



Group Health Cooperative
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January 5, 2010

U.S. Department of Health and Human Services
Centers for Medicare & Medicaid Services
Attention: CMS-4137-IFC
P.O. Box 8017
Baltimore, MD 21244-8010.

Internal Revenue Service
Attention: REG-123829-08
Room 5205
P.O. Box 7604
Ben Franklin Station
Washington, DC 20044

U.S. Department of Labor
Office of Health Plan Standards and Compliance Assistance
Employee Benefits Security Administration
Attention: RIN 1210-AB27
Room N-5653
200 Constitution Avenue, NW.
Washington, DC 20210

Re: Interagency GINA Regulations: CMS-4137-IFC /REG-123829-08/ RIN 1210-AB27

Dear Sir or Madam:

Group Health Cooperative (“Group Health”) is writing to offer comments in response to the interim final regulations that were issued in the *Federal Register* on October 7, 2009 (74 Fed. Reg. 51664) (the “Interim Final Rules”). The regulations were promulgated pursuant to §§101 through 103 of Title I of the Genetic Information Nondiscrimination Act of 2008 (GINA, Pub. L. No. 110-233).

Group Health is one of America’s oldest and largest consumer-governed health care organizations. Founded in Seattle in 1947, the organization is governed by its members – nearly 640,000 covered lives across Washington state and North Idaho. We are a national leader in integrated care, and an important voice for health care reform. Group Health is heralded as a model for health care that focuses on and delivers better health. We are proud of our innovations such as the use of electronic medical records in patient care; online patient services such as secure messaging and online prescription refills; and the provision of team-based health care

through a medical home. Additionally, Group Health has a long-standing focus on prevention, early screening, evidence-based medicine, and research.

Through the Group Health Research Institute (“GHRI”; formerly the Group Health Center for Health Studies), Group Health conducts epidemiologic, health-services, and clinical research related to prevention, diagnosis, and treatment of major health problems. Since GHRI’s founding in 1983, its researchers have published more than 1,800 scientific journal articles — many of these collaborations with researchers from the University of Washington, Fred Hutchinson Cancer Research Center, and other institutions. GHRI’s research has led to significant medical innovations in areas such as breast cancer screening, immunization, and chronic disease management. GHRI currently has more than 240 ongoing research studies and received \$23.4 million in research grants in 2008.

Congress enacted Title I of GINA to prevent group health plans and health insurers from charging higher premiums or denying coverage on the basis of genetic information; requiring or requesting individuals to undergo genetic testing (subject to limited exceptions); and requesting, requiring, or purchasing genetic information prior to or in connection with enrollment, or for underwriting purposes. Group Health unreservedly supports these objectives, which are consistent with Group Health’s long-standing practices.

However, we believe that the Interim Final Rules issued by the Departments of Health and Human Services, Labor and the Treasury (the “Agencies”) fundamentally misinterpret GINA by extending the term “underwriting purposes” to include the offering of plan-based financial incentives that are offered for the purpose of encouraging enrollees to provide clinically relevant information through health risk assessments (“HRAs”).

HRAs can enhance individuals’ ability to manage their health while lowering the cost of their medical care. Automated HRAs, such as those in use at Group Health, electronically process clinically relevant information supplied by the enrollee resulting in the immediate generation of a health risk assessment report. Using that report, the enrollee can become better informed about the status of his or her health, as well as his or her personal health risks, and can take positive action towards better health—such as eating more healthfully, exercising more, or making an overdue appointment for screenings or other preventive care.

Within Group Health’s integrated health care system, in which the financing and delivery of care are linked, an HRA may be used to further advantage the patient in that the valuable assessment information it derives via expertly developed health risk algorithms is used to populate our members’ electronic health records with clinical information that is relevant and immediately accessible to the patients’ health care teams for treatment purposes.

Family medical history is a powerful tool for predicting the risk of many health concerns, such as heart disease, colorectal cancer, breast and ovarian cancer, osteoporosis and diabetes. HRAs such as Group Health’s are an efficient, effective mechanism for collecting family history and transmitting it seamlessly into patients’ medical records. They are invaluable tools that advance patient, provider, and policy goals of improving health and preventing disease.

However, the mere ability to solicit family history information is of little value unless enrollees are motivated to provide it. In this regard, experience has taught us that incentives *work*. In the health plan we offer our own employees, an incentive that was modest by any measure—a flat premium discount equivalent to between 1.7% and 9% of the total premium cost—succeeded in driving the HRA completion rate from approximately 20% to over 90% in just one year. By classifying the provision of such incentives as an “underwriting *purpose*,” the Interim Final Rules confuse a health plan’s *means* of collecting genetic information with its *end*, or purpose, in collecting it, which has no relation to the statutory definition of “underwriting purposes.” The Interim Final Rules’ prohibition of incentives in this context will, as a practical matter, restrict integrated health care systems like Group Health from using HRAs to obtain important clinical information, and will therefore affect our ability to provide the best medical care and preventive screenings.

Finally, we believe that the Interim Final Rules run counter not only to the existing HIPAA Nondiscrimination and Wellness Programs regulations (which expressly permit premium and cost-sharing incentives of up to 20 percent of the cost of coverage in connection with wellness programs), but also to the healthcare reform legislation currently pending in Congress (*The Patient Protection and Affordable Care Act*, H.R. 3590), which would increase the ceiling on wellness-related premium and cost-sharing incentives to 30 percent of the cost of coverage and, further, would authorize adoption of a higher ceiling by regulatory action. It would be inappropriate to construe GINA in a manner that would negate these past and present Congressional expressions of public policy.

We are deeply concerned that the Interim Final Rules, as written, will significantly encumber efforts by Group Health Cooperative and many other organizations to improve the health of individuals and populations and provide patients the best medical care possible while reducing costs. A detailed discussion of our specific comments and recommendations is attached below. We appreciate your review of our comments and recommendations and hope that they assist the agencies in crafting final rules that adhere to the language of GINA and are faithful to Congressional intent.

Thank you for the opportunity to comment on this important topic.

Sincerely,



Scott Armstrong
President and CEO

Encl.

Attachment

Comment and Recommendation No. 1: The definition of “underwriting purposes” used in the Interim Final Rules, with respect to health risk assessment (HRA) incentives, exceeds the scope of the GINA legislation. The regulations should contain a definition of “underwriting purposes” that mirrors the statutory definition.

Under GINA, health plans and health insurance issuers “shall not request, require or purchase genetic information for underwriting purposes.”¹ GINA defines “underwriting purposes,” in relevant part, to mean, with respect to any group health plan or health insurance coverage offered in connection with a group health plan: (1) rules for, or determination of, eligibility (including enrollment and continued eligibility) for benefits under the plan or coverage; and (2) the computation of premium or contribution amounts under the plan or coverage.² Read together, these provisions mean that health plans and health insurance issuers are prohibited from requesting, requiring or purchasing genetic information for use in determining eligibility for benefits or for use in the computation of premium or contribution amounts under the plan or coverage.

The Interim Final Rules expand the statutory definition of “underwriting purposes” to include “changes in deductibles or other cost-sharing mechanisms in return for activities such as completing a health risk assessment or participating in a wellness program” and “discounts, rebates, payments in kind or other premium differential mechanisms in return for completing a health risk assessment or participating in a wellness program.”³ While we agree with the Agencies that the definition of “underwriting purposes” in GINA is broader than merely activities relating to rating and pricing a group policy, by extending the definition to include various forms of incentives for the completion of HRAs, the Agencies’ definition casts an unreasonably broader net than that required by the law.

