

The Role of Worksite Health Screening A Policy Statement From the American Heart Association

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The healthcare system in the United States is undergoing a paradigm shift that will result in a greater focus on the early identification and management of risk factors known to be associated with a higher risk for noncommunicable diseases, in particular, cardiovascular disease (CVD). Healthcare delivery must move beyond the clinical environment by partnering with employers, schools, community-based organizations, and public health agencies to reach large segments of the population and address the problems that contribute to poor health.^{1,2} Justification for this transformation in US healthcare delivery can be made from several perspectives, namely the renewed focus on prevention. However, one of the most compelling arguments in the current economic environment is the financial benefit of shifting the focus towards prevention. Direct medical costs associated with CVD in the United States are projected to increase from \$273 billion in 2010 to \$818 billion in 2030. Indirect costs associated with CVD secondary to lost productivity will increase from \$172 billion to \$276 billion over this same timeframe.³ Clearly, to avoid these disconcerting economic forecasts, the change in healthcare delivery and emphasis on primary and primordial prevention must happen quickly.

Modifiable risk factors that portend a higher likelihood of initial CVD development, or subsequent events if a diagnosis has been established, have been known for several decades: excess body weight, hyperglycemia and diabetes mellitus, physical inactivity/low cardiorespiratory fitness (CRF), high blood pressure, tobacco use, and poor diet. Improved identification and management of these risk factors is essential to altering future healthcare projections of worsening health coupled with higher costs.

The workplace is an ideal environment to initiate the shift towards prevention. Biometric screening is defined by the

Centers of Disease Control and Prevention as “the measurement of physical characteristics such as height, weight, body mass index, blood pressure, blood cholesterol, blood glucose, and aerobic fitness tests that can be taken at the worksite and used as part of a workplace health assessment to benchmark and evaluate changes in employee health status over time.”⁴ Biometric screening is often combined with a Health Risk Assessment tool (eg, questionnaire to assess current and future health risks),⁵ and combined they are defined as health screening in the workplace.

There is consensus that conducting health screenings in the workplace is a promising strategy for early detection of established risk factors with the hopes of preventing the development of noncommunicable diseases, or, if an individual has already been diagnosed with a noncommunicable disease, managing this condition and preventing subsequent events.⁶⁻⁸ Screenings may be even more effective at identifying risk factors and providing better return on investment (ROI) if they are targeted toward higher risk individuals.⁹⁻¹³ Health screenings serve as a catalyst to further clinical health assessments for those who were not aware of their risk factors¹⁴ as well as a first step in a workplace health and wellness promotion process where awareness of personal health risks can lead to participation in lifestyle change or tailoring of disease management programs (eg, structured exercise, dietary, or psychosocial interventions).¹⁵⁻¹⁷ Increasingly, based on provisions in the Patient Protection and Affordable Care Act (ACA), health screenings will be associated with monitoring progress toward the achievement of health standards and, often, screening results will be connected to incentives that encourage employee participation in worksite health and wellness programs.¹⁸ Research suggests that the healthcare costs avoided

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from delaying or preventing the onset of noncommunicable diseases justify the upfront investments made in identifying and reducing existing health risks.¹⁹ Whether through prevention or risk reduction, currently available studies indicate that employers can achieve a positive ROI when employee health screening is offered in concert with a well designed comprehensive health and wellness program.^{20–22}

Although the implementation of worksite health screening seems highly reasonable and advantageous on the surface, there are numerous nuances and logistical considerations that require discussion. This American Heart Association (AHA) policy statement will provide considerations for and guidance on worksite health screening, with particular implications for subsequent health and wellness programming, in the context of a rapidly changing US healthcare landscape.

Review of Available Evidence Related to Worksite Health Screening and Health and Wellness Programs

Effectiveness of Health Screenings for Behavior Change and Health Outcomes

The rationale for hypothesizing that health screenings would be effective independent of additional behavioral change programming is that employees who are aware of their health status may be motivated to make behavioral changes on their own, identify other sources of support for making behavioral changes, or seek follow-up medical care.²³ From the perspective of the employer, offering health screenings that are not coupled with additional programming can be cost effective if their employees have the individual resources required to change their behaviors (eg, memberships to athletic training facilities, resources within the community) and are sufficiently motivated to do so. However, given that participation in health screening programs is commonly voluntary, employees who are willing to complete the health screening may be systematically different from nonparticipants; at least 1 study suggests that healthier employees are more likely to participate.²⁴ Other studies suggest that employees whose self-reported health is poorer are more likely to change their behaviors,²⁵ possibly because they may be further along the behavior change continuum that ranges from precontemplation to action and, ultimately, maintenance.²⁶ A handful of studies have evaluated the effectiveness of health screenings for encouraging participation in health and wellness programming, promoting health behavior changes and modifying health outcomes.

