The Art of Health Promotion

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Meta-Evaluation of Worksite Health Promotion Economic Return Studies: 2012 Update

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Setting the Stage

Two earlier editions of *The Art of Health Promotion* reported formal meta-evaluations of economic return studies of worksite health promotion programs.[1,2] These meta-evaluations were among the most popular articles in our publishing history because practitioners, scientists, and employers continue to seek evidence on the economic effectiveness of workplace health promotion. The 2003 report examined 42 peer-reviewed journal articles that met the inclusion criteria, and the 2005 report examined 56 peer-reviewed journal articles. This 2012 update examines 10 additional studies that met the same set of inclusion criteria; four of the weaker studies were dropped, resulting in a total of 62 studies in this report.

The meta-evaluation method used here is the same as used in the earlier reports and has been adapted from use with other preventive health programs, providing an overall summary and individual look at the quality of the peer reviewed articles that comprise the current scientific evidence of economic return for worksite health promotion and wellness programs.

The term "meta-evaluation" as used in this article is defined as the application of a systematic review process to a set of evaluation studies with a similar purpose in order to determine their respective quality and to summarize their primary findings. It applies the formal meta-evaluation review process and methodology developed and refined by Windsor and Orleans[3] and further modified by Boyd and Windsor[4] to studies of multi-component worksite health promotion programs as defined by Heaney.[5] This report include excerpts from the book *Proof Positive: An Analysis of the Cost-Effectiveness of Worksite Wellness*, seventh edition, revised and expanded in December of 2011,[6] which applies the same methodology.

This edition of *The Art of Health Promotion* addresses the following topics:

- Study inclusion criteria
- Literature search process
- Description of meta-evaluation approach
- Summary of results of meta-evaluation
- Summary of individual study findings
- Discussion of key findings
- The Harvard Meta-Analysis: a significant new finding

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Study Inclusion Criteria

The study selection or inclusion criteria used remained the same for this update as for the two earlier reports. In addition, for the purposes of this updated meta-evaluation, articles classified as "program evaluations" by Medline were included if they met all of the following criteria:

1. ***Multicomponent Programming.*** Qualifying articles must report on programs that include any combination of a minimum of three of the following types of program interventions: smoking prevention and cessation, physical fitness, nutrition, stress management, medical self-care, high blood pressure control, cholesterol reduction, cardiovascular disease prevention, prenatal care, seat belt use, back injury prevention, back pain prevention, weight management, and nutrition education.

In This Issue

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2. ***Workplace Setting Only.*** Qualifying articles must report on evaluation of organized program efforts conducted only in workplace settings for working populations with or without spouses.
3. ***Reasonably Rigorous Study Design.*** Qualifying articles must include the use of a comparison or control group; however, participants can be used as their own controls in order to meet this criterion.
4. ***Original Research.*** Qualifying articles must represent the initial or original publication of research findings and results.
5. ***Examine Economic Variable.*** Qualifying articles must evaluate one or more economic variables associated with working populations or characteristics of organizational life as part of the evaluation design and measurement strategy. This typically includes any one or combination of health benefit plan costs (including health care utilization indicators), sick leave absenteeism, workers' compensation costs, disability insurance and management costs, pension effects, and/or presenteeism effects.
6. ***Publication in a Peer-Reviewed Journal.*** Qualifying articles must be published in a peer-reviewed journal and follow traditional methods of peer review and scientific inquiry.
7. ***Use of Statistical Analysis.*** Qualifying articles must include some appropriate form of statistical analysis of observed changes.
8. ***Sufficient Sample Size.*** Qualifying articles must have large enough samples to allow meaningful analysis and statistical power.
9. ***Replicable Interventions.*** Qualifying articles must use replicable interventions that can be conducted in typical worksite settings.
10. ***Minimum Length of Intervention Period.*** Qualifying articles must include an experimental or observational period that is a minimum of 12 months in duration.

Literature Search Process

As documented in previous reports, the research and evaluation literature on health promotion and wellness programs in workplace settings is both complex and voluminous. The literature is characterized by more than 650 formal program evaluation studies of varying quality and methodology, a large number of secondary descriptions of program results, a variety of summary articles reviewing the evaluation literature with varying degrees of rigor, reports of multiple studies, and a growing number of well-designed scientific studies of evaluation findings for programs implemented in workplace settings.[7–9] For the purposes of this updated review and analysis, the literature was again divided into original and secondary reports of worksite health promotion program evaluation efforts and the secondary literature then discarded after review for article leads.

In addition, a distinction continues to be made in this analysis between evaluation studies of single program components or interventions (e.g., a smoking cessation or weight management program evaluation) versus multiple or more comprehensive program interventions (e.g., including a program with smoking cessation, physical activity, cardiovascular health, weight management, and stress management interventions). Another component of the original meta-evaluation approach that was maintained here included an organized search process using both "health promotion" and "wellness." Additionally, one potential article considered for review was rejected because of its inclusion and emphasis on a disease management program in the evaluation design.[10]

The search process used to identify the relevant literature that is analyzed in this update remained the same as the earlier meta-evaluations and was as follows:

Step 1. Online Search of the Business Literature Database. A computerized search of the business literature was conducted using the University of Washington's computer database entitled "Business Index—1989 to the present." This search was conducted in November, 2011, and utilized four primary search terms, "health promotion," "return-on-investment," "worksite," and "evaluation," in an expanded string search format. This search was primarily conducted to uncover citations from the peer-reviewed literature that were relevant to the search topics.

Step 2. Online Search of Health and Social Sciences Databases. Health and social sciences literature was searched through databases that included Medline, 1966 to present; Nursing & Allied Health, 1982 to present; PsycINFO: Psychology, 1967 to present; Expanded Academic Index, 1989 to present; ERIC,1982 to present; and Health Plan, 1986 to present. Title word and abstract limitations were applied to all Medline searches. All potential review articles were acquired through Loansome Doc. The key words used in various combinations in the search process included cost/benefit, cost-effectiveness, cost savings, disability experience, economic analysis evaluation, health care cost, health promotion, health and productivity management, presenteeism, prevention, program, sick leave absenteeism, wellness, workers' compensation, and worksite or workplace.

Step 3. Review of Selected Publications for Program Evaluation Findings. The electronic databases of the following journals were reviewed to identify articles on the economic evaluation of worksite health promotion programs: *American Journal of Health Promotion*; *American Journal of Preventive Medicine*; *American Journal of Public Health*; *Annals of Public Health*; *Health Affairs*; *Health Values*; *Inquiry*; *JAMA, the Journal of the American Medical Association*; *Journal of Occupational and Environmental Medicine*; *Health Services Research*; *Medical Care*; *Population Health Management*; and *Public Health Reports*.

Step 4. Back Search of References From Primary Articles. The references of articles already included in the meta-evaluation were reviewed to identify additional studies.

Step 5. Colleague Inquiry. Several professional colleagues were approached in late 2011 to determine if any applicable articles might be in publication that were likely to meet the study inclusion criteria.

The literature search process described above identified 62 qualifying evaluation studies of the economic return associated with worksite health promotion and wellness programs and are formally analyzed in this meta-evaluation. The studies included in this meta-evaluation are identified in Table 1. The 10 new studies

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For information on submission of articles for *The Art of Health Promotion*, please contact the editor at 206-364-3448.