The GINA prohibition does not include the offering of incentives or rewards for the collection of genetic information, nor does it specifically address HRAs. This is because the statutory prohibition against the collection of genetic information for underwriting purposes, consistent with the remainder of the statute, is aimed at preventing certain prohibited uses of genetic information. It does not seek to prohibit generally the collection of such information for legitimate purposes following one’s enrollment under a plan or coverage.⁴ On the contrary, Congress’ intent in enacting GINA was to increase access to genetic information, in order to promote health and scientific innovation, by “relieving the fear of discrimination and prohibiting

¹ E.g., 29 U.S.C. § 1182(d).

² E.g., 29 U.S.C. § 1191b(d)(9)(A&B).

³ E.g., 29 C.F.R. § 2590.702-1(d)(1)(A&B).

⁴ In this regard, on occasion the Preamble to the Interim Final Rules erroneously refers to GINA as containing a “statutory prohibition on collecting genetic information.” E.g., 74 Fed. Reg. 51665, 51669.

its actual practice in employment and health insurance.”⁵ An overly broad interpretation of “underwriting purposes” undermines this objective.

The Interim Final Rules’ prohibition against offering incentives in return for the mere completion of an HRA that requests genetic information, but without regard to whether the enrollee in fact supplies any genetic information whatsoever, is not only inconsistent with GINA’s plain language, but also drastically undercuts the ability of health plans and health insurance issuers to collect genetic information for non-discriminatory purposes, such as providing individuals with a clinically valid health risk assessment. The benefits that flow from the inclusion of family medical history in such instruments are described below.

Health risk assessments that request genetic information, including family medical history, are a relatively inexpensive, but highly effective, tool for predicting individual risk for developing many serious health conditions. Evidence suggests they are a catalyst for behavior change among at-risk groups when used in the context of health promotion programs.

While early research suggested that employer-based HRAs were ineffective in motivating and sustaining behavior change,⁶ recent evidence suggests that they are effective when used in the context of health promotion programs.⁷ In recent years, complex computerized algorithmic structures have allowed for HRAs to immediately deliver highly personalized risk information with tailored recommendations for lifestyle interventions, chronic illness care, screenings and other preventive maneuvers.

Family history is an important component of a comprehensive risk assessment, as it can clarify a person’s potential for many diseases as well as inform prevention and treatment options. Family history has been shown to independently predict risk for many common conditions that account for a significant burden of morbidity and mortality, including heart disease,⁸ stroke,⁹ asthma,¹⁰

⁵ Pub. L. No. 110-233, 122 Stat. 881, § 2 (2008).

⁶ Schoenbach VJ, Wagner EH, Beery WL. Health risk appraisal: review of evidence for effectiveness. *Health Serv Res.* 1987 Oct;22(4):553-80; Spasoff RA, McDowell IW. Potential and limitations of data and methods in health risk appraisal: risk factor selection and measurement. *Health Serv Res.* 1987 Oct;22(4):467-97; and Wagner EH, Beery WL, Schoenbach VJ, Graham RM. An assessment of health hazard/health risk appraisal. *Am J Publ Health.* 1982 Apr;72(4):347-52.

⁷ Anderson DR, Stauffer MJ. The impact of worksite-based health risk appraisal on health-related outcomes: a review of the literature. *Am J Health Promot.* 1996 Jul-Aug;10(6):499-508; Shekelle PG, Tucker JS, Maglione M, Morton SC, Roth E, Chao B, et al. Health Risk Appraisals and Medicare. In: Services CfMM, editor. Baltimore MD: Centers for Medicare & Medicaid Services; 2003; and Guide to Community Preventive Services. Assessment of Health Risks with Feedback Plus Health Education With or Without Other Interventions: Task Force Findings and Rationale Statement. Atlanta, GA: US Centers for Disease Control and Prevention; 2008 [updated March 10, 2009; cited 2009 December 27]; Available from: <http://www.thecommunityguide.org/worksites/RRahrfluseducation.html>.

⁸ Williams RR, Hunt SC, Heiss G, Province MA, Bensen JT, Higgins M, et al. Usefulness of cardiovascular family history data for population-based preventive medicine and medical research (the Health Family Tree Study and the NHLBI Family Heart Study). *Am J Cardiol.* 2001 Jan 15;87(2):129-35.

allergy,¹¹ diabetes,¹² depression,¹³ breast cancer,¹⁴ colorectal cancer,¹⁵ ovarian cancer,¹⁶ and many other conditions. While family history is not highly predictive for common disease when used in isolation,¹⁷ it remains an important tool when used in combination with other known risk factors.

HRAs that encompass family history not only help identify individuals' personal risk for disease, but they can motivate them to engage in healthy behaviors, thereby helping mitigate those risks.¹⁸ For example, awareness of the risks posed by a positive family history of early heart disease in a first degree relative, in the context of other health risks, can prompt an individual to adopt and sustain healthy lifestyle choices such as smoking cessation, physical activity and dietary changes. Family history is also used to tailor many widely accepted and evidence-based prevention recommendations, such as screening for breast cancer,¹⁹ colorectal cancer,²⁰

⁹ Jood K, Ladenvall C, Rosengren A, Blomstrand C, Jern C, Jood K, et al. Family history in ischemic stroke before 70 years of age: the Sahlgrenska Academy Study on Ischemic Stroke. *Stroke*. 2005 Jul;36(7):1383-7.

¹⁰ Cole Johnson C, Ownby DR, Havstad SL, Peterson EL. Family history, dust mite exposure in early childhood, and risk for pediatric atopy and asthma. *J Allergy Clin Immunol*. 2004 Jul;114(1):105-10.

¹¹ Korol D, Kaczmarek M. Positive family history of allergy in children with hypersensitivity to cow's milk. *Medical Science Monitor*. 2001 Sep-Oct;7(5):966-70.

¹² Valdez R, Yoon PW, Liu T, Khoury MJ. Family History and Prevalence of Diabetes in the U.S. Population. *Diabetes Care*. 2007 October 2007;30(10):2517-22.

¹³ Tenev VT, Robinson RG, Jorge RE, Tenev VT, Robinson RG, Jorge RE. Is family history of depression a risk factor for poststroke depression? Meta-analysis. *American Journal of Geriatric Psychiatry*. 2009 Apr;17(4):276-80; and Runeson B, Asberg M. Family history of suicide among suicide victims. *Am J Psychiatry*. 2003 Aug;160(8):1525-6.

¹⁴ Familial breast cancer: collaborative reanalysis of individual data from 52 epidemiological studies including 58,209 women with breast cancer and 101,986 women without the disease. *Lancet*. 2001 Oct 27;358(9291):1389-99.

¹⁵ Johns LE, Houlston RS. A systematic review and meta-analysis of familial colorectal cancer risk. *Am J Gastroenterol*. 2001 Oct;96(10):2992-3003.

¹⁶ Pharoah PD, Ponder BA. The genetics of ovarian cancer. *Best Pract Res Clin Obstet Gynaecol*. 2002 Aug;16(4):449-68.

¹⁷ Berg AO, Baird MA, Botkin JR, Driscoll DA, Fishman PA, Guarino PD, et al. National Institutes of Health State-of-the-Science Conference Statement: Family History and Improving Health. *Annals of Internal Medicine*. 2009;151(12):878-85.

¹⁸ O'Neill SM, Rubinstein WS, Wang C, Yoon PW, Acheson LS, Rothrock N, et al. Familial risk for common diseases in primary care: the Family Healthcare Impact Trial. *Am J Prev Med*. 2009 Jun;36(6):506-14.