In a 2010 systematic review, Soler et al²⁷ evaluated the effectiveness of health screening with and without feedback on health outcomes based on 86 studies published between 1980 and 2005. In the subset of 37 studies that evaluated health risks and provided feedback, there were favorable changes in health behaviors relevant to CVD, including self-reported increases in fruit and vegetable intake with a concomitant decrease in saturated fat intake, increased physical activity, and modest improvements in smoking cessation rates. Overall, the behavioral changes were modest, and most study designs were before–after analyses that did not include a comparison group. The effectiveness of health screening with feedback on healthcare services use demonstrated promising

findings in relation to decreases in physician visits per year. Not surprisingly, the effectiveness of health screening on each of the behavioral and biometric measures was stronger when the screening was followed by offering a comprehensive health and wellness program. Based on the evidence, the authors concluded that although many of the studies did suggest that health screenings were effective, the study designs were flawed. Stronger evidence could be determined from studies that, at a minimum, included a control arm, and at best, randomized employees to the intervention or control.

Three additional studies that were either published since the review or were not included in the review evaluated the effectiveness of worksite health screenings and warrant some discussion. In 1 Dutch company, 368 employees volunteered to complete an internet-based health screening that included an evaluation of height, weight, waist circumference, blood pressure, a blood collection to determine lipids and glucose, and a urine sample for albumin and creatinine.²⁸ Employees were offered a health counseling session and tailored motivational and educational health advice. There was a significant improvement in the Framingham Risk Score (-4.9% , $P=0.02$) and even more substantial improvements among employees who were at the highest risk at baseline; among the 21 employees whose baseline Framingham Risk Score was $\geq 20\%$, CVD risk declined by 17.9% ($P<0.001$). Although the findings from this study were notable, the study design suffers a number of limitations including the reliance on a volunteer sample of participants who represented only 8% of all employees ($n=2149$) at the company. Further, of the 368 who participated in the program, fewer than half (48%) returned for the follow-up assessment. It is plausible that those who returned for repeated assessment did so because of the changes they observed in their CVD risk.

Blue Cross–Blue Shield of Kansas City evaluated the effectiveness of their comprehensive worksite health and wellness programming on 15 employee groups that included 4230 employees.²⁹ All program participants underwent a health screening after which they met with a health and wellness program counselor to review screening results and discuss programming options to support their behavior changes. The majority of employees (86%) who were low-risk at baseline remained so at follow-up. Nearly half (49%) of high-risk employees improved their risk status, and 40% of the moderate-risk employees improved. Thus, this study, which integrated health screening with subsequent health and wellness programs, including telephone coaching, smoking cessation, and exercise campaigns, showed promising results.

More than 5000 employees from 15 employee groups representing a range of industries across the United States underwent health screenings as part of the myhealthIQ program (www.myhealthiq.com).³⁰ Health status was categorized as higher risk versus lower risk at baseline and on follow-up, which took place 7 to 12 months later. For each of the cholesterol metrics and smoking category, the proportion of employees classified as high-risk declined significantly (total cholesterol: -4.6% , $P<0.01$; HDL cholesterol: -3.9% , $P<0.01$; LDL cholesterol: -6.1% , $P<0.01$; smoking: -2.5% , $P<0.01$). The decrease in the proportion of employees initially classified as high risk according to systolic blood pressure group was not statistically

significant (-0.7% , $P=0.30$), whereas the -3.4% decrease in diastolic blood pressure was significant ($P<0.01$). There was no change in the proportion of employees in the high-risk body mass index (BMI) category (0% , $P=0.96$). Based on these findings and on a significant improvement in their summary score, the investigators concluded that education about health risks could motivate behavior changes in employees.

In 1 study that used a rigorous trial design, university employees who had CVD risk factors were randomly assigned to complete a health screening plus targeted disease management or a health screening with counseling and environmental support for behavior change to determine which was most effective in changing the Framingham Risk Score over 1 year.³¹ The Framingham Risk Score decreased 22.6% in the disease management arm, but went up 4.2% in the counseling arm ($P=0.02$), suggesting that health screenings are only effective when coupled with targeted interventions.

In summary, the body of currently available evidence indicates health screening in the workplace is a promising strategy for initiating behavioral changes in employees that can ultimately lead to improvements in established CVD risk factors and maintenance of cardiovascular health. However, most evidence evaluating the effectiveness of worksite health screening demonstrates that the most effective model is one that combines screening with encouragement to participate in some type of health and wellness program.

