Employer-Based Health Initiative: Impact on Employees’ Cardiovascular Outcomes

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Background: Cardiovascular disease is the primary cause of mortality among men and women in the United States. The Ready, Set, Goal program was an employer-based initiative designed to identify individuals at risk for cardiovascular disease and to offer an intervention to alter those risk factors. The program involved cardiovascular education, screening, behavior-change incentives, continuing assessment, and follow-up. Pharmacologic treatment was not part of the intervention.

Objective: To analyze the effects of the Ready, Set, Goal pilot program in 5 employers in the United States on salient cardiovascular end points for employees who completed the program.

Methods: The analysis used a pretest/posttest within-subjects design to compare baseline measurements with measurements for all subjects who completed a second assessment 6 months after baseline measurements. Enrollment began in June 2004 in the first site and in May 2005 in the last site; it ended in January 2006. Patient clinical data from the pilot interventions were aggregated to assess the effects of the intervention on salient cardiovascular end points for individuals who completed the Ready, Set, Goal program. Changes in short-term cardiovascular risk factors were evaluated. Descriptive measures with paired t-tests ($\alpha = 0.05$) were calculated at the aggregate level for each dependent variable. Range checks were conducted on all variables for clinical validity.

Results: A total of 589 subjects from 5 employer group pilot interventions completed the program. Of these, 43% were men, 60% were white, 9% were African-American, 11% were Hispanic, and 20% were categorized as “other.” After the intervention, mean blood pressure, total cholesterol, and low-density lipoprotein cholesterol levels were significantly lower ($P < 0.05$) compared with baseline measurements. On average, systolic blood pressure declined by 1.9 mm Hg; diastolic blood pressure by 1.3 mm Hg; total cholesterol decreased by 5.2 mg/dL and low-density lipoprotein cholesterol by 3.4 mg/dL. Triglyceride levels increased and high-density lipoprotein levels decreased, although these changes were not significant, and neither were the mean increases in body weight. But increases in body mass index were significant.

Conclusions: A worksite cardiovascular health program can have positive effects on salient cardiovascular end points for employees. The increases in triglyceridines and body mass index should be further explored. [AHDB. 2009;2(2):80-85.]

Cardiovascular (CV) disease (CVD) is the primary cause of mortality among men and women in the United States. An estimated 80.7 million American adults (1 in 3) have 1 or more types of CVD; of these, about 47% are estimated to be 60 years or older. From an employer’s perspective, the economic burden of CVD has grown steadily over the past decade, fueled by rising medical costs coupled with the indirect costs associated with CV morbidity and mortality. Approximately 17% of all medical expenditures (about $149 billion annually) and nearly 30% of Medicare expenditures are attributable to CVD. The 2008 direct and indirect costs of CVD in the United States are estimated to be $448.5 billion. Healthcare costs for individuals with multiple CV risk factors are typically 3 times higher than for those without such risk factors. Much of the medical literature has focused on factors associated with increasing risk for CVD or on factors...
associated with poorer outcomes in the presence of CVD. The beneficial effects of healthy lifestyles on lowering CV risks and improving CVD outcomes and longevity have been reported in the literature. It has also been suggested that the prevention of risk factors at a young age may be key to “successful aging”; the investigators emphasize the need for intensive prevention in younger and middle-aged individuals with CV risk factors as a way to improve their overall health and longevity. Early intervention to identify and manage CV risk factors may offer the opportunity to reduce employer healthcare costs, increase worker productivity, and improve worker quality of life.

The Centers for Disease Control and Prevention (CDC) has identified 5 controllable or modifiable major risk factors for CVD: tobacco use, elevated cholesterol levels, physical inactivity, poor nutrition, and hypertension. Each of these risk factors is amenable to change through appropriate behavior modification and pharmacotherapy. Risk reduction for CVD translates into decreased morbidity, mortality, and healthcare costs.