¹⁹ US Preventive Services Task Force. *The Guide to Clinical Preventive Services*. Washington DC: Agency for Healthcare Research and Quality; 2009.

²⁰ US Preventive Services Task Force. *The Guide to Clinical Preventive Services*. Washington DC: Agency for Healthcare Research and Quality; 2009.

diabetes,²¹ and lipid disorders.²² For instance, evidence suggests that women with a significant family history of breast cancer may benefit from chemoprevention with tamoxifen or raloxifene.²³ Family history is also used to determine who might benefit from genetic testing and in the interpretation of the results of those tests.²⁴

While family history is generally regarded as a vital clinical tool, it is not consistently collected and effectively used in clinical practice.²⁵ A main obstacle is that it is time-consuming to obtain, organize, and interpret family history in the busy day-to-day operation of a health care practice. The use of HRAs, embedded into electronic health records (as is the case at Group Health), allows patients to record their own family history, and the availability of such HRAs through group health plans and health insurance issuers extends the clinical benefits of HRAs to a much larger population. Embedded HRAs also have the benefit of standardizing the collection of family history, delivering comprehensive assessments that seamlessly incorporate family history and other health risks, and providing patients and their health care providers with immediate and personalized recommendations for evidence-based care.

The participation rate for HRAs is directly impacted by the existence or non-existence of a monetary incentive for completing HRAs. Evidence shows there is a strong correlation between offering rewards or incentives, such as changes in deductibles or other cost-sharing mechanisms, or discounts, rebates, payments in kind or other premium differential mechanisms, and improved participation rates for HRAs.

Because of the emerging evidence (summarized below) regarding the value of incentives, an increasing number of employers are using them to improve engagement rates and participation in health and wellness programs. A recent business survey from 2007 showed that nearly 50% of employers were using incentives for these purposes.²⁶

There is a strong evidence base to support the use of monetary incentives in improving HRA response rates. Taitel et al. recently published a paper (a copy of which is attached below for your reference) demonstrating that, among a variety of determinants, the magnitude of a

²¹ American Diabetes A. Standards of Medical Care in Diabetes--2008. Diabetes Care. 2008 Jan 1 31(Supplement_1):S12-54.

²² US Preventive Services Task Force. Screening for Lipid Disorders: Recommendation Statement. Washington, D.C.2008.

²³ US Preventive Services Task Force. Chemoprevention of breast cancer: recommendations and rationale. Washington D.C.2002.

²⁴ Burke W. Taking Family History Seriously. Annals of Internal Medicine. 2005 September 6, 2005;143(5):388-9.

²⁵ Guttmacher AE, Collins FS, Carmona RH. The Family History -- More Important Than Ever. N Engl J Med. 2004 Nov 25;351(22):2333-6.

²⁶ Capps K HJ. Employee Health and Productivity Management Programs; The use of incentives--a survey of major US employers. Lyndhurst, NJ: IncentOne2007.

monetized individual incentive is the single most important determinant of the overall response rate for an HRA.²⁷ Using a database with over 120 employers and about 820,000 employees, they found that an incentive of \$40-\$120 was required to achieve a 50% response rate to a single HRA invitation. The level of the incentive was also strongly influenced by the organizational and communications efforts surrounding the invitation, but these efforts alone were not as strongly correlated with a high response rate. In a different study with over 30 employers and 559,000 employees, investigators found similar results in which incentive value had the strongest correlation with HRA completion rates.²⁸ After controlling for all variables, only incentive value and communications strategy remained predictive of response rates. Other investigators, with smaller sample sizes, have published similar findings.²⁹

As we mention in our cover letter, in the health plan we offer our own employees at Group Health, a flat premium discount equivalent to between 1.7% and 9% of the total premium cost—succeeded in driving the HRA completion rate from approximately 20% to over 90% in just one year.

The Agencies invited evidence-based estimates of the costs—in terms of the forgone benefits of identifying disease risks early and preventing their onset—associated with the reduction in HRA response rates that will be caused by implementation of the Interim Final Rules in their current form. As the above-cited research and Group Health's own experience strongly indicate, such costs will be substantial.

²⁷ Taitel MS, Haufle V, Heck D, Loeppke R, Fetterolf D. Incentives and other factors associated with employee participation in health risk assessments. *J Occup Environ Med.* 2008 Aug;50(8):863-72.

²⁸ Seaverson EL, Grossmeier J, Miller TM, Anderson DR. The role of incentive design, incentive value, communications strategy, and worksite culture on health risk assessment participation. *Am J Health Promot.* 2009 May-Jun;23(5):343-52.

²⁹ Anderson DR GJ, Seaverson ELD, Snyder D. Impact of financial incentives on health assessment participation. *ACSM Health and Fitness Journal.* 2008;12:18-22.

Comment and Recommendation No. 2: The Interim Final Rules should be clarified to provide that it is permissible for a health plan or health insurance issuer to offer changes in deductibles or other cost-sharing mechanisms, or discounts, rebates, payments in kind or other premium differential mechanisms, in return for completing a single “bifurcated” HRA that segregates questions requesting genetic information from other questions, and does not condition the benefit or reward offered on completion of the questions that request genetic information.

The Agencies indicate that it would be permissible for a health plan or health insurance issuer to request completion of “two distinct health risk assessments,” one that requests genetic information and one that does not, as long as the request is made after and unrelated to enrollment, and any changes in deductibles or other cost-sharing mechanisms, or discounts, rebates, payments in kind or other premium differential mechanisms are offered only in exchange for completion of the HRA that does not request genetic information.³⁰

Although, as noted above, Group Health disagrees with the Agencies’ interpretation of “underwriting purposes,” we believe that at a minimum the Interim Final Rules should be modified to clarify that it would similarly be permissible to offer a reward or benefit for completion of a single, bifurcated HRA that segregates questions requesting genetic information from other questions, and that informs the user that any benefit or reward offered in connection with the HRA is not contingent upon response to questions that request genetic information. In this context, the purpose of the Interim Final Rules could be fully served without requiring the actual physical segregation, in separate HRA instruments, of questions related to genetic information from other questions.

Comment and Recommendation No. 3: The 60-day advance filing requirement contained in the “Instructions for the Notice of Research Exception under the Genetic Information Non-Discrimination Act” should be eliminated because it is not required by GINA or the Interim Final Rules, and would unnecessarily delay research. We recommend plans or issuers be required to file such a notice “no later than” the date on which the first request is made to a participant or beneficiary to undergo a genetic test or, alternatively, eliminate the requirement in the instructions to the notice, that the plan or issuer attest to compliance with 45 C.F.R. Part 46.

Under its research exception, GINA permits a plan or issuer to request participants or beneficiaries to undergo a genetic test if certain conditions are satisfied. One of those conditions is that the plan or issuer notify the Secretary in writing that the plan or issuer “is conducting activities” pursuant to the research exception.³¹ Under the Interim Final Rules, such notification is accomplished by completing the “Notice of Research Exception under the Genetic Information Nondiscrimination Act” (the “Notice Form”) authorized by the Secretary and to provide the Notice Form to the address specified in the instructions thereto.³² The Instructions for the Notice Form, provided by the Department of Labor at:

<http://www.dol.gov/ebsa/GINAexceptioninstructions.html>, include an additional requirement for

³⁰ E.g., 29 C.F.R. § 2590.702-1(d)(3), Example 5.

³¹ E.g., 29 U.S.C. § 1182(c)(4)(D).

³² E.g., 29 C.F.R. § 2590.702-1(c)(5).

health plans or health insurance issuers conducting research pursuant to the research exception—namely, to file the Notice Form at least 60 days prior to the date the first request is made to a participant or beneficiary to undergo a genetic test.