Table 1
Studies Meeting Inclusion Criteria

1. Aldana SG, Jacobson BH, Harris CJ, et al. Influence of a mobile worksite health promotion program on health care costs. *Am J Prev Med.* 1993;9:378–383.
2. Aldana SG, Merrill RM, Price K, et al. Financial impact of a comprehensive multisite workplace health promotion program. *Prev Med.* 2005;40:131–137.
3. Anderzén I, Arnetz BB. The impact of a prospective survey-based workplace intervention program on employee health, biologic stress markers, and organizational productivity. *J Occup Environ Med.* 2005;47:671–682.*
4. Baun WB, Bernacki EJ, Tsai SP. A preliminary investigation: effect of a corporate fitness program on absenteeism and health care cost. *J Occup Med.* 1986;28:18–22.
5. Bertera RL. Behavioral risk factor and illness day changes with workplace health promotion: two-year results. *Am J Health Promot.* 1993;7:365–373.
6. Bertera RL. The effects of workplace health promotion on absenteeism and employment costs in a large industrial population. *Am J Public Health.* 1990;80:1101–1105.
7. Blair SN, Smith M, Collingwood TR, et al. Health promotion for educators: impact on absenteeism. *Prev Med.* 1986;15:166–175.
8. Bly JL, Jones RC, Richardson JE. Impact of worksite health promotion on health care costs and utilization: evaluation of Johnson & Johnson's Live for Life Program. *JAMA.* 1986;19; 256:3235–3240.
9. Bowne DW, Russell ML, Morgan JL, et al. Reduced disability and health care costs in an industrial fitness program. *J Occup Med.* 1984;26:809–816.
10. Cady LD Jr, Thomas PC, Karwasky RJ. Program for increasing health and physical fitness of fire fighters. *J Occup Med.* 1985;27:110–114.
11. Conrad KM, Riedel JE, Gibbs JO. Effect of worksite health promotion programs on employee absenteeism. *AAOHN J.* 1990;38:573–580.
12. Dalton BA, Harris J. A comprehensive approach to corporate health management. *J Occup Med.* 1991;33:338–348.
13. Erfurt JC, Foote A, Heirich MA. The cost-effectiveness of work-site wellness programs for hypertension control, weight loss, and smoking cessation. *J Occup Med.* 1991;33:962–970.
14. Fries JF, Fries ST, Parcell CL, Harrington H. Health risk changes with a low-cost individualized health promotion program: effects at up to 30 months. *Am J Health Promot.* 1992;6:364–371.
15. Fries JF, Bloch DA, Harrington H, et al. Two-year results of a randomized controlled trial of a health promotion program in a retiree population: the Bank of America study. *Am J Med.* 1993;94:455–462.
16. Fries JF, Harrington H, Edwards R, et al. Randomized controlled trial of cost reductions from a health education program: the California Public Employees' Retirement System (PERS) study. *Am J Health Promot.* 1994;8:216–223.
17. Fries JF, McShane D. Reducing need and demand for medical services in high risk persons. *West J Med.* 1998;169:201–207.
18. Gibbs JO, Mulvaney D, Henes C, Reed RW. Work-site health promotion; five year trend in employee health care costs. *J Occup Med.* 1985;27:826–830.
19. Goetzel RZ, Jacobson BH, Aldana SG, et al. Health care costs of worksite health promotion participants and non-participants. *J Occup Environ Med.* 1998;40:341–346.
20. Goetzel RZ, Dunn RL, Ozminkowski RJ, et al. Differences between descriptive and multivariate estimates of the impact of Chevron Corporation's Health Quest program on medical expenditures. *J Occup Environ Med.* 1998;40:538–545.
21. Golaszewski T, Snow D, Lynch W, et al. A benefit-to-cost analysis of a work-site health promotion program. *J Occup Med.* 1992;34:1164–1172.
22. Hall-Barrow J, Hodges LC, Brown P. A collaborative model for employee health and nursing education: successful program. *AAOHN J.* 2001;49:429–436.

Table 1, Continued

23. Harvey MR, Whitmer RW, Hilyer JC, Brown KC. The impact of a comprehensive medical benefits cost management program for the city of Birmingham: results at five years. *Am J Health Promot.* 1993;7:296–303.
24. Haynes G, Dunnigan T, Smith V. Do employees participating in voluntary health promotion programs incur lower health care costs? *Health Promot Int.* 1999;14:43–51.
25. Henke RM, Goetzel RZ, McHugh J, Isaac F. Recent experience in health promotion at Johnson & Johnson: lower health spending, strong return on investment. Health Aff (Millwood). 2011;30:490–499.*
26. Henritze J, Brammell HL. Phase II cardiac wellness at the Adolph Coors Company. *Am J Health Promot.* 1989;4:25–31.
27. Henritze J, Brammell HL, McGloin J. LIFECHECK: a successful, low touch, low tech, in-plant, cardiovascular disease risk identification and modification program. *Am J Health Promot.* 1992;7:129–136.
28. Hochart C, Lang M. Impact of a comprehensive worksite wellness program on health risks, utilization, and health care costs. *Popul Health Manag.* 2011;14:111–116.*
29. Hodges LC, Harper TS, Hall-Barrow J, Tatom ID. Reducing overall health care costs for a city municipality: a real life community based learning model. *AAOHN J.* 2004;52:247–257.
30. Jeffery RW, Forster JL, Dunn BV, et al. Effects of work-site health promotion on illness-related absenteeism. *J Occup Med.* 1993;35:1142–1146.
31. Jones RC, Bly JL, Richardson JE. A study of a work site health promotion program and absenteeism. *J Occup Med.* 1990;32:95–99.
32. Knight KK, Goetzel RZ, Fielding JE, et al. An evaluation of Duke University's LIVE FOR LIFE health promotion program on changes in worker absenteeism. *J Occup Med.* 1994;36:533–534.
33. Lechner L, de Vries H, Adriaansen S, Drabbels L. Effects of an employee fitness program on reduced absenteeism. *J Occup Environ Med.* 1997;39:827–831.
34. Leigh JP, Richardson N, Beck R, et al. Randomized controlled study of a retiree health promotion program: the Bank of America study. *Arch Intern Med.* 1992;152:1201–1206.
35. Loeppke R, Nicholson S, Taitel M, et al. The impact of an integrated population health enhancement and disease management program on employee health risk, health conditions, and productivity. *Popul Health Manag.* 2008;11:287–296.*
36. Long DA, Sheehan P. A case study of population health improvement at a Midwest regional hospital employer. *Popul Health Manag.* 2010;13:163–173.*
37. Lorig K, Kraines RG, Brown BW Jr, et al. A workplace health education program that reduces outpatient visits. *Med Care.* 1984;23:1044–11054.
38. Lynch WD, Golaszewski TJ, Clearie AF, et al. Impact of a facility-based corporate fitness program on the number of absentees from work due to illness. *J Occup Med.* 1990;32:9–12.
39. Maes S, Verhoeven C, Kittel F, Scholten H. Effects of a Dutch work-site wellness-health program: the Brabantia Project. *Am J Public Health.* 1998;88:1037–1041.
40. Merrill RM, Hyatt B, Aldana SG, Kinnersley D. Lowering employee health care costs through the healthy lifestyle incentive program. *J Public Health Manag Pract.* 2011;17:225–232.*
41. Milani RV, Lavie CJ. Impact of worksite wellness intervention on cardiac risk factors and one-year health care costs. *Am J Cardiol.* 2009;104:1389–1392.*
42. Mills PR, Kessler RC, Cooper J, Sullivan S. Impact of a health promotion program on employee health risks and work productivity. *Am J Health Promot.* 2007;22:45–53.*
43. Musich SA, Adams L, Edington DW. Effectiveness of health promotion programs in moderating medical costs in the USA. *Health Promot Int.* 2000;15:5–15.

