention program described by Goetzel et al, including the effects on body weight, obesity rates, blood glucose levels, etc.
- Summarize the implications for introduction of environmental modifications in environmental settings, including comparison with individually oriented health promotion interventions.

Abstract

Objective: To examine first-year results from a workplace environmental obesity prevention program at The Dow Chemical Company. Methods: A quasi-experimental cohort study was conducted among employees at nine treatment worksites (n = 8013) who received environmental weight management interventions and three control worksites (n = 2269). Changes in employees' weight, body mass index (BMI), and other health risks were examined using χ^2 and t-tests. Results: After 1 year, a modest treatment effect was observed for weight and BMI largely because the control group subjects gained weight; however, no effect was observed for overweight and obesity prevalence. Other risk factors (tobacco use, high blood pressure, and systolic and diastolic blood pressure values) decreased significantly, although blood glucose (high risk prevalence and values) increased. Conclusions: Environmental changes to the workplace can achieve modest improvements in employees' health risks, including weight and BMI measures, in 1 year. (J Occup Environ Med. *2009;51:125–138*)

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Over 66% of American adults are overweight or obese[1] placing them at increased risk for developing a number of disorders including type 2 diabetes, cardiovascular disease, stroke, some forms of cancer, osteoarthritis, depression, gallbladder disease, and respiratory disorders.[2,3] It is estimated that health problems related to excess weight may lead to an estimated 280,000 to 325,000 premature deaths each year in the US.[4]

Employed adults spend nearly a quarter of their lives at work. Unfortunately, certain aspects of the work environment, and its associated pressures and time demands, have been shown to negatively affect employee lifestyle and behavior patterns including poor eating habits and inactivity, which may lead to overweight and obesity.[5–10] Obesity can be costly to organizations. Obese employees take more sick leave than their non-obese counterparts and are twice as likely to experience high levels of absenteeism.[11]

Although precise estimates of the medical costs associated with overweight and obesity vary, the relative amount of costs incurred by obese workers when compared with their non-obese counterparts is large.[12–17] The Centers for Disease Control and Prevention estimates the combined annual direct and indirect national medical cost burden attributable to overweight and obesity to be $117 billion (in 2000 dollars).[16] Approximately $75 billion of that amount is spent on treating medical conditions related to obesity.[17] Strum estimated annual excess medical costs attributable to obesity and overweight to be

In Press/Under Review Papers

- Goetzel RZ et al. (In press). *Case Study: Introducing Environmental Interventions at The Dow Chemical Company Aimed at Reducing Overweight and Obesity among Workers*. Book chapter in American College of Sports Medicine Worksite Health Handbook. Second Edition: Healthy Worker, Healthy Company, Pronk N (ed.) Human Kinetics.

- Della L, Mitchell SG, DeJoy, DM, Goetzel RZ, Roemer EC, Wilson MG. Management Support of Workplace Health Promotion: Field Test of the Leading by Example Tool. American Journal of Health Promotion.

- Goetzel RZ, Gibson TB, Short ME, et al. Results of a Multi-site Analysis Examining Relationships among Body Mass Index, Medical Utilization and Worker Productivity. Medical Care.

- Short ME, Goetzel, RZ, Tabrizi MJ, et al. How Do Self-reported Health Care Utilization and Absenteeism Measures Compare to Administrative Data? Journal of Occupational and Environmental Medicine.

Presentations 2005-2006

- Advisory Committee Meeting, National Business Group on Health
  - *Environmental Approaches to Obesity Prevention and Management at The Dow Chemical Company: Institute on the Costs and Health Effects of Obesity*
  - *Environmental Approaches to Obesity Prevention and Management at The Dow Chemical Company: The Dow LightenUP Project - Year 1 Results and Lessons Learned.*
- American Public Health Association 133th Annual Conference
  - *Development of an Environmental Obesity Intervention in a Large Organization*.
- The Health and Human Capital Management Congress
  - *Developing a Corporate Culture to Effectively Maximize Health & Productivity Initiatives in the Workplace*.
- National Conference on Health Promotion and Education
  - *Environmental Approaches to Obesity Prevention and Management at the Dow Chemical Company – Evaluating Program Impact on Health and Costs*.
- Leadership Summit - Institute on the Costs and Health Effects of Obesity: Health Improvement as a Business Imperative. National Business Group on Health
  - *Interventions to Address Obesity at the Dow Chemical Company: How the Program was Sold, Designed, Implemented and Evaluated.*
- Centers for Disease Control and Prevention National Health Promotion Conference
  - *Environmental Approaches to Obesity Prevention and Management at Dow Chemical Company: First Year Results*
- Institute for Health Productivity Management Annual International Conference
  - *The Dow Chemical Company Health Strategy Case Study: LightenUP*