Neither the 60-day advance filing requirement nor the specific attestation of compliance with 45 C.F.R. Part 46 contained in the Instructions for the Notice Form is required by GINA or the Interim Final Rules. Together, these requirements would operate to unnecessarily delay valuable research. In order for a plan or issuer to be able to attest to compliance with 45 C.F.R. Part 46, as required by in the Notice Form, the research study must first receive Institutional Review Board (“IRB”) approval in accordance with 45 C.F.R. § 46.109. Only after IRB approval is obtained, thereby accomplishing compliance with 45 C.F.R. Part 46, can the Notice Form can be submitted. However, the requirement in the instructions to the Notice Form, that no requests be made to participants to undergo genetic tests occur for at least 60 days after submission of the Notice Form, will unnecessarily delay the commencement of the IRB-approved study.

While we are unable to ascertain the Congressional intent behind the notice requirement, we assume notice is required in order to inform the Agencies as to the existence of research being conducted pursuant to the research exception so as to assist the Agencies in monitoring and enforcing compliance with GINA. However, because neither GINA nor the Interim Final Rules require the Agencies to take any action prior to commencement of a research study, we believe the Agencies’ objectives can be accomplished without requiring that the Notice Form be filed 60 days in advance. . We recommend that plans and issuers be required to file a notice “no later than” the date the first request is made to a participant or beneficiary to undergo a genetic test.

Alternatively, we recommend that the Notice Form be amended so that it does not include an affirmative attestation of compliance with 45 C.F.R Part 46. Such a modification would enable a plan or issuer to file the Notice Form as soon as it had all of the information that would enable it to file “a description of the activities conducted,” but before the IRB had approved the study. This change would neither eliminate nor alter the condition, imposed by GINA and other law, that the study comply with 45 C.F.R Part 46, but it would allow the plan or issuer to provide GINA’s required notification to the Secretary on a more timely basis.

FAST TRACK ARTICLE

Incentives and Other Factors Associated With Employee Participation in Health Risk Assessments

Michael S. Taitel, PhD

Vincent Haufle, MPH

Debi Heck, MA

Ronald Loeppke, MD, MPH

Donald Fetterolf, MD, MBA

Objectives: Investigate factors associated with employee participation rates in health risk assessments. **Methods:** This cross-sectional study using multiple regression analyzed data from 124 employers with 882,275 eligible employees who completed 344,825 health and productivity assessments (HPAs). **Results:** Incentive value and Communications and Organizational Commitment Level (Com/Org Level) were the strongest predictors of HPA completion rates. Employer size and a Gateway Model were also significant predictors. In addition, a correlation of variables showed other important relationships. To achieve a 50% HPA completion rate, employers with a low Com/Org Level will need an incentive value of approximately \$120 whereas employers with a high Com/Org Level only need approximately \$40—a difference of \$80 dollars. **Conclusion:** This applied study offers empirical evidence to help employers increase their employees' participation in health risk assessments. (J Occup Environ Med. 2008;50:863–872)

Employers are in a unique position to positively influence the health of the US population because they have access to the employees and dependents that make up a large portion of the population, and they are responsible for paying a majority of this group's health care expenditures.¹ Employers impact health through their control of benefit plan designs, communication channels, corporate policies, physical environments, and corporate culture. They also play an important role in the prevention of illness through worksite health promotion programs.

A large and expanding body of health research shows that employees with multiple modifiable risk factors cost more than other workers and that increasing healthy behaviors and decreasing health risks are associated with cost savings.^{2,3} Furthermore, employers offering health promotion programs benefit from enhanced corporate image and good will, increased employee morale, greater employee retention, reduced absenteeism, and higher on the job productivity.⁴

As a result of these and other data, public policymakers are encouraging employer-based initiatives. For example, Healthy People 2010 has the goal of increasing the proportion of worksites that offer comprehensive worksite health promotion programs.⁵ The recently proposed "Healthy Workforce Act 2007" (S.1753), is legislation that would provide tax incentives to employers to stimulate investment in comprehensive health promotion. Further-

From Alere, Rosemont, IL.

All funding for this study was provided by Alere, formerly Matria Healthcare.

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more, the Centers for Disease Control and Prevention's Healthier Worksite Initiative offers guidance and practical tools to employers developing health promotion programs.⁶

More and more employers are embracing the notion that a healthy workforce is beneficial to their organization's productivity and profitability.⁷ They are seeking methods to improve the overall health of their workforce and reduce the cost associated with treating illness. To this end, they are taking an active role in promoting health.

National surveys of employers show that most offer some form of health promotion. Childress and Lindsay⁸ report that 90% of US worksites with over 50 employees offer at least one health promotion program. Nevertheless, only a small proportion of employers offer comprehensive health promotion programs. Results from the 2004 National Worksite Health Promotion indicate that only 6.9% of the responding worksites offer a comprehensive health promotion program as defined by Healthy People 2010, which include the following elements: health education, supportive environments, integration into organizational structure, links to employee support services, and health screenings.⁹ Although many employers have stepped up to provide health promotion, clearly there is room for improvement.

Health screenings in the form of health risk assessments (HRAs) are commonly used by employers as a key element in their health promotion programs. A 2007 survey of 573 US employers with a total of 11 million employees found that 72% offered HRAs.^{2:p1466} HRAs are self-report surveys that typically include questions about various medical and lifestyle indicators that have been shown to relate to preventable chronic health conditions. Medical risk indicators may include measures such as body mass index, blood pressure, and lipid profiles. Lifestyle risk indicators may include measures such as physical activity levels, smoking

status, nutrition, and stress levels. More recently HRAs are beginning to include measures of health-related productivity.¹⁰

HRAs produce reports that serve several functions. Individual risk reports provide feedback to the responder regarding their relative risk for various mental and physical health conditions and their overall risk profile. This feedback, informed by behavior change theories such as Prochaska's Transtheoretical Model¹¹ and Bandura's Cognitive-Social Model,¹² usually offers tailored recommendations and education to help the individual change certain behaviors to reduce their modifiable risks. A 2008 Hewitt and Associates survey of approximately 30,000 employees indicated that 99% of respondents agreed or strongly agreed that it is important to know their personal health risk to take steps to prevent or treat chronic disease. In addition, 60% of respondents report taking action on their health based on the feedback from an HRA. Of the 40% not yet taking action, 55% indicate they are ready to follow recommendations, 35% plan to take, and 10% do not plan to take action to improve health based on HRA feedback.¹³ There is insufficient empirical evidence that HRAs by themselves lead to health risk reductions.^{14,15} Nevertheless, there is growing support that HRAs coupled with comprehensive health promotion programs are associated with health risk reduction.^{16,17}

Aggregate reports summarize a population's health risk and provide essential information needed for program planning and for measuring changes in the population's risk status over time. Many advanced HRAs integrate with comprehensive wellness and disease management programs and serve as a mechanism to identify individuals for specific health enhancing interventions.^{10:p470}

Employee participation is the key to maximizing the value of health promotion programming. Achieving high rates of engagement and participation is identified by leading experts as es-

sential to successful worksite health promotion programming.¹⁸ Because HRAs are typically the entry point into these programs, employers have a vested interest in increasing and maintaining high HRA participation rates. Research indicates that employees who typically respond to health risk assessments are different than nonresponders.^{19,20} Consequently, efforts that are successful at increasing HRA participation rates will engage more individuals who otherwise would not have participated in health promotion activities and produce reports that are more representative of the whole employee population. Therefore, employers and health promotion providers continually seek to improve program participation.