Table 1, Continued

44. Naydeck BL, Pearson JA, Ozminkowski RJ, et al. The impact of the Highmark employee wellness program on 4-year healthcare costs. *J Occup Environ Med.* 2008;50:146–156.*
45. Ozminkowski RJ, Dunn RL, Goetzel RZ, et al. A return on investment evaluation of the Citibank, N.A., health management program. *Am J Health Promot.* 1999;14:31–43.
46. Ozminkowski RJ, Ling D, Goetzel RZ, et al. Long term impact of Johnson & Johnson's Health & Wellness Program on health care utilization and expenditures. *J Occup Environ Med.* 2002;44; 21–29.
47. Ozminkowski RJ, Goetzel RZ, Wang F, et al. The savings gained from participation in health promotion programs for Medicare beneficiaries. *J Occup Environ Med.* 2006;48:1125–1132.*
48. Schultz AB, Lu C, Barnett TE, et al. Influence of participation in a worksite health promotion program on disability days. *J Occup Environ Med.* 2002;44:776–780.
49. Sciacca J, Seehafer R, Reed R, Mulvaney D. The impact of participation in health promotion on medical costs: a reconsideration of the Blue Cross and Blue Shield of Indiana study. *Am J Health Promot.* 1993;7:374–395.
50. Serxner S, Gold D, Anderson D, Williams D. The impact of a worksite health promotion program on short term disability usage. *J Occup Environ Med.* 2001;43:25–29.
51. Serxner SA, Gold DB, Grossmeier JJ, Anderson DR. The relationship between health promotion program participation and medical costs: a dose response. *J Occup Environ Med.* 2003;45:1196–1200.
52. Shephard RJ, Corey P, Renzland P, Cox M. The influence of an employee fitness and lifestyle modification program upon medical care costs. *Can J Public Health.* 1982;73:259–263.
53. Shephard RJ. Twelve years experience of a fitness program for the salaried employees of a Toronto life assurance company. *Am J Health Promot.* 1992;6:292–301.
54. Shi L. Health promotion, medical care use, and costs in a sample of worksite employees. *Eval Rev.* 1993;17:475–487.
55. Shi L. Worksite health promotion and changes in medical care use and sick days. *Health Values.* 1993;17:9–17.
56. Shimizu T, Nagashima S, Mizoue T, et al. A psychosocial-approached health promotion program at a Japanese worksite. *J UOEH.* 2003;25:23–34.
57. Stave GM, Muchmore L, Gardner H. Quantifiable impact of the Contract for Health and Wellness: health behaviors, health care costs, disability, and workers' compensation. *J Occup Environ Med.* 2003;45:109–117.
58. Stein AD, Karel T, Zuidema R. Carrots and sticks: impact of an incentive/disincentive employee flexible credit benefit plan on health status and medical costs. *Am J Health Promot.* 1999;13:260–267.
59. Stein AD, Shakour SK, Zuidema RA. Financial incentives, participation in employer-sponsored health promotion, and changes in employee health and productivity: HealthPlus Health Quotient Program. *J Occup Environ Med.* 2000;42:1148–1155.
60. Trudeau JV, Deitz DK, Cook RF. Utilization and cost of behavioral health services: Employee characteristics and workplace health promotion. *J Behav Health Serv Res.* 2002;9:61–74.
61. Wheat JR. Does workplace health promotion decrease medical claims? *Am J Prev Med.* 1992;8:110–114.
62. Wood EA, Olmstead GW, Craig JL. An evaluation of lifestyle risk factors and absenteeism after two years in a worksite health promotion program. *Am J Health Promot.* 1989;4:128–133.

* Indicates one of the 10 new studies added to the list of studies from the 2005 meta-evaluation.

added to the list of studies from the 2005 meta-evaluation cited earlier are designated with an asterisk.

Description of Meta-Evaluation Approach

The purpose of this meta-evaluation is to provide an assessment of the methodological quality of these studies and summarize their effect size. The methodology involves a systematic review of the studies using a standardized set of seven design and methodological criteria with the scoring rules shown in Table 2. Points are totaled and studies are ranked by their point scores.

In the meta-evaluation analytic process for each criterion, a specified number of points iwas assigned to each study based on the characteristics of the specific program evaluation study. Within this approach, the higher the number of total points from all the methodological criteria, the greater likelihood of relevance of the study to current-day programming, and therefore the greater the significance of the research findings to practitioners. Once the studies are ranked in terms of the total number of points from application of the seven meta-evaluation criteria, their results are then summarized with particular attention to the economic variables used. The points defining criterion 7 (experimental time period) were updated to reflect the change in the time period of this analysis, which did create some modifications in point totals and the ultimate rankings of individual studies.

Summary Results of Meta-Evaluation

The results of the meta-evaluation are shown in Table 3. Studies with a larger number of subjects and more recent, longer-duration, and better-designed studies obviously rank higher, and their results deserve more weight in assessing the quality of the research literature regarding the economic return associated with multi-component worksite health promotion programs from the perspective of practitioners.

Summary of Individual Study Findings

Table 4 summarizes the percentage change in the value of the economic variables, based on changes associated with the groups receiving the most intensive intervention for the longest observational time period cited in the study. This approach probably produces a "best-case scenario" result, and allows results to be reported in a succinct format. There is significant variation in the measurement methodology used in the various studies, even when a common economic variable such as sick leave absenteeism is used. The greatest inconsistency was in how health plan costs were measured. Despite these methodological inconsistencies, there was strong consistency in the direction and magnitude of changes produced by programs.