The Ready, Set, Goal (RSG) program was an employer-based initiative funded by AstraZeneca and implemented at the worksites by employers and employer-selected vendors. These vendors were primarily responsible for collecting the biometrics, compiling the data, and providing descriptive on the enrolled population. The program was designed to identify individuals at risk for CVD and to offer interventions to alter these risk factors. The RSG program was developed in response to frequent requests from employers to address their desire to affect their employees’ CV health.

The RSG program was designed to focus on high-risk employees who were not being captured in the healthcare system and to evaluate the impact of the program on important clinical measurements. This program involved disease awareness and education, screenings, patient education, behavioral incentives, and ongoing assessment and follow-up. The general model at each worksite was to evaluate the prevalence of CVD at the employer level, develop nonpharmacologic interventions to modify risk factors present in the employee population, and then evaluate the impact of the interventions on health outcomes and costs. Key features of the RSG program were:

- It was designed for US employers engaged in preventive medicine and health education programs
- The intervention centered around a health risk assessment that encouraged interaction between the employee, a physician, or another third-party health administrator
- The core component, an RSG packet developed by AstraZeneca, was used consistently among all 5 employers (7 worksites) and contained patient education materials, focusing on CV risk factors
- Flexibility to allow employers to engage in other educational activities that best fit their abilities to implement onsite programs
- Measurable results were obtained, including biometrics based on the Adult Treatment Panel III guidelines and healthcare utilization.

One of the strongest elements of this program was its flexibility to be implemented by a variety of employers and employer groups. Because different employers have varying capabilities and demographics, it was critical to the success of this program to allow flexibility in what types of education programs could be offered. It was also critical to have a core component that was consistent among all employers. Therefore, the RSG packet was developed and contained patient education materials that were used at all sites. Other education modalities included onsite speaker programs, heart-healthy nutrition programs, and exercise competitions. Some of these programs used education materials that had been developed by the employers, by AstraZeneca, or by professional organizations (eg, the American Heart Association). Employers implemented the education
intervention over 3 to 9 months, depending on their needs and capabilities.

The RSG program was staged initially by an employer creating awareness, followed by an initial baseline assessment, and follow-up assessments at 6 and 9 months after initial assessment. In addition to baseline measurements, which included CV risk assessment, physical assessment, and blood work, patients also self-reported healthcare and resource use (eg, physician, hospital, emergency department visits, sick leave) during the 6-month period before the baseline date. The Figure depicts the RSG initiative and potential impacts for employers. The duration of the RSG program at each worksite was 12 months.

### Methods and Design

The purpose of this study was to analyze and evaluate data collected from pilot tests of the RSG program at 7 worksites for 5 employer groups. Patient clinical data from the pilot groups have been aggregated to assess the effects of the intervention on modifiable risk factors and clinical parameters for employees who completed the RSG program at their respective worksites. The original intent of the analysis was to assess change in risk factors, resource use, and outcomes from baseline measurements taken at the time of program initiation to 6 months after the intervention was initiated. However, this analysis has been limited to clinical measures and CV end points that were consistently collected and reported for the 5 employer groups (at 7 worksites).

The following dependent variables were included in the analysis: systolic blood pressure (BP), diastolic BP, total cholesterol, triglycerides, high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), total cholesterol to HDL-C ratio, glucose levels, weight, body mass index (BMI), and coronary risk profile. Data were pooled across sites for the primary analysis on short-term CV variables. Insufficient data on resource use and absenteeism were available to conduct a meaningful and informative analysis of those measures.

The analysis followed a pretest/posttest design, in which baseline measurements were compared with measurements for all subjects who completed a second assessment 6 months after the baseline measurements. Descriptive analyses (means, standard deviations) were conducted at the aggregate level for each dependent variable for which a sufficient number of observations were available; paired t-tests were used to assess statistical differences between baseline and 6-month measurements. The basic analysis focused on the effects of the intervention on the short-term surrogates of CVD—BP, cholesterol panel (total cholesterol, LDL-C, and HDL-C), weight, and BMI.