We suggest that there are three essential constructs controlled by employers that influence health promotion participation: communications, organizational commitment, and incentives.

Communications

Health communications may take the form of mailings, payroll stuffers, web site advertising, worksite posters, phone calls, and e-mails. The content can raise awareness of health risks, suggest methods to reduce them, provide the motivation and skills needed to reduce these risks, help direct individuals to supportive environments, and reinforce healthy attitudes.²¹ Several benchmarking studies have recognized that effective communication is an essential component of disseminating information about worksite health promotion programming.^{18:p114} Others have found that insufficient or ineffective communications about health promotion programs can result in low levels of participation because employees are simply unaware of available programs.²²

Organizational Commitment

Organizational commitment is the structure that supports engagement and dissemination of health promotion programs, which includes employee involvement and leadership

support. Employee involvement can take the form of employee advisory boards (EABs), wellness committees, union representation, and internal champions. Leadership support is defined by senior leadership and management's visible advocacy and program participation, and by their allocation of dedicated resources to health promotion programming.

Several elements of organizational commitment can influence employee participation in health promotion programs. EABs and employee wellness committees are important groups of representative employees that influence the promotion, planning, and development of worksite health promotion programs.^{22,23} They help tailor health promotion programs to fit the needs and desires of the employees and, as a result, help create more attractive programming that can increase participation rates.^{20;p401} Evidence suggests that the amount of employee involvement in an EAB is positively correlated with both the awareness and participation in a worksite health promotion campaign.²⁴

Champions have long been recognized in the business community as a tool to influence others to support projects.^{25,26} Champions are opinion leaders who are recognized by their peers and typically have an influential relationship with fellow employees. Champions can include employees at all levels: staff, management, and even executive leadership. They are well positioned to influence others to participate in health promotion programming.

Management and leadership support are essential to have a successful worksite health promotion program. Sloan and Gruman²⁷ found that supervisor support was independently associated with participation in health promotion programs. Crump et al²⁸ found that worksite organizational factors (perceived management support, organizational resources, and supportive social environment) are predictive of employee participation in health promotion programs in the worksite setting. Further, evidence

suggests that having a staff person exclusively committed to health promotion programming is a strong predictor of a worksite having a comprehensive health promotion program.^{22;p439} The bottom line is that organizational commitment represents much of the corporate culture and workplace environment that influences participation and sustainable behavior change.

Incentives

Incentives are financial and nonfinancial rewards linked to specific behaviors. Recently employers (and benefit consultants) are showing renewed interest in using rewards or incentives to increase health promotion participation rates. A 2004 National Worksite Health Promotion Survey indicated that 26% of employers use incentives to promote participation.^{9;p2} Incentives can extrinsically motivate individuals to modify their behavior by changing the cost and benefits associated with the behavior. Typically, the higher the average dollar value of an incentive, the higher the participation levels.²⁹ Incentives can take the form of cash, gift cards, coupons, merchandise, time off, awards and recognition, drawings or lotteries, preferred benefit plan designs, premium and copay reductions, and contributions to flexible spending accounts (FSA), and health savings accounts (HSA). The monetary value of incentives typically ranges from just a few dollars to several hundreds of dollars.

Cash-based incentives are offered in the form of taxable dollars, gift cards, and coupons. Merchandise can range from small inexpensive trinkets to large ticket items like iPods and digital cameras. Employer-sponsored days off from work can include additional vacation days or paid time off. Tax-exempt contributions to FSA or HSA are an increasingly popular choice among employers and are a natural fit with the trend toward consumer-driven health plans. Medical plan premium reductions and medical and pharmacy copay reductions are a way employers

are tying health promotion participation to medical utilization.

Drawings or lotteries are perceived as a way to administer an incentive at a relatively low cost. Drawings give the appearance of a large incentive but may, in reality, be a low-cost way for employer's to deliver an incentive. Nevertheless, research on the effectiveness of lotteries suggests that they may not work well to influence behavior.³⁰ Preferred benefit plan designs, which are usually enhanced medical care coverage, are another way employers can reward individuals who participate in health promotion programming. A very economical incentive that is frequently used among employers is the use of awards and recognitions. For example, employees who participate in health promotion programming are recognized by management and praised in front of their peers. For some employees, competition to receive recognition drives participation more than compensation.

Employers considering the use of incentives should be aware of the Health Insurance Portability and Accountability Act, Americans with Disability Act, state law, and tax policies that may impact the use of incentives. In general, incentives offered to a whole employee population are not limited other than certain tax liabilities. Nevertheless, incentives directed to subpopulations, such as smokers or the obese, or incentives directed at specific behavior change, or biometric results are more regulated.³¹

Employers have a strong interest in improving the health of their workforce by offering health promotion programs. They want to achieve high participation rates to maximize the value of these offerings. Nevertheless, there is little empirical evidence from the applied setting to guide employers on selecting the best factors to drive participation. As an initial contribution, we investigated several factors that are likely to be associated with employee participation rates in HRAs.

TABLE 1
Frequency Distribution by Employer Size ($n = 124$)

Employer Size	Frequency	Percent
Less than 1000 employees	14	11.3
1000–4999 employees	58	46.8
5000–10,000 employees	29	23.4
Greater than 10,000 employees	23	18.6

TABLE 2
Frequency Distribution by Industry Types ($n = 124$)

2007 NAICS US Titles	Frequency	Percent
Accommodation and Food Services	4	3.2
Administrative and Support and Waste Management and Remediation Services	5	4.0
Construction	4	3.2
Educational Services	6	4.8
Finance and Insurance	9	7.3
Health Care and Social Assistance	18	14.5
Information	6	4.8
Manufacturing	23	18.6
Mining, Quarrying, and Oil and Gas Extraction	4	3.2
Other Services (except Public Administration)	4	3.2
Professional, Scientific, and Technical Services	13	10.5
Public Administration	4	3.2
Retail Trade	12	9.7
Utilities	6	4.8
Wholesale Trade	6	4.8

Study Data and Methods

In this cross-sectional study, we analyzed data from 124 employers with 882,275 incentive-eligible employees who completed 344,825 HRAs. These employers varied in size (Table 1) and represented a wide distribution of business, government, and industry sectors (Table 2). One commonality is that they all engaged Alere to provide a variety of integrated population health improvement initiatives, and all relied on Alere's "health and productivity assessment" (HPA), a web (and occasionally paper)-based HRA used to measure health risks, worker productivity, and modifiable behaviors.

Alere's health improvement programs are supported by a standardized technology infrastructure that hosts and tracks participation in HPAs, preventive care screenings, and Healthy Living Programs, which are personalized on-line modules that help employees take important

steps to reduce their health risks and improve overall health. Once an employee completes their assessment, an algorithm triggers the programs best tailored to their risk profile and stage of readiness for change. These programs address weight loss, physical activity, nutritional management, stress relief, heart health, diabetes prevention, smoking cessation, healthy aging, and cancer prevention. Employees may also self-select to participate in any of the programs regardless of their HPA results.

Employees also have access to on-line seminars that cover a wide variety of health and wellness topics. The program offers participatory interventions that include physical activity, healthy weight management, nutrition and stress management. In addition, programs may include telephonic health coaching. The fundamental components to these interventions are that they provide the tools for the par-

ticipant to set personal goals, develop action plans, and track progress.

The data for this study were obtained from Alere's information system that tracks program participation. We also collected data by abstracting administrative records maintained by Alere's Wellness Consultants who are experts in health promotion program design and are responsible for supporting the employers' health promotion programs. The abstracts include program campaign dates, number of eligible employees, wellness programming structures and activities, marketing and communication campaigns, incentive structures, incentive types and monetary values.