Discussion of Key Findings

This meta-evaluation illustrates the general lack of standardization in the methodology used in economic analysis of worksite health promotion programs. Different measurement methods, varying categories of economic variables used for measuring economic return, use of alternative research designs and statistical tests, all highlight the lack of consistency in research methodology in this field of study. However, in spite of the use of these widely varying

Table 2
Meta-Evaluation Criteria and Scoring Rules

Points	Meta-Evaluation Criteria Subcomponents
Criterion 1. Research design	
5	Randomized pretest and posttest, plus matched control group with multiple replications
4	Equivalent control group design, with pretest and posttest with multiple replications
3	Nonequivalent control group design, with pretest and posttest with multiple replications
2	Subjects as own controls, with pretest and posttest with multiple replications
1	Subjects as own controls, with pretest and posttest with single replication
1-point bonus	For control versus experimental group equivalence
Criterion 2. Sample size*	
5	>50,000
4	25,000–49,999
3	10,000–24,999
2	1000–9999
1	≤999
1-point bonus	For controlling for sample attrition
Criterion 3. Quality of baseline delineations	
5	Comprehensive baselines for risk factors, biometrics, and organizational indicators
4	Baseline measures for selected risk factors, biometrics, and organizational indicators
3	Comprehensive baselines for risk factors and biometrics
2	Selected multiple baseline measures for risk factors and biometrics
1	Selected baselines for risk factors and/or organizational indicators
1-point bonus	For each additional year of baseline conducted prior to the intervention
Criterion 4. Quality of measurements used	
5	Self-report with independent objective verification for all measures, with use of standard measures
4	Self-report with independent objective verification for most measures
3	Self-report or independent objective verification for selected measures
2	Self-report only on risk factors and biometric measures
1	Limited consistency in measurement methodology
1-point bonus	For completely equal measurement treatment of experimental versus control groups
Criterion 5. Appropriateness and replicability of interventions	
5	Current comprehensive state-of-the-art programming, highly replicable, and described in detail
4	Current state-of-the-art programming and highly replicable
3	Current state-of-the-art programming and moderately replicable
2	Traditional programming and highly replicable
1	Traditional programming and moderately replicable
1-point bonus	For very detailed description of intervention
Criterion 6. Length of observational period	
5	>120 months
4	49–120 months
3	25–48 months
2	13–24 months
1	12 months
1-point bonus	For equal observation period for experimental and control group observations
Criterion 7. Experimental time period	
5	Last year of intervention conducted including and after 2005
4	Last year of intervention conducted from 1997 to 2004
3	Last year of intervention conducted from 1993 to 1996
2	Last year of intervention conducted from 1989 to 1992
1	Last year of intervention conducted prior to 1989

* Sample size was not used to independently weight the observed effect in each study. This varies from traditional meta-evaluation methods, but follows the approach advocated by Windsor and Orleans[3] and Boyd and Windsor.[4]

methods and approaches, the results continue to show a surprising congruence. Summary comments on these trends are below.

Methodology Quality. Methodology scores range from 12 to 30. Comment: Given the wide variation in the quality of research methodology, we need to be cautious about the way we summarize the literature to estimate the impact of programs. It may be prudent to report the range of outcomes reported in the literature rather than predict a single likely outcome.

Numbers of Subjects. The number of the subjects in all studies combined was 546,971. Comment: This is a large number of study subjects and represents a very diverse range of industries and types of organizations, including public sector agencies. Given an average duration of 3.83 years for the 62 studies, the number of person-years of observation was close to 2.1 million. This represents a significant amount of experimentation and observation by any standard.

Organization Size. Studies were conducted in a wide range of sizes of organizations. Comment: The distribution of studies by organizational size is shown in Table 5.

Publication Year. The median year of publication for the studies was 1996. Comment: Slightly more than half the 62 studies have been published since 1996, or within the past 16 years. The more recent studies report larger average effects and higher cost-benefit yields than the earlier literature.

Recent Studies Have Better Study Methodology. Of the 10 highest scoring studies in the meta-evaluation, only one was published before 1990, and six were published after 2000; the combined subjects for the 10 best studies included 381,738 subjects, or 69.7% of all the subjects involved in all 62 studies. Comment: The more recent and larger studies receive the most weight in the meta-evaluation methodology and continue to reflect the most important research findings.

Recent Studies Use New Approaches. The more recent studies also tend to use the newer prevention technologies including the following: use of the Transtheoretical Model™, Internet-provided health information, tailoring, benefits-linked financial incentives, telephonic high risk intervention coaching, self-directed change, and annual required morbidity-based health risk appraisals used for individual targeting of interventions. Comment: These newer prevention technologies are also associated with higher levels of economic impact and return. Their use in the studies that have been published in the past 10 years has resulted in slightly more than double the average cost-benefit ratio reported in studies of

Table 3
Meta-Evaluation Results

Reference No.	Primary Author	Meta-Evaluation Criterion Scores							Total	Rank
		1	2	3	4	5	6	7		
25	Henke*	2	4	5	4	5	5	5	30	1
16	Fries†	5	5	5	4	4	3	2	28	2
51	Serxner†	4	4	4	4	4	4	4	28	2
23	Harvey	4	3	5	4	5	4	2	27	4
44	Naydeck*	4	3	4	3	4	4	5	27	4
47	Ozminkowski*	3	5	4	3	4	4	4	27	4
46	Ozminkowski	2	3	5	4	4	4	4	26	7
56	Shimizu	4	2	4	4	4	4	4	26	7
1	Aldana†	4	2	4	4	4	3	4	25	9
8	Bly†	4	3	4	4	5	4	1	25	9
48	Schultz†	3	2	4	4	4	4	4	25	9
34	Leigh†	5	2	5	4	5	1	2	24	12
45	Ozminkowski	4	3	3	3	4	3	4	24	12
6	Bertera†	4	4	3	3	5	3	1	23	14
15	Fries	5	2	4	3	5	2	2	23	14
17	Fries†	3	5	3	2	5	2	3	23	14
40	Merrill*	3	2	2	3	4	4	5	23	14
57	Stave†	3	2	4	3	4	3	4	23	14
59	Stein†	3	2	4	3	4	3	4	23	14
2	Aldana†	3	2	5	1	3	3	5	22	20
5	Bertera†	3	3	4	3	4	3	2	22	20
7	Blair†	4	3	5	4	3	2	1	22	20
19	Goetzel†	5	2	0	4	4	3	4	22	20
20	Goetzel†	3	2	2	4	4	3	4	22	20
21	Golaszewski	2	4	2	3	4	5	2	22	20
28	Hochart*	3	2	4	3	2	3	5	22	20
36	Long*	2	2	3	3	4	3	5	22	20
58	Stein	3	2	4	3	4	3	3	22	20
60	Trudeau	4	1	4	4	3	2	4	22	20
30	Jeffery†	5	3	4	2	2	3	2	21	30
32	Knight†	3	2	2	4	4	4	2	21	30
35	Loeppke*	4	1	4	2	2	3	5	21	30
50	Serxner†	3	2	2	3	4	3	4	21	30
62	Wood†	3	1	2	4	4	4	3	21	30
14	Fries	2	5	2	2	4	3	2	20	35
55	Shi	3	2	4	3	4	2	2	20	35
12	Dalton	2	2	4	3	4	3	1	19	37
31	Jones†	4	2	1	4	4	3	1	19	37
54	Shi†	5	2	1	3	4	2	2	19	37
9	Bowne	3	2	4	3	1	4	1	18	40
13	Erfurt	5	2	2	2	3	3	1	18	40
38	Lynch†	3	2	3	4	2	3	1	18	40
42	Mills*†	3	2	4	2	2	1	4	18	40
43	Musich†	2	2	2	3	2	4	3	18	40
49	Sciacca†	3	1	3	4	2	4	1	18	40
10	Cady	2	2	4	3	1	4	1	17	46
11	Conrad	3	2	2	3	2	4	1	17	46
24	Haynes	2	2	2	3	3	3	2	17	46
33	Lechner†	1	1	4	4	3	1	3	17	46

Table 3, Continued

Reference No.	Primary Author	Meta-Evaluation Criterion Scores								
		1	2	3	4	5	6	7	Total	Rank
39	Maes	2	1	2	3	3	3	3	17	46
3	Anderzén*	1	1	2	4	2	1	5	16	51
18	Gibbs†	2	2	2	3	2	4	1	16	51
29	Hodges	1	1	1	3	2	3	5	16	51
37	Lorig	2	2	2	3	3	2	1	15	54
22	Hall-Barrow	1	2	2	2	2	1	4	14	55
41	Milani*	1	1	2	3	2	1	4	14	55
53	Shephard	2	1	2	1	1	5	2	14	55
26	Henritze	2	1	1	1	3	4	1	13	58
4	Baun†	1	1	2	3	2	2	1	12	59
27	Henritze	1	1	1	3	3	1	2	12	59
52	Shephard†	3	1	2	3	1	1	1	12	59
61	Wheat	2	2	1	2	2	1	2	12	59

* New study in this update of the meta-evaluation.
† Included in the Baicker et al.[14] meta-analysis.

traditional program models; in other words, instead of the typical 1:3.0 cost-benefit ratio they report 1:6.1.