Clinical data for subjects from the 5 US employer groups that participated in the RSG initiative were obtained from the vendors who were contracted to implement the program and coordinate data collection. Enrollment began at the first worksite in June 2004, with the last site starting enrollment in May 2005; all sites completed enrollment by January 2006. Vendors provided data as Excel spreadsheets. Although a uniform set of data was to be collected at each site, not all data were collected by every site, and completeness of the data varied somewhat across sites. Therefore, this analysis used the clinical CV measures that were thought to be the most valid, reliable, and complete. The analysis included only subjects who completed at least 6 months of the intervention.

### Table 1: RSG Program Participant Demographics (N = 589)

<table>
<thead>
<tr>
<th>Race</th>
<th>Male, %</th>
<th>Female, %</th>
<th>Total, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>31.1</td>
<td>28.5</td>
<td>59.6</td>
</tr>
<tr>
<td>African-American</td>
<td>1.5</td>
<td>7.8</td>
<td>9.3</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2.6</td>
<td>8.8</td>
<td>11.4</td>
</tr>
<tr>
<td>Other</td>
<td>8.3</td>
<td>11.4</td>
<td>19.7</td>
</tr>
<tr>
<td>Total</td>
<td>43.5</td>
<td>56.5</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Other includes 2 subjects with missing data.

RSG indicates Ready, Set, Goal.
Applying the inclusion criteria of having reasonably completed clinical data as well as completion of the RSG program yielded a total of 589 subjects. This study group served as the basis for all analyses presented in this report. Table 1 depicts the number of subjects, by gender, from each site that was retained for a “completer” analysis.

Data were analyzed to evaluate the effect of the intervention on the primary clinical endpoints and risk factors of interest listed in Table 1. Two-tail, paired t-tests with a type I error of 0.05 were used to assess the change scores in each variable of interest. (All analyses were conducted using Microsoft Excel.)

Results
The effects of the RSG intervention were significant and in the expected direction for the majority of clinical parameters, except for triglycerides, HDL-C, body weight, and BMI (Table 2). The post-RSG increases in triglycerides and weight were not significant, whereas the increase in BMI was significant (P > 0.05). Of note, the mean baseline weight was approximately 180 lb, with a BMI averaging 27.6 kg/m², which suggests that employees who participated in the RSG program were mildly obese. Recognizing that the participant population was skewed toward women, who are generally more health conscience, these findings suggest that diet and exercise alone were not enough to contribute significant reductions in weight and BMI. It is possible, however, that the employees who volunteered to participate in the RSG program were generally in better health than the overall US population.

Particularly noteworthy are the changes in BP (systolic and diastolic), glucose levels, total cholesterol, and LDL-C levels. There was also a small, but not significant, decrease in the mean percent 10-year coronary risk profile. As noted earlier, the CDC has identified high cholesterol levels and hypertension as 2 of 5 key risk factors for CVD. Moderating and mitigating these morbidity drivers can have a favorable impact on the long-term well-being of an employed population such as the one included in this analysis. Elevated glucose levels are also associated with negative long-term consequences, such as neuropathies, visual loss, and amputations. In monetary terms, the costs associated with uncontrolled diabetes, hypertension, or dyslipidemia can be extraordinary for the employee and employer.

Discussion
The success of the RSG CV initiative should be judged in terms of the goals for the program and against the clinical objectives specified for the intervention. The overarching goal of the RSG program was to identify and communicate CV risk factors in an employee population. Overall, the program resulted in employees achieving significant decreases in BP, total cholesterol, LDL-C, and glucose levels. These measures are important predictors for improvements in general CV health, which should, in turn, translate into lower morbidity. The decline in 10-year coronary risk profile, although