Measures

Dependent Variable

The dependent variable used to measure participation in HRAs was the HPA completion rate. Throughout this article, we will refer to the general concept of participation as "HRA participation," and we will refer to the operational measure of participation as "HPA completion." The HPA completion rate was defined as the ratio of the number of employees who completed the HPA to the total number of employees eligible for the incentive program for the time period the HPA was accessible to employees. The assessment periods varied depending on the employers' predefined preferences, although, most assessment periods lasted approximately 9 to 12 months.

Independent Variables

As an applied study, we relied on available information that the literature and expertise suggested would impact participation rates. Some of these factors include the level of an employer's communication and organizational commitment to health promotion programming, employer and employee characteristics, and the use of incentives. Incentives have

multiple elements including structure, type, and monetary value.

Communications and Organizational Commitment. Recognizing that communication, employee involvement, and leadership support are influential on program participation, we created an ordinal metric combining many of these elements. We engaged Alere's Wellness Consultants to subjectively assess each employer's Communications and Organizational Commitment Level (Com/Org Level) using the following criteria:

Low: Program advertised 1 to 3 times throughout the campaign period. This advertisement includes a basic announcement, typically at or around program launch. These advertisements are in one or more places such as open enrollment materials, launch brochure, and/or flyer. In addition, one to two other communications occur during the program period. Limited client resources (personnel time) are allocated to the program (<10% of a FTE).

Medium: Program advertised 4 to 10 times throughout the campaign period. A series of communications occur throughout the program period, in multiple mediums, such as open enrollment materials, brochures and/or flyers, emails, posters, postcards, and employee meetings. Some executive/management support for program is shown, a few established wellness committees, but overall culture does not strongly support or adapt to the program. Moderate client resources (personnel time) are allocated to the program (<50% of an FTE).

High: Program advertised 10 or more times throughout the campaign period. Multiple communications occur throughout the program period, in multiple mediums, such as open enrollment materials, brochures and/or flyers, emails, posters, postcards, and employee meetings. Wellness Champions are established for "most programs." Strong, visible execu-

tive/management support is shown, and established wellness committees and regular dedicated client resources (personnel time) are allocated to the program (>50% of a FTE).

Employer and Employee Characteristics. As a proxy for the potential influence of employer size, we relied on Alere's employer size groupings (<1000, 1000 to 4999, 5000 to 10,000, and >10,000) to categorize the number of incentive-eligible employees. We then evaluated the impact of employer size on HPA completion rates. We also evaluated if the average age and gender of the HPA respondents correlated with the completion rate. Finally, to determine if HPA completion rate is related to participation in other wellness programming, we created an Engagement Score by calculating the ratio of the median total wellness points (a measure of health program participation) to the 95th percentile of the maximum wellness points achieved per employer. We selected the median total wellness points and the 95th percentile of the maximum to minimize the influence of outlier scores that may skew the ratio. The Engagement Score was based on wellness points from HPA responders only. We used this Engagement Score in further analyses.

Incentive Structure. In this study, incentive structures are measured by a set of dichotomous variables that indicate the presence or absence of a wellness point system, incented independently, a Gateway Model, mandatory biometrics, and the use of multiple incentive types.

A Wellness Points System is indicated when employees that complete a wellness activity (eg, HPA, annual physical examination, weight loss program) receive an employer-specific, predefined number of points for that activity. For example, an employee completing an HPA receives five points; they receive three additional points when they attend a healthy living seminar. On the basis

of the various activities that an employee completed, they will have accumulated a total number of points. An incentive is provided when their total number of points meets or exceeds a predetermined points threshold. Some employers use a tiered incentive structure where an employee can earn a more valuable incentive as their total number of points reaches a higher level. It is important to note that employees are informed of the total points needed to achieve the various incentives and understand each activity's relative contribution to the total.

The incented independently incentive structure is indicated when the incentive is provided exclusively for HPA completion; this incentive is independent from other program incentives. The Gateway Model is indicated when employees must complete the HPA to be eligible to earn an incentive for participating in other health promotion activities. Mandatory Biometrics is indicated when biometrics (eg, body mass index, blood pressure, high-density lipoprotein) are required for the participant to achieve an incentive. The final incentive structure assessed, multiple incentive types, is indicated when more than one incentive type is provided for HPA completion. For example, employees receive a gift card and a pharmacy copayment waiver for completing the HPA.

Incentive Type. Incentive types are the various modes used to deliver incentives. These include awards/recognition, merchandise, cash/gift card, drawings, FSA or HSA contribution, preferred benefit plan, time off from work and cost sharing that may include medical insurance premium reduction, medical or pharmacy deductible reduction, and medical or pharmacy copayment waiver. The distribution of the various incentive types offered by the employers in our sample is very similar to the distribution reported in a survey of major US employers.³²

Monetary Value of Incentive. To test the influence of incentives value

on HPA completion rate, we developed a methodology that allows us to monetize different incentives types uniformly across employers. For most incentive types, the incentives value was straight forward and clearly identified by the employer. For example, if completing an HPA is worth 10 points and the total points needed to achieve the first incentive level is 30 points, then completion of the HPA contributes to 33% of the incentive value. Therefore, if 30 total points achieves \$120 in cash, the HPA is worth approximately \$40. In a tiered incentive structure, we limited the monetization of the incentive for HPA completion to its relative contribution to achieving the first possible incentive level. If the HPA was incented independently, the entire value of the incentive was applied. On the other hand, some incentive types were more complicated and required additional attention.

Awards/recognition have inherent value, but due to the limited data available regarding the type of awards and their delivery, we determined that there was not a reliable way to assign a dollar value. Therefore, we did not monetize the value of awards/recognition in this analysis.

Some employers issued an incentive in the form of time off from work. We converted time off from work into dollars by calculating the average hourly salary ([average yearly salary/250 workdays]/8 hours workday) and multiplied hourly salary by the number of hours of time off.

The monetizing of drawings required us to consider the economic concept of expected value to account for the discounted value of the reward. Expected value is the face value of the incentive multiplied by the probability of winning.³³ For example, the expected value of a drawing with a 0.1% chance of winning \$500 is \$0.50. By using this approach, we could have looked retrospectively at each employer that

offered a drawing and determined the average chance of winning the drawing based on number of incentive-eligible HPA respondents and calculate the expected value. Nevertheless, this methodology is problematic because it is very difficult for an individual to calculate their odds of winning or the expected value of the incentive when they do not know how many others will complete the HPA. This methodology also does not account for the psychological value of this incentive, such as experiencing the thrill of the gamble or the fantasy of winning a big prize. As a result, the strict expected value will under-represent the actual value of the incentive.

We needed to develop a methodology for monetizing the impact of a drawing incentive, taking into account both the expected value and the psychological value of the incentive. Nevertheless, we did not find sufficient empirical literature to provide guidance. Therefore, taking into account the range of face and expected values, we determined that multiplying the face value of the incentives by 1% would be a reasonable estimate of the incentive value to each employee. For example, if the face value of the drawing is \$3000, then the incentives dollar value would be \$30 from the employee's perspective.

Analysis

We examined the bivariate relationship between the HPA completion rate and all of the independent measures using a Spearman rank order correlation. Multivariate linear regression analysis was used to explore the relationship between employee participation in the HPA and all independent variables. All analyses were conducted using SAS 9.1 software (Copyright © 2002–2003 by SAS Institute Inc, Cary, NC) and Microsoft Excel 2003 (Copyright ©1985–2003 Microsoft Corporation).