Health Care Utilization or Cost as a Study Outcome. Thirty-two studies, or 51.6%, used health care utilization or cost as an outcome measure. Comment: Persistent health care cost escalation in spite of health care reform will likely continue to make this economic variable the most significant concern for employers. As a consequence, it is likely to continue to be the most frequently examined economic variable in future program studies.

Absenteeism as Outcome Measure. Sick leave absenteeism was measured in 26 studies (41.9%). Comment: Sick leave effects are the second most common economic variable used to examine the economic return associated with worksite health promotion programs. Interest in absenteeism is likely to increase given the growing interest in productivity as an overall outcome, but may be more difficult to measure given the growing tendency of employers to include sick days and vacation time into combined leave approaches. Several of the more recent studies reported here attempt to monetize the savings associated with reduction of presenteeism-related losses.[11–13] However, most studies included here only used one of five possible economic variables to examine economic return, resulting in a significantly lower level of reported economic benefit.

Workers' Compensation and/or Disability as an Outcome Measure. Only seven studies examined workers' compensation and/or disability management costs. Comment: The limited number of studies that examine these two economic variables continue to indicate that few health promotion programs have included injury prevention or a concern for costs associated with injuries.

Use of Only One Outcome Measure. Forty-four studies (70.9%) use only one outcome measure. Comment: More than two-thirds of the studies examined the savings limited to a single economic variable, and many of these, in arriving at a return-on-investment (ROI) calculation, divide this savings by the entire program cost; as a consequence, total economic impact and return are likely to be understated. The ideal would be for each study to examine health plan cost, sick leave cost, workers' compensation cost, disability management, and presenteeism cost effects. This approach to economic return would likely provide a more realistic assessment of the economic return associated with worksite health promotion and wellness programs and would tend to make health promotion and wellness more of a strategic business issue.

Meta-Analysis: A Significant New Research Finding

As a significant new development since the previous meta-evaluation, a formal meta-analysis has been published in the peer review literature. The article, authored by Katherine Baicker, David Cutler, and Zirui Song, is a meta-analysis of the literature on the financial impact of workplace health promotion limited to health plan cost savings and sick leave absenteeism savings.[14] This analytic process involves combining the raw data or the reported outcomes from multiple studies to perform new statistical analysis. The authors limited their analysis to data from studies with experimental or quasi-experimental study designs for health care cost savings. This included data from 22 studies that examine health plan cost savings associated with worksite health promotion programs and 22 studies that examine sick leave absenteeism savings associated with worksite health promotion programs. Some of the studies addressed both economic variables. Baicker and colleagues[14] calculated ROIs of $3.27 for medical cost savings and $2.73 for absenteeism reduction. Because of the importance of this independent study, using much more sophisticated statistical techniques, it should be cited much more frequently by health promotion and wellness professionals. Studies included in this analysis are indicated in Tables 3 and 4.

Conclusion

This 2012 meta-evaluation update provides a systematic look at the quality and summary results of the literature on the financial impact of workplace health promotion programs. The summary evidence continues to be strong with average reductions in sick leave, health

Table 4
Percentage Reported Change in Economic Variables and Cost/Benefit Ratios

No.	Author	Study Rank	% Change in Sick Leave Absenteeism	% Change in Health Costs	% Change in WC/DM Costs[a]	Cost-Benefit Ratio Reported
25	Henke[b]	1		−3.70		2.90
16	Fries[c]	2				
51	Serxner[d]	2			−20.00	
23	Harvey	4		−50.10		19.41[e]
44	Naydeck[b]	4		−7.90		1.65
47	Ozminkowski[f]	7				
46	Ozminkowski	7		−9.70		
56	Shimizu	7	−35.40			
1	Aldana[d]	9		−16.0[g]		3.60
8	Bly[d]	9		−7.4[h]		
48	Schultz[d]	9			−36.50	2.30
34	Leigh[d]	12	−12.10	−32.00		4.73
45	Ozminkowski	12		−41.00		4.64
17	Fries[d]	14	−23.30	−26.70		6.00
6	Bertera[d]	14	−14.00			2.05
15	Fries	14	−35.20	−48.80		5.96
40	Merrill[b]	14		−23.50		3.85
57	Stave[d]	14				6.13
59	Stein[d]	14	−11.70	−29.70	−7.60	
2	Aldana[d]	20	−20.00	−6.20		15.6
19	Goetzel[d]	20		−14.20		
20	Goetzel[d]	20		−32.40		
28	Hochart[b]	20		−11.60		
5	Bertera[d]	20	−12.20			
7	Blair[d]	20	−24.00			
21	Golaszewski[i]	20	−19.00			3.4
36	Long[b]	20				2.87
60	Trudeau[j]	20				
58	Stein[k]	20				
50	Serxner[d]	30		−16.00		
30	Jeffery[d]	30	−22.00			
32	Knight[d]	30	−33.50			
35	Loeppke[b]	30	−33.60			
62	Wood[d]	30	−36.30			3.5
14	Fries	35		−30.40		
55	Shi	35	−11.00	−8.0[l]		
12	Dalton	37		−18.40	−43.20	7
31	Jones[d]	37	−31.6[m]			
54	Shi[d]	37	−21.70	−28.40		3.07[n]
9	Bowne	40	−20.10	−45.70	−31.70	2.9
13	Erfurt[o]	40				
38	Lynch[d]	40	−13.80			
42	Mills[b,d]	40	−22.8[p]			6.19
43	Musich[d]	40		−19.60		
49	Sciacca[d]	40		−12.0[q]		
10	Cady	46			−25.60	
11	Conrad[r]	46	−16.30			
24	Haynes[s]	46		−21.70		
33	Lechner[d]	46	−52.40			

Table 4, Continued

No.	Author	Study Rank	% Change in Sick Leave Absenteeism	% Change in Health Costs	% Change in WC/DM Costs[a]	Cost-Benefit Ratio Reported
39	Maes	46	−20.80			
3	Anderzen[b]	51	−9.30			
18	Gibbs[d]	51		−24.20		2.51
29	Hodges	51		−40.60	−59.80	
37	Lorig	54		−7.20		
22	Hall-Barrow	55				8
41	Milani[b]	55		−38.90		6
53	Shephard	55				4.85
26	Henritze	58				10.1
4	Baund	59	−33.40	−47.20		
27	Henritze[t]	59	−68.20			
52	Shephard[d]	59		−34.50		
61	Wheat	59		−31.00		
No. of studies			26	32	7	25
Averages[u]			−25.10	−24.50	−32.00	5.56