Table 2 RSG Program: Cardiovascular End Points, Change from Baseline

<table>
<thead>
<tr>
<th>Clinical end point</th>
<th>Baseline mean (SD)</th>
<th>Post-RSG mean (SD)</th>
<th>Change from baseline</th>
<th>Effect</th>
<th>Paired t-test probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic BP, mm Hg</td>
<td>128.6 (17.0)</td>
<td>126.7 (14.6)</td>
<td>−1.9</td>
<td>↓</td>
<td>0.003</td>
</tr>
<tr>
<td>Diastolic BP, mm Hg</td>
<td>75.9 (11.6)</td>
<td>74.6 (10.9)</td>
<td>−1.3</td>
<td>↓</td>
<td>0.008</td>
</tr>
<tr>
<td>Total cholesterol, mg/dL</td>
<td>196.1 (39.9)</td>
<td>191.0 (38.0)</td>
<td>−5.1</td>
<td>↓</td>
<td>0.000</td>
</tr>
<tr>
<td>Triglycerides, mg/dL</td>
<td>130.2 (74.0)</td>
<td>134.7 (82.7)</td>
<td>4.5</td>
<td>↑</td>
<td>0.199</td>
</tr>
<tr>
<td>HDL-C, mg/dL</td>
<td>49.3 (15.3)</td>
<td>47.3 (15.3)</td>
<td>−2.0</td>
<td>↓</td>
<td>0.000</td>
</tr>
<tr>
<td>LDL-C, mg/dL</td>
<td>119.6 (36.4)</td>
<td>116.1 (34.4)</td>
<td>−3.5</td>
<td>↓</td>
<td>0.012</td>
</tr>
<tr>
<td>Total cholesterol to HDL-C ratio</td>
<td>4.3 (1.4)</td>
<td>4.1 (1.8)</td>
<td>−0.2</td>
<td>↓</td>
<td>0.024</td>
</tr>
<tr>
<td>Glucose level, mg/dL</td>
<td>96.9 (26.0)</td>
<td>94.6 (17.8)</td>
<td>−2.3</td>
<td>↓</td>
<td>0.040</td>
</tr>
<tr>
<td>Weight, lb</td>
<td>179.8 (41.6)</td>
<td>180.2 (41.9)</td>
<td>0.4</td>
<td>↑</td>
<td>0.203</td>
</tr>
<tr>
<td>Body mass index, kg/m²</td>
<td>27.6 (7.3)</td>
<td>28.1 (6.7)</td>
<td>0.5</td>
<td>↑</td>
<td>0.023</td>
</tr>
<tr>
<td>Coronary risk profile, %</td>
<td>6.4</td>
<td>6.3</td>
<td>−0.1</td>
<td>↓</td>
<td>0.550</td>
</tr>
</tbody>
</table>

BP indicates blood pressure; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; RSG, Ready, Set, Goal.
not significant, was in the desired direction. One of the major benefits of workplace wellness initiatives is to keep workers in better health and more productive. Limited data from 2 worksites showed a decline in the average number of days of work lost as a result of illness (absenteeism) from 2.3 days for an employee in the preintervention period to 2.07 days per employee in the postintervention period. Because CVD is one of the primary cost drivers for employer health programs, a decrease in absenteeism, coupled with improved CV health, has positive economic implications for employers. These findings are also consistent with other studies, which have shown that behavioral and clinical risk factors are predictive of absenteeism.5,10

The RSG program was implemented with the assistance of wellness and disease management vendors at the local worksites, demonstrating that such worksite interventions are feasible when done in collaboration. Data from 2 worksites suggest very high levels of employee satisfaction with the RSG initiative. When asked about the overall value of the program, participants were very satisfied (mean score of 4.4 on a 5-point scale). Moreover, participants indicated that they were “very happy” that their employer had made the program available at the workplace.