Since no a priori hypotheses had been made to determine the order

of entry of the predictor variables, we used a forward stepwise multiple regression analysis to predict HPA completion rate. A *P*-value of less than 0.05 was considered significant for the results of all statistical analyses.

Results

Descriptive Results

Table 3 presents the means and standard deviations for the average age of the HPA respondents, incentive value, engagement score, gender, and HPA completion rates.

Table 4 displays the frequency distribution of the incentive structures and the Com/Org Level. We find that 75.8% of employers offered Wellness Points; 37.9% incented independently; and 22.6% used a Gateway Model whereas only 8.1%

TABLE 3
Mean and Standard Deviation (SD) of Continuous Variables

	Mean	SD
Average age (yrs)	42.5	2.8
Incentive value (US dollars)	\$57.35	\$69.49
Engagement score	0.40	0.18
Gender (% female)	59.8%	18.3%
HPA completion rate	39.1%	27.0%

TABLE 4
Frequency Distribution of Incentive Structures and Com/Org Levels (*n* = 124)

	Frequency	Percent
Gateway Model	96	77.4
Wellness points	94	75.8
Incented independently	47	37.9
Mandatory Biometrics	10	8.1
Multiple incentive types		
No incentives	2	1.6
One incentive	84	67.7
Two incentives	35	28.2
Three incentives	3	2.4
Com/Org Level		
Low	23	18.6
Medium	58	46.8
High	43	34.7

TABLE 5

Frequency Distribution and Mean Incentive Value by Incentive Type (*n* = 124)

	Frequency	Percent*	Mean (dollars)	SD
Cost sharing	50	40.3	\$79.14	\$84.24
Cash/gift card	42	33.9	\$47.82	\$47.53
Merchandise	26	21.0	\$44.60	\$67.03
Flexible spending account (FSA) or health savings account (HSA) contribution	17	13.7	\$43.39	\$24.23
Drawings	15	12.1	\$65.05	\$84.38
Time off from work	6	4.8	\$30.55	\$18.30
Awards/recognition	5	4.0	\$30.83	\$28.80
Preferred benefit plan	2	1.6	\$205.00	\$113.14

*Some employers offered more than one incentive type and some employers did not offer any incentives.

required Mandatory Biometrics. Most employers (96.0%) offered one or two incentives for the HPA. Employers in this study demonstrated a range of Com/Org Levels: 18.6% had low Com/Org Level; 46.8% had medium Com/Org Level; and 34.7% had high Com/Org Level.

Table 5 displays the frequency distribution of the various incentives types and the mean incentive value for each type offered by the employers. Cash/gift card, cost sharing, and merchandise were the most frequently used incentive types among these employers. Preferred benefit plan, cost sharing and drawings are the top three incentive types with the highest average incentive values.

Bivariate Analysis Results

All of the independent variables analyzed are listed in Tables 3–5. Table 6 displays the Spearman rank correlations between HPA completion rate and the significant predictor

variables and the correlations among themselves. Several measures were positively correlated with HPA completion: Incentive value (*r* = 0.681, *P* = <0.0001), Com/Org Level (*r* = 0.507, *P* = <0.0001), cost sharing (*r* = 0.288, *P* = 0.001), Gateway Model (*r* = 0.273, *P* = 0.002), Multiple incentive types (*r* = 0.226, *P* = 0.01), and incented independently (*r* = 0.190, *P* = 0.03). Employer size (*r* = -0.195, *P* = 0.03) was negatively correlated with HPA completion rate. In addition, incentive value correlated with Com/Org Level, cost sharing, Gateway Model and incented independently (*P* ≤ 0.05). Further, Com/Org Level correlated with multiple incentive types; and incented independently correlated with Gateway Model and employer size (*P* ≤ 0.05).

Multivariate Regression Results

Multivariate regression results are shown in Table 7. The incentive

TABLE 7

Multiple Regression Results

Variables	F Statistic	P
Intercept	2.30	0.15
Incentive value	58.58	<0.0001
Com/Org Level	61.14	<0.0001
Employer size	16.59	<0.0001
Gateway Model	5.09	<0.05

*R*² = 0.55; *F* = 36.83; *P* < 0.0001.

value (which ranged from \$0 to \$480 per participating employee), Com/Org Level, employer size, and the use of a Gateway Model accounted for approximately 55% of the variance in HPA completion rates, *F*(4, 119) = 36.83, *P* < 0.0001.

In recognition of the possible collinearity between the incentive value and other predictors, we also ran a regression model removing incentive value so as to better understand the contribution of these other predictor variables in the model. Use of cost sharing and incented independently were significant in the model but were not sufficiently influential to be considered for inclusion in the final model. Incentive value had a much stronger relationship to HPA completion rate as compared to the other correlates and therefore stayed in the final model.

To help validate the model, we tested the assumptions of multiple linear regression and found them to be within acceptable limits.

In Figs. 1, 2, we highlight the relationships among incentive value, Com/Org Level, and HPA completion rate. Figure 1 shows a scatter

TABLE 6

Spearman Rank Correlations

	HPA Completion Rate	Incentive Value	Com/Org Level	Cost Sharing	Gateway Model	Multiple Incentive Types	Employer Size
Incentive value	0.681*						
Com/Org Level	0.507*	0.344*					
Cost sharing	0.288*	0.353*	0.118				
Gateway Model	0.273*	0.313*	0.152	0.169			
Multiple incentive types	0.226*	0.092	0.304*	0.006	0.023		
Employer size	-0.195*	0.118	0.059	-0.044	0.165	-0.054	
Incented independently	0.190*	0.427*	0.160	0.002	0.263*	0.128	0.401*

**P* ≤ 0.05.

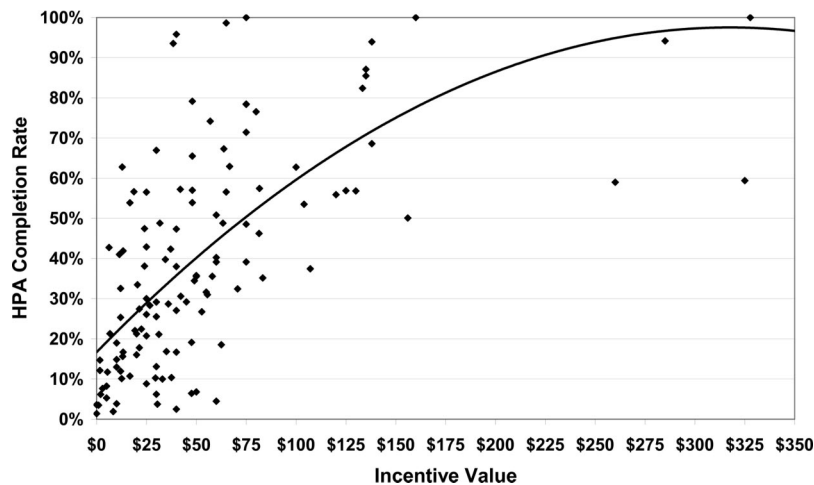


Fig. 1. HPA completion rate by incentive value ($n = 123$).