[a] WC/DM refers to workers' compensation costs and disability management claims cost.
[b] New study in this update of the meta-evaluation.
[c] This study was included because of its large population (i.e., >100,000 subjects) and its primarily ''virtual'' style of interventions.
[d] Included in the Baicker et al.[14] meta-analysis.
[e] Imputed from data provided in the study.
[f] Analysis of claims data provided a range of $101 to $648 a year of savings for program participants. A midrange estimate of $374 of annual savings then compared to the Harvard meta-analysis program cost finding of $144/participant/yr provides an imputed cost/benefit ratio of 1:2.59.
[g] For consistency, whole integers reported in the literature have been written as a decimal (x.0) and for cost-benefit ratios an additional significant digit has been added (x.y0).
[h] An estimate of 56% for hospital costs as a portion of overall costs was made, and then applied to the overall observed change to derive the measure of 7.4%.
[i] This study also examined offsetting pension costs, decreased life insurance costs, increased productivity, and program revenue generation.
[j] This study found that health promotion program participants experienced higher behavioral health service costs than nonparticipants, indicating that they were more likely to seek help for mental health issues after the program. No meaningful percentages were possible to extract from the article, but its results were considered significant because of the behavioral health implications.
[k] This study provides an initial look at the relationship between an index of health risk (HQ) and per capita medical plan costs, sick leave, and short term disability (STD) days, but does not lend itself to percentage calculation.
[l] The 8.0% reported reduction was in doctor visit rate. There was a also a reported reduction of 1.0% in hospitalizations, but this was not significant.
[m] Reductions were found in hourly employees only.
[n] This cost-benefit ratio was the highest of three different program intervention models.
[o] This article is included because it is one of the first to show a ''dose-related'' response with increasing intervention intensity and offers one of the few cost-effectiveness analyses in the economic cost/return literature.
[p] Includes 10.4% reduction in presenteeism losses and translates to a 1:4.29 cost-benefit contribution.
[q] Applying more rigorous statistical methods revealed that participants did not have a statistically significant lower per capita cost, but the rate of cost growth for participants was 12% lower than for nonparticipants.
[r] This number is the average found with two of the three studies. The third study found no significant change.
[s] This study showed that wellness program participants had higher health costs during the study period but had several major limitations.
[t] Program also examined cardiac rehabilitation savings and savings from treadmill testing.
[u] Averages values reported are simple mathematical means of the average reported effect size of each study. They do not reflect the use of a weighted average related to the sample size of each study.

plan costs, and workers' compensation and disability insurance costs of around 25%. These outcomes continue to have profound implications for American employers, as well as all our global trading partners in developed nations, and should eventually lead to the institutionalization of appropriately designed and executed worksite health promotion programming for all working populations.

Based on these published results, it is reasonable to conclude that worksite health promotion represents one of the most effective strategies for reducing medical costs and absenteeism. Future research will help us understand the impact of health promotion on enhancing the broader productivity of American workers. This will become increasingly important because the average age of American workers is increasing faster than that of many of our newer global trading partners and competitors.[15(p38)] This becomes even more strategically important if our worksite wellness efforts reflect more of a health and productivity management approach in which health plan cost, sick leave cost, workers' compensation costs, disability management costs, and presenteeism costs are a primary objective.[16] Abstracts of the newly included 10 articles can be found in the Selected Abstracts section that follows.

Larry S. Chapman, MPH, is President and CEO, Chapman Institute, and Editor, The Art of Health Promotion.

Table 5
Number of Studies by Number of Subjects

Size of Study Population	No. of Studies	% of Studies
1–200	5	8.0
201–500	6	10.3
501–1000	10	16.1
1001–5000	25	40.3
5001–10,000	9	14.5
10,001+	7	11.2
Total	62	100.0

References

1. Chapman LS. Meta-evaluation of worksite health promotion economic return studies: 2005 update. *Am J Health Promot.* 2005;19(6):1–10.
2. Chapman LS. Meta-evaluation of worksite health promotion economic return studies. *Am J Health Promot.* 2003;17(3):1–10.
3. Windsor RA, Orleans CT. Guidelines and methodological standards for smoking cessation intervention research among pregnant women: improving the science and art. *Health Educ Q.* 1986;13:131–161.
4. Boyd NR, Windsor RA. A meta-evaluation of nutrition education intervention research among pregnant women. *Health Educ Q.* 1993;20:327–345.
5. Heaney C, Goetzel R. A review of health related outcomes of multi-component worksite health promotion programs. *Am J Health Promot.* 1997;11:290–307.
6. Chapman L. *Proof Positive: An Analysis of the Cost-Effectiveness of Worksite Wellness.* Lake Forest Park, Wash: Chapman Institute; 2012:193.
7. Pelletier KR. A review and analysis of the clinical and cost-effectiveness studies of comprehensive health promotion and disease management programs at the worksite: update VIII 2008 to 2010. *J Occup Environ Med.* 2011;53:1310–1331.
8. Aldana S. Financial impact of health promotion programs: a comprehensive review of the literature. *Am J Health Promot.* 2001;15:296–320.
9. Goetzel RZ, Ozminkowski RJ. The health and cost benefits of work site health-promotion programs. *Annu Rev Public Health.* 2008;29:303–323.
10. Nyman JA, Barleen NA, Abraham JM. The effectiveness of health promotion at the university of minnesota: expenditures, absenteeism, and participation in specific programs. *J Occup Environ Med.* 2010;52:269–280.
11. Mills PR, Kessler RC, Cooper J, Sullivan S. Impact of a health promotion program on employee health risks and work productivity. *Am J Health Promot.* 2007;22:45–53.
12. Loeppke R, Nicholson S, Taitel M, et al. The impact of an integrated population health enhancement and disease management program on employee health risk, health conditions, and productivity. *Popul Health Manag.* 2008;11:287–296.
13. Long DA, Sheehan P. A case study of population health improvement at a Midwest regional hospital employer. *Popul Health Manag.* 2010;13:163–173.
14. Baicker K, Cutler D, Song Z. Workplace wellness programs can generate savings. *Health Aff.* 2010;9:1–8.
15. World Economic Forum. *Working Toward Wellness: Accelerating the Prevention of Chronic Diseases.* Produced in cooperation with PricewaterhouseCoopers. Geneva: World Economic Forum; 2007.
16. Chapman L, Sullivan S. Health and productivity management: an emerging paradigm for the workplace. *Am J Health Promot.* 2003;17(6):1–12.

Selected Abstracts

The Impact of a Prospective Survey-Based Workplace Intervention Program on Employee Health, Biologic Stress Markers, and Organizational Productivity.

Anderzén I, Arnetz BB.