Presentations 2006-2007

- American Public Health Association 134th Annual meeting
  - *Leading by Example (LBE): Assessing Leadership and Organizational Support for Health Promotion and Disease Prevention.*
  - *Assessing Environmental Supports for Healthy Behaviors: The Environmental Assessment Tool.*
  - *Environmental Approaches to Obesity Prevention and Management at Dow Chemical Company: First Year Results.*
  - *Role of Worksite Wellness in Obesity Preventions Efforts.*
- World Health Care Congress
  - *Measurement of Health Status for Improved Productivity*
- Institute on the Costs and Health Effects of Obesity-National Business Group on Health
  - Morning Keynote Address: "*Good Health is Good Business – Making Health Happen.*"
- The 19th IUHPE World Conference on Health Promotion and Health Education
  - *Lessons Learned from a Worksite Intervention Project: Building Capacity to Sustain a Healthy Culture.*
  - *Environmental Approaches to Weight Management in a Work Setting: Structuring the Process Evaluation*.
  - *An Environmental Assessment Tool for Weight Management: Worksite Application.*

Presentations 2007

- The GM Health Services 2007 Worldwide Leadership Conference
  - *Achieving Population Health Improvement at the Worksite: The Role of Culture and Organizational Environment.*
- CDC/NIOSH WorkLife 2007
  - *Environmental Approaches to Obesity Prevention and Management at The Dow Chemical Company: Second Year Results.*
- The HERO Forum for Employee Health Management Solutions
  - *Environmental approaches to obesity prevention and management at Dow Chemical Company: Design and implementation of interventions.*
- Corporate Health Improvement Program Meeting
  - *The Lighten Up Study, Creating a Healthy Culture*
- The IBI/NBGH Joint Forum on Health, Productivity and Absence Management
  - *Forecasting Return on Investment (ROI) for Improving Employee Health and Productivity*
- American Public Health Association, 135th Annual meeting
  - *Challenges of Implementing a Healthy Choice Vending Intervention*
- American Heart Association Annual Scientific Sessions
  - *Environmental Approaches to Obesity Prevention and Management at The Dow Chemical Company: Second Year Results.*

Presentations 2008-2009

- The Seventh International Conference on Occupational Stress
  - *Job Stress and Obesity: Examining Organizational Support and Presenteeism.*
- Kentucky Conference on Health Communication
  - *Assessing organizational support of a worksite health promotion intervention: The incremental impact of management communication on perceptions of intervention support*
- 18th Annual Art and Science of Health Promotion Conference
  - *Maximizing ROI: What Does the Latest Research Tell Us*
- American Public Health Association 136th Annual Meeting
  - *First year results of an environmental intervention aimed at reducing overweight and obesity and the workplace*.
  - *How Do Self-reported Health Care Utilization and Absenteeism Measures Compare to Administrative Data?*
  - *Use of an environmental assessment tool to measure organizational physical and social support for worksite obesity prevention programs*.
  - *Employee perceptions of an environmental obesity management program.*
  - *Modifying the worksite environment to support individual behavior change*.
- American Occupational Health Conference
  - *First-Year Results of an Obesity Prevention Program at The Dow Chemical Company.*

LightenUP

Implementation

Key Learnings

Healthy Culture – Key Elements

Shared, Focused Vision, Accountability and Role Clarity

Leadership and Partners Engagement: visible, supportive, encouraging, active, specific support request

Integrated Employee Programming and Communications (campaigns, assessment, outreach, environment)

Peer Support

Positive Climate and Energy - high trust/confidentiality, open employee communications, visible company commitment, community

Policies: tobacco, seat belts

Environmental Supports

Key Learnings – overall project

Overall Implementation . .the following are key to implementation

- Integration of employee programming w/assessment, communications, health outreach and cultural supports.
- Clear definition of employee behavior, geographic/site focus w/specific support requests for leaders and workgroups.
- Education and periodic updates to partners regarding the “why” and “how.”
- Flexibility of workgroups and workgroup focal points to align.
- Alignment with organizational priorities, metrics, strategies and processes.
- Sensitivity to organizational processes and timelines when implementing.
- Respect and align with current organizational culture.