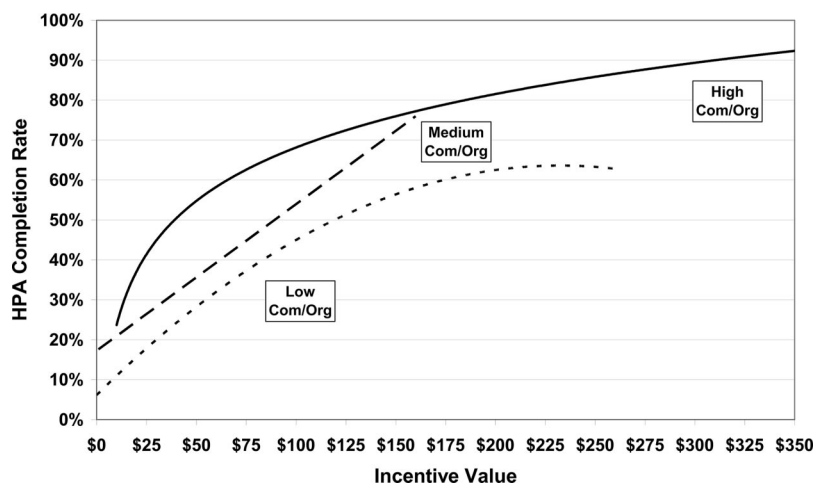


Fig. 2. HPA completion rate by incentive value and com/org level ($n = 123$).

plot of the HPA completion rate by the incentive value. A 2nd order polynomial regression line was fitted to the data ($R^2 = 0.453$) to draw attention to the relationship between incentive value and HPA completion rate. Figure 2 shows the HPA completion rate by incentive value stratified by the three Com/Org Levels. We found that a 2nd order polynomial regression line best fit the low Com/Org Level, a linear regression line best fit the medium Com/Org Level, and a logarithmic regression line best fit the high Com/Org Level. Figure 2 clearly shows that the higher the Com/Org Level, the higher the HPA completion rate. For example, to achieve a 50% HPA completion rate, employers with a low Com/Org Level need an incen-

tive value of approximately \$120, whereas employers with a high Com/Org Level only need approximately \$40; this is a difference of \$80 dollars.

Discussion

This study explored the various factors that potentially influence employee participation rates in HRAs. We relied on data from the real world experience of employers offering HPAs as part of their integrated population health improvement initiatives with Alere. As indicated earlier, these employers represented a wide distribution of industry types and sizes. These employers experienced a range of participation rates, and they exhibited a variety of factors that impacted their workforces' participation.

Our most notable finding from the regression analysis is that incentive value and Com/Org Level were the strongest predictors of HPA completion rate. The analysis also showed that employer size and a Gateway Model were significant predictors. In addition, a correlation of variables showed other important relationships. For example, multiple incentive types, incited independently, and cost sharing each significantly correlated with HPA completion rate. Although they did not remain in the regression model due to their covariance with other more significant predictors, their independent effects should be recognized.

On the basis of these findings, we confirm basic behavioral theory that higher incentive values are associated with higher participation rates. Nevertheless, our data suggest that this is strongly influenced by Com/Org Levels. Employers seeking to achieve high HRA participation rates need to consider both incentive value and Com/Org Level. Furthermore, employers should consider the cost-effectiveness of investing in incentives versus communications and organizational commitment. Research has shown that investment in key elements of communications and organizational commitment will have positive effects beyond health promotions, such as improved employee relations, improved retention and turnover, and increased productivity.³⁴

Employer size was included as one of the characteristics of the study sample. It proved to be significant predictor of HPA completion rate. Clearly, size has some impact which may be due to a variety of factors not measured in this study, such as workgroup size or corporate culture.

Employers should consider using a Gateway Model to increase participation. The Gateway Model requires employees to complete the HPA to be eligible to earn an incentive for participating in other health promotion activities. Its predictive value in the regression analysis along with its positive correlation with HPA com-

pletion rate and its lack of correlation with the engagement score suggests that the Gateway model has a positive impact on HPA completion without negatively impacting subsequent health promotion participation.

We can also learn from the lack of significant relationship between variables that we expected to correlate. With the exception of cost sharing, we did not find any other independent effects of incentive types on HPA completion rate. We take this to mean that the type of incentive does not matter; the important aspect is the total monetary value of the incentive. Therefore, those selecting the incentive types for their programs have a wide range of options. As long as the incentive has sufficient monetary value to most employees, program designers can consider other criteria for their decisions, such as employee preference, ease of incentive administration, or leveraging other healthful behaviors.

Furthermore, although not a formal hypothesis, we expected that HPA completion rate would also be associated with overall health promotion participation measured by the Engagement Score. Nevertheless, this study shows them to be independent of each other. This lack of relationship may mean that HRA participation and health promotion participation need to be measured independently and that HRA participation may not be a proxy for total health promotion participation. Additional work is needed to further explore this relationship.

This applied study included a convenient yet reasonably comprehensive set of measures. Nevertheless, there are a number of variables and concepts that may be important but were not included, such as the influence of delayed gratification versus immediate reward; newer versus established programs; HRA accessibility; the content of communications; competitions; and selection of incentives based on employee preference. In addition, different employees who are offered the same incentive types

and structures may receive different actual and/or perceived value. For example, a drug copay reduction will have varied monetary value depending on the employees' drug utilization or if they are on a spouses' health plan. A merchandise incentive may be valued more or less depending on whether the employee possesses or desires the merchandise. Finally, a cash incentive of \$50 may be worth more to a minimum wage worker than to a corporate executive.

Recently, there has been interest in measuring the concept of corporate culture as it relates to the health of a workforce and participation in worksite health promotion programs.^{35,36} Although not explicitly measured, we believe that the construct of Com/Org Level has many similarities and would correlate highly with measures of corporate culture.

In conclusion, this applied study offers empirical evidence for various modifiable factors that impact employee participation rates in HRAs. Employers should consider these factors when designing their health promotion programs. We found the monetary value of incentives strongly impacted participation rates. Furthermore, the Com/Org Level that includes communication frequency and modality, employee involvement in wellness committees, wellness champions, resource allocation, and leadership support were equally important. In addition, use of a Gateway model, incenting an HRA independently and using multiple incentives contributed to participation rates. Finally, employers can use the exhibit of the relationship of incentive value and Com/Org Level to HPA completion rate (Fig. 2) as a guide to estimate their programs' expected participation rate given their investment in incentives and communications and organizational commitment.

Limitations

There were several limitations to this study. The HPA was offered as part of each employer's health improvement initiatives, which may have included a varied set of mod-

ules and activities. Although not included as an independent measure, the available set of health promotion interventions and their incentive design may have also played a role in the employees' decision to complete the HPA. In addition, the Alere HPA and total population health improvement platform used in this study may not be representative of HRAs and health promotion offerings used in other settings. To the extent that other HRAs vary from an on-line, theory-driven, branching logic tool that is integrated into a total population health improvement platform then the generalizability of these results may be limited. Also, the methodology used to monetize the drawing incentive was based on expert opinion. Further research is needed in this area to further develop and validate this methodology.

As an applied cross-sectional study, we observed levels and grouping of variables as they naturally occurred among employers. Some may suggest that a randomized controlled study is necessary to understand the factors that impact participation rates or that a dose-response design is needed to more fully isolate and understand this impact of varied incentive types or incentive value. This may be true; however, we believe that our design and results are appropriate and sufficient to make informed business decisions by employers interested in enhancing the health and productivity of their workforce.

About Alere

Alere is a leading provider of integrated comprehensive health improvement programs to health plans, employers, and government agencies. Alere is dedicated to developing better educated, motivated, and self-enabled health care consumers and supporting clinicians in managing the care of their patients. The company manages major chronic diseases and episodic conditions including diabetes, congestive heart failure, coronary artery disease, asthma, chronic obstructive pulmonary disease, high-risk obstetrics, cancer,

musculoskeletal and chronic pain, depression, obesity, and other conditions. Alere delivers programs that address wellness, healthy living, productivity improvement and navigation of the health care system, and provides case management of acute and catastrophic conditions. Alere's mission is to leverage technology to improve health care one person at a time.

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