OBJECTIVE: To study whether knowledge about psychosocial work indicators and a structured method to implement changes based on such knowledge comprise an effective management tool for enhancing organizational as well as employee health and well-being. METHODS: White- collar employees representing 22 different work units were assessed before and after a 1-year intervention program. Subjective ratings on health and work environment, biologic markers, absenteeism, and productivity were measured. RESULTS: Significant improvements in performance feedback, participatory management, employeeship, skills development, efficiency, leadership, employee well-being, and work-related exhaustion were identified. The restorative hormone testosterone increased during the intervention and changes correlated with increased overall organizational well-being. Absenteeism decreased and productivity improved. CONCLUSIONS: Fact-based psychosocial workplace interventions are suggested to be an important process for enhancing employee well-being as well as organizational performance.

J Occup Environ Med. 2005;47:671–682.

Recent Experience in Health Promotion at Johnson & Johnson: Lower Health Spending, Strong Return on Investment.

Henke RM, Goetzel RZ, McHugh J, Isaac F.

Johnson & Johnson Family of Companies introduced its worksite health promotion program in 1979. The program evolved and is still in place after more than thirty years. We evaluated the program's effect on employees' health risks and health care costs for the period 2002–08. Measured against similar large companies, Johnson & Johnson experienced average annual growth in total medical spending that was 3.7 percentage points lower. Company employees benefited from meaningful reductions in rates of obesity, high blood pressure, high cholesterol, tobacco use, physical inactivity, and poor nutrition. Average annual per employee savings were $565 in 2009 dollars, producing a return on investment equal to a range of $1.88–$3.92 saved for every dollar spent on the program. Because the vast majority of US adults participate in the workforce, positive effects from similar programs could lead to better health and to savings for the nation as a whole.

Health Aff (Millwood). 2011;30:490–499.

Impact of a Comprehensive Worksite Wellness Program on Health Risk, Utilization, and Health Care Costs.

Hochart C, Lang M.

In 2005, Blue Cross Blue Shield of Kansas City initiated a comprehensive worksite wellness program designed to impact employer culture and to assist healthy employees to stay at low risk and to reduce risk levels for those at moderate or high risk. Fifteen employer groups (9637 employees) participated in the A Healthier You (AHY) program for 3 consecutive years, 2006–2008. The results of health risk appraisals and biometric screening were used to evaluate program impact. Among the 4230 employees (44.0% of eligible employees) who completed health risk appraisals in all 3 years, 85.8% of individuals in the low-risk category in 2006 remained at low risk in 2008. There were also improvements in other risk categories, with 39.9% of those in the medium-risk category and 48.9% of those in the high-risk category in 2006 moving to a lower risk category in 2008. There were improvements in blood pressure control and total cholesterol, but no improvement in weight control. To assess financial and utilization outcomes, claims for the participating employer groups were compared to those for 7 employers (3800 employees) who did not participate in AHY in 2006–2008. Although none of the utilization measures was statistically different, the AHY groups had significantly smaller increases in both overall and emergency room costs per member per month. The AHY program now has over 180 employer groups, which will allow future evaluations to examine the impact of the program on a much larger population and to focus on the comparative effectiveness of different intervention strategies across implementations.

Popul Health Manag. 2011;14:111–116. doi: 10.1089/pop.2010.0009. [published online ahead of print 2011 Jan 17]

The Impact of an Integrated Population Health Enhancement and Disease Management Program on Employee Health Risk, Health Conditions, and Productivity.

Loeppke R, Nicholson S, Taitel M, Sweeney M, Haufle V, Kessler RC.

This study evaluated the impact of an integrated population health enhancement program on employee health risks, health conditions, and productivity. Specifically, we analyzed changes in these measures among a cohort of 543 employees who completed a health risk assessment in both 2003 and 2005. We compared these findings with 2 different sets of employees who were not offered health enhancement programming. We found that the DIRECTV cohort showed a significant reduction in health risks after exposure to the program. Relative to a matched comparison group, the proportion of low-risk employees at DIRECTV in 2005 was 8.2 percentage points higher; the proportion of medium-risk employees was 7.1 percentage points lower; and the proportion of high-risk employees was 1.1 percentage points lower ($p < 0.001$). The most noticeable changes in health risk were a reduction in the proportion of employees with high cholesterol; an improvement in diet; a reduction of heavy drinking; management of high blood pressure; improved stress management; increased exercise; fewer smokers; and a drop in obesity rates. We also found that a majority of employees who improved their risk levels from 2003 to 2005 maintained their gains in 2006. Employees who improved their risks levels also demonstrated relative improvement in absenteeism. Overall, this study provides additional evidence that integrated population health enhancement positively impacts employees' health risk and productivity; it also reinforces the view that "good health is good business."

Popul Health Manag. 2008;11:287–296.

A Case Study of Population Health Improvement at a Midwest Regional Hospital Employer.

Long DA, Sheehan P.

This article reviews the population health improvement initiative of a Midwest regional hospital employer. Services included health risk assessments, health education, and motivational health coaching conducted telephonically. Outcomes categories for this program evaluation comprised participation rates, participant satisfaction, health status and behavior change, productivity change, health care claims savings, and return on investment. Participation rates varied widely with incentive structure, although retention of participants in coaching programs averaged 89%. The participant satisfaction rate for the last 14 months of interventions was 96%. Four years of population health status and behavior trending showed significant improvements in smoking status, dietary fat and fiber intake, exercise, mental health (ie, stress, effects depressive symptoms in the past year, life satisfaction), readiness to change (ie, diet, exercise, stress, smoking, body weight), perceptions of overall health, an index of good health habits, sum of lifestyle health risks, and sum of risks and chronic conditions. Body mass index showed nonsignificant improvements during the years of greatest participation (years 2 to 4). Indicators of productivity demonstrated improvements as well. These gains were noted for employees across all health risk statuses, which suggests population health improvement strategies can influence productivity even for healthy employees. Program year 3 was evaluated for health care claims savings using a 2-stage multivariate regression approach. Stage 1 was a computation of propensity-to-participate scores. Stage 2 was an estimation of per member per month (PMPM) claims savings for participant cohorts using a propensity score-weighted linear regression analysis. Participants averaged $40.65 PMPM savings over the control population. Program return on investment, including incentive costs and vendor fees, was 2.87:1.

Popul Health Manag. 2010;13:163–173.

Lowering Employee Health Care Costs Through the Healthy Lifestyle Incentive Program.

Merrill RM, Hyatt B, Aldana SG, Kinnersley D.

OBJECTIVE: To evaluate the impact of the Healthy Lifestyle Incentive Program (HLIP), a worksite health program, on lowering prescription drug and medical costs. DESIGN: Health care cost data for Salt Lake County employees during 2004 through 2008 were linked with HLIP enrollment status. Additional program information was obtained from a cross-sectional survey administered in 2008. INTERVENTION: The program includes free annual screenings, tailored feedback on screening results, financial incentives for maintaining and modifying certain behaviors, and periodic educational programs and promotions to raise awareness of health topics. MAIN OUTCOME MEASURES: Frequency and cost of prescription drug and medical claims. RESULTS: Participation increased from 16% to 23% in men and 34% to 45% in women over the 5-year study period and was associated with a significantly greater level of physical activity and improved general health. Participants were generally satisfied with the HLIP (43% were very satisfied, 51% satisfied, 5% dissatisfied, and 1% very dissatisfied). The primary factors contributing to participation were financial incentives (more so among younger employees), followed by a desire to improve health (more so among older employees). Over the study period, the cost savings in lower prescription drug and medical costs was $3,568,837. For every dollar spent on the HLIP the county saved $3.85. CONCLUSION: Financial incentives and then a desire for better health were the primary reasons for participation. The HLIP resulted in substantial health care cost savings for Salt Lake County Government.