Alignment to Existing Dow Strategies and Processes

- Integration of preventive health interventions into existing Dow site goal setting process.
- Emphasis on shared responsibility for health. .
- Integration into existing processes is key (ex: communication is integrated into site communication processes, behavior change is integrated into contribution practices; “Healthy Living, Healthy Giving,” site goals integrated into MI plans, etc.)

Key Learnings

Communications

- simple, consistent, interactive, communications focused on norms, beliefs and behaviors using multiple vehicles is effective.
- integration with existing communication vehicles is effective (safety or communication meetings, e-mail, leader face to face).
- periodic updates to leaders, HS and other partners aids engagement.

Integrated Employee Programming – WY8 Challenge

- long term, goal oriented, employee driven program w/supplemental resources are effective and emphasizes shared responsibility.
- integration of assessment, communication, health outreach and cultural supports is key to effectiveness.
- personal engagement with employee clients aided goal setting and participation.

Key Learnings

Employee Engagement – the following are key:

- focus on behavioral drivers when communicating to employees.
- focus efforts to meet existing employee interests and needs at the point of impact (plant/dept "life:" direct supervision, plant/dept focal points and peer support.
- strong trust of Health Services organization is key – emphasis on confidentiality.
- ensure visibility of supportive environment interventions.
  - communicate shared responsibility.
  - promote positive energy through the following:
    - on-going (competitions)
    - connect to existing employee and beliefs ("Healthy Living, Healthy Giving")
    - identify and recognize champions and success stories - get the employees involved i.e. Healthy Culture Focal Points as "Points of Light."
    - recognize peers, supervisors (lifestyle changes and advocates/points of light).
- ensure momentum through on-going continuation of existing health efforts and strategy.

Key Learnings

Peer Support and Work Climate

Interventions that are implemented and visible in the workgroup can positively impact employee perception, awareness, access to physical activity and healthy foods.

- employee recognition is effective in building positive climate and employee perception (best when done employee to employee or workgroup leader to employee).
  - a formal introduction is best initially, but needs to be quickly passed on to leaders and teams to implement on an on-going basis.
  - modeling recognition for leadership is helpful.
- designated, workgroup focal points w/specific roles are valued and effective in communication and advocacy (most effective w/workgroup leader active support).
- health supports are effective when available within plants / depts when they are employee driven and simple (Healthy Cupboards, Operator rounds, etc.).

Key Learnings

Environmental Supports

Implementation of access to healthy foods and access to physical activity recommendations can be increased through leadership support and education.

- Access to Physical Activity
  - implementation of designated walkng paths in manufacturing areas is difficult due to operating discipline issues.
  - effort may best be focused on walking during the day (energy breaks, water breaks, Operator rounds, etc.).
- Access to Healthy Food
  - access and sales of these foods, can be positively impacted through vendor partnering and leadership support.
  - continued improvement in access to Healthy Foods for cafeteria and catering requires communicated high level support and vendor agreements.

Key Learnings

Leadership Engagement – the following are key:

Leadership partnering, when approached proactively with specific support requests, yeilds engagement and support.

- leadership communication and engagement; leaders do respond to specific support requests where there is are processes to reinforce their expectations; they will seek guidance to help them to be effective.
- engage support and recommendations from key health related partners, site leadership team and leader champions.
- engage support from Senior Leadership in the form of recognition and affirmation is appreciated and effective in impacting leadership support level.
- Educate/train initially and communicate periodically (roles, behaviors, best practices, motivation to address their own health).
- make leader support “turn key” so that they can focus on influencing and modeling; use small bits of communication, integrated into existing vehicles.

Key Learnings

Health Services Engagement

- focused, site wide interventions can increase HS engagement in their own health.
- awareness of employee successes can serve to increase HS motivation.

Discussion and Questions