The effects of a broad-based intervention, like the RSG program, may be influenced by a variety of factors endogenous and exogenous to the study. The magnitude of the effects depends not only on the intervention but also on the subjects’ willingness to participate and the many environmental influences in the workplace. Therefore, it is not surprising that the observed changes in clinical end points were not substantial in nominal terms. It is, however, most encouraging that the majority of indicators of the impact of the RSG initiative were positive or pointed in the desired direction in terms of clinical, economic, and patient-reported outcomes. Taken as a whole, the RSG program seems to achieve the intrinsic goals of the sponsor, as well as the desired benefits for the employer groups and their employees. The importance of interventions such as the RSG program is supported by a recent report of the American Heart Association.1 Based on the findings of this study and others, employers still have much work to do in the wellness arena.

Limitations

Interpretation of this analysis should be tempered by several limitations. First, the analysis was conducted on subjects who completed the study and had sufficient pre- and postintervention measures on clinical variables. The effects of the RSG intervention on subjects who partially completed the program are not known.

Second, because subjects volunteered for the program, selection bias could influence the findings. Therefore, the results of this analysis should not be generalized beyond employees who completed the RSG intervention.

Third, data were abstracted from the original data sets supplied by the RSG vendors for the respective study sites. There was significant variability in the data reporting formats and data elements. Range checks were conducted to provide some assurance that data were within reasonable and expected limits. Finally, some data were self-reported and other data were measured by different study personnel within and across sites. The issues of self-reporting and inter-rater variability must be considered.

Conclusion

Future research on the RSG program or similar initiatives should try to capture the effects of the program on employee productivity (absenteeism and presenteeism). Understanding the relationship between decreased morbidity or improved clinical outcomes and worker productivity is critical to establishing the value of worksite health and wellness programs to the employer community. Although decreased morbidity and improved clinical outcomes should intuitively improve productivity, this relationship needs to be demonstrated empirically.

Disclosure Statement

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References


STAKEHOLDER PERSPECTIVE

Employer-Based Wellness Initiatives: Lifestyle Modifications Insufficient in Employees at High Risk for Cardiovascular Disease

**EMPLOYERS:** Anytime health awareness initiatives like the Ready, Set, Goal (RSG) program can engage an employer to actively promote a wellness venue to benefit the health and wellness of employees, that is definitely a step in the right direction. Back in the 1990s, these types of initiatives were known as disease management programs. Because there were numerous programs introduced with varying degrees of participation, many in the healthcare community were not sure if such programs were, in fact, successful in managing a disease. We have now reached a new height with a reclassification of these initiatives, by referring to them more appropriately as “wellness” programs.

In the particular program discussed in the article, the main goal was to identify and communicate cardiovascular risk factors to the employee base. More specifically, the RSG initiative focused on high-risk employees who are not being captured in the healthcare system, implemented an action plan for them, and then analyzed the outcomes. The 5 employer groups should be recognized and commended for their respective efforts to raise the awareness and the impact of cardiovascular disease on their employees’ overall health and well-being.

That said, reviewing the overall results would lead us to believe that patient education, diet, and exercise alone are in general not enough to have a substantial impact on this type of high-risk population.

Although many of the clinical end points did reach significant outcomes, the absolute numerical changes in elevated blood pressure, body mass index, and cholesterol levels were far from acceptable, given the length of time the participants were in the program. No one can dispute the fact that patient awareness and patient education, diet, and exercise are important. On the contrary, these are key elements for the formula of building health and well-being.

However, clearly missing in this program is the one element that makes the sum of all the aforementioned parts much greater than the individual pieces. By this I mean the culmination of decades of intense research and development to produce well-documented results in reducing blood pressure, cholesterol, and other lipid levels to guideline goals, namely, pharmacotherapy.

With today’s knowledge of pharmaceutical advances, pharmacotherapy should be part of the armamentarium in the equation of wellness, especially for populations at high risk for cardiovascular disease. As an employer-based initiative, integrating the pharmacotherapy component into any wellness program—in addition to patient awareness and patient education, diet, and exercise—will complete the formula for more successful outcomes that are closer to acceptable guideline levels. It should also, in turn, keep employees more motivated to stay with their respective regimens well after the program ends, and will ultimately provide lifestyle modifications toward an increase in overall wellness. Isn’t that the overall goal?

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