J Public Health Manag Pract. 2011;17:225–232.

Impact of Worksite Wellness Intervention on Cardiac Risk Factors and One-Year Health Care Costs.

Milani RV, Lavie CJ.

Cardiac rehabilitation and exercise training (CRET) provides health risk intervention in cardiac patients over a relatively short time frame. Worksite health programs offer a unique opportunity for health intervention, but these programs remain underused because of concerns over recouping the costs. We evaluated the clinical efficacy and cost-effectiveness of a 6-month worksite health intervention using staff from CRET. Employees ($n = 308$) and spouses ($n = 31$) of a single employer were randomized to active intervention ($n = 185$) consisting of worksite health education, nutritional counseling, smoking cessation counseling, physical activity promotion, selected physician referral, and other health counseling versus usual care ($n = 154$). Health risk status was assessed at baseline and after the 6-month intervention program, and total medical claim costs were obtained in all participants during the year before and the year after intervention. Significant improvements were demonstrated in quality-of-life scores (+10%, $p = 0.001$), behavioral symptoms (depression −33%, anxiety −32%, somatization −33%, and hostility −47%, all p values <0.001), body fat (−9%, $p = 0.001$), high-density lipoprotein cholesterol (+13%, $p = 0.0001$), diastolic blood pressure (−2%, $p = 0.01$), health habits (−60%, $p = 0.0001$), and total health risk (−25%, $p = 0.0001$). Of employees categorized as high risk at baseline, 57% were converted to low-risk status. Average employee annual claim costs decreased 48% ($p = 0.002$) for the 12 months after the intervention, whereas control employees' costs remained unchanged (−16%, p = NS), thus creating a sixfold return on investment. In conclusion, worksite health intervention using CRET staff decreased total health risk and markedly decreased medical claim costs within 12 months.

Am J Cardiol. 2009;104:1389–1392. [published online ahead of print 2009 Sep 26] Epub.

Closing Thoughts

By Michael P. O'Donnell, MBA, MPH, PhD

When we launched the *American Journal of Health Promotion* in 1986, five studies had been published on the financial impact of workplace health promotion, and three more were published that same year. We had a solid conceptual framework to justify our hypothesis that health promotion programs were likely to reduce medical costs and enhance productivity, but we had very little empirical evidence to prove it. We now have at least 62 studies, and that is after dropping four that have weak methodology.

I am reminded of a dinner conversation I had with Gerald Greenwald in 2003. He had been vice chairman of Chrysler Corporation when I managed the employee wellness programs at their corporate headquarters in the early 1980s. He was later chairman and CEO of United Airlines Corporation, has served on the boards of at least five Fortune 500 companies, and has led several large investment groups. He asked me if workplace health promotion programs really saved any money. As I was prone to do all the time, and as I thought was appropriate given Mr. Greenwald's business and investment acumen, I went into a detailed analysis of the results and methodological limitations of the studies that had been published by that date. He cut me off after a few minutes, saying "Wait a minute, did you say you have more than a dozen well-designed studies that show an ROI of 3:1? I have a lot less evidence than that when I have to make billion-dollar investment decisions on new products!"

We still have many questions to answer before we fully understand the financial impact of workplace health promotion. For example, we need to identify the specific characteristics of health promotion programs that produce the strongest financial outcomes and also improve health and quality of life. We need to expand the financial outcomes we study, with special attention to enhancing productivity. We need to learn how to apply these analyses to small employers, especially those who are not self-insured. If we want to continue to impact national policy, we need to expand our unit of analysis beyond employers, and in doing so, measure the impact of health promotion programs on Medicare, Medicaid, and Social Security spending, as well as state and federal corporate and individual income tax revenues.[1] (Whoops, am I getting a little off topic?) We also need to strive to improve our research methodology, working to improve each aspect of the way we design and execute studies. Scientists and accountants will quibble over specific elements of our methodology, but business decision makers will not. The existing research is more than adequate to provide business decision makers the evidence they need that investments in workplace health promotion save money. In fact, I suspect that the methodological quality of the studies we conduct on this topic is superior to the methodology used to study the financial impact of any other treatment in health care or any other investment in business that costs only $200–$300 person per year to deliver.

Michael P. O'Donnell, MBA, MPH, PhD, is Editor of the American Journal of Health Promotion.

References

1. O'Donnell MP. Can we reduce our federal deficit and create jobs by making the healthy choice the easiest choice? *Am J Health Promot.* 2011;26(2):iv–xii.

On a Personal Note...

By Larry S. Chapman, MPH

This edition of *The Art of Health Promotion* is my last. My 15 years as editor has been a real privilege! Thank you, Michael O'Donnell and all the staff of the *American Journal of Health Promotion*, for your support and confidence! During its 25+ years of existence the *Journal* has provided the field of health promotion and wellness with valuable tools, has improved knowledge and science, and has demonstrably deepened and improved the quality and effectiveness of our efforts and contributions.

You will now be in the very capable hands of Paul Terry, PhD, who will be taking over as the new editor of *The Art of Health Promotion*. Welcome, Paul!

It is my unshakable belief that the strategies offered through health promotion and wellness offers one of the few bright spots on the horizon in our efforts to improve the health and well-being of our population. We have much to overcome and to do. Collectively, I believe our field can provide real solutions to some of the thorniest problems plaguing our health care system and our society at large. There is certainly plenty to do for all of us.

It's been a great ride, Michael! Best of health and success to you all!

Comment From Michael O'Donnell...

I want to recognize and thank Larry Chapman for his excellent work on this article on the economic return from workplace health promotion and for the outstanding contributions he has made in serving as editor of *The Art of Health Promotion* for the past 15 years. Larry helped me conceive the idea of *The Art* and has written or edited the contents of nearly all the issues during its lifetime. I also want to thank Larry for his astounding contributions to the field of health promotion. He is indeed one of our true pioneers. In his 35+-year career, Larry has helped to develop and/or improve more than 1000 workplace health promotion programs, written 13 books, and shared his knowledge with thousands of health promotion professionals in hundreds of training sessions. Larry is one of a small handful of people who literally shaped the field of workplace health promotion.

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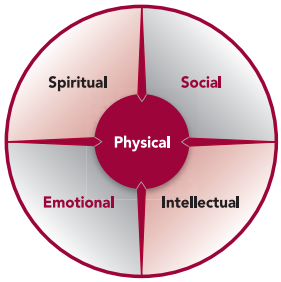
Definition of Health Promotion

"Health Promotion is the art and science of helping people discover the synergies between their core passions and optimal health, enhancing their motivation to strive for optimal health, and supporting them in changing their lifestyle to move toward a state of optimal health. Optimal health is a dynamic balance of physical, emotional, social, spiritual, and intellectual health. Lifestyle change can be facilitated through a combination of learning experiences that enhance awareness, increase motivation, and build skills and, most important, through the creation of opportunities that open access to environments that make positive health practices the easiest choice."

(O'Donnell, *American Journal of Health Promotion,* 2009, 24,1,iv)



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