Return on Investment: Health Screening as a Facilitator for Health Interventions

Once modifiable risk factors are identified via worksite health screenings, they must be improved on for optimal impact on employee health. Some literature suggests there is a favorable ROI through participation in a worksite health and wellness program. For most studied worksite health and wellness programs, a health screening was incorporated as an essential first step in identifying known risk factors for individual employees. The health screening information was used to prioritize interventions to improve health, tailor programs to individual needs, and potentially refer employees to their healthcare providers. For example, it was estimated that worksite weight management interventions achieving a 5% weight loss would reduce the total annual medical and absenteeism costs by \$90 per overweight or obese employee.³² Overall, previous analyses have reported a wide variability in ROI through worksite health and wellness programs; namely, that every dollar invested in a worksite health and wellness program could generate between \$2.50 and \$10.00 in savings attributable to both reduced absenteeism and medical costs.²³ A recent meta-analysis reported that an average worksite health and wellness program would lead to \$358 in annual savings per employee, with an up-front cost of \$144 per employee per year.³³ Such investment projections typically consider the costs of administering the health screening, maintaining onsite exercise equipment, organizing health education programming, and providing bonuses and reimbursements to motivate participation.

A number of randomized, controlled trials found that worksite health screenings alone offered little ROI benefit, whereas an assessment followed by behavioral counseling and incentives achieved favorable cost savings.^{34,35} Naydeck et al³⁶

studied the ROI of a worksite health and wellness program offered by Highmark Inc. between 2002 and 2005. The program was launched with a health screening that included cholesterol, glucose, and blood pressure measurements. Participants were then provided with free nutrition classes, smoking cessation classes, and access to fitness centers. The researchers used longitudinal medical claims data to create a matching pool of nonparticipants who were similar to participants in their preintervention medical expenditures and health profiles. Multivariate analysis showed that in comparison with nonparticipants, program participants experienced a \$176 reduction in health expenditures per person per year. It is important to note, however, that employees simply completing the health screening with no follow-up behavioral interventions did not experience cost savings.

Considerations for Health Screening and Biometric Measures

Traditional Biometric Measures

There are 7 established, traditional biometric measures related to cardiovascular health that are captured within the worksite health screening, ideally obtained as an initial component of a worksite health and wellness program. These include blood pressure, glucose, cholesterol, physical activity, diet, body habitus (ie, BMI), and tobacco use.^{7,23,37-41} For its 2020 goals for cardiovascular health, the AHA has defined poor, intermediate, and ideal health categories based on these biometric measures, as listed in Table 1.⁴²

Employers should consider using this biometric measure categorization model for worksite health screenings to help illustrate current health status to employees, individualize health and wellness programming, and establish goals for improvement or health maintenance. In addition, the recently released AHA/American College of Cardiology cholesterol screening guidelines,⁴³ the Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure,⁴⁴ and the 2013 AHA/American College of Cardiology/Centers for Disease Control and Prevention science advisory, “An Effective Approach to Blood Pressure Control,”⁴⁵ should also be considered when assessing biometric measurement results during a worksite health screening.

In assessing BMI, the AHA recommends adding waist circumference because the accuracy of BMI for diagnosing obesity is especially limited for individuals in the intermediate BMI ranges, in men, and in the elderly.⁴⁶ Also, abdominal adiposity and visceral fat provide a more refined health indicator of the risk for cardiovascular death than BMI, especially in middle-aged adults.⁴⁷⁻⁵⁰

For tobacco use, it is important to determine how “use” will be assessed (self-report vs. cotinine test), what tobacco products will be included in the definition (cigarette, cigar, smokeless tobacco product, e-cigarette, etc.), and the amount of tobacco use that meets the threshold for use. The goal of defining tobacco use should be to provide a simple and precise assessment of the consumer’s tobacco use status that minimizes misunderstandings or potential false reporting and accounts for changing trends in tobacco products and uses.

Table 1. Definitions of Poor, Intermediate, and Ideal Cardiovascular Health for Each Metric in the AHA 2020 Goals for Adults Aged ≥20 Years

	Level of Health for Each Metric		
	Poor	Intermediate	Ideal
Current smoking	Yes	Former ≤12 months	Never or quit >12 months Never tried; never smoked whole cigarette
BMI*	≥30 kg/m ²	25–29.9 kg/m ²	18.5–25 kg/m ²
PA†	None	1–149 min/week moderate or 1–74 min/wk vigorous 1–149 min/wk moderate + 2× vigorous >0 min <60 min of moderate or vigorous every day	≥150 min/wk moderate or ≥75 min/wk vigorous ≥150 min/wk moderate + 2× vigorous ≥60 min of moderate or vigorous every day
Healthy diet pattern, number of components‡	0–1	2–3	4–5
Total cholesterol	≥240 mg/dL	200–239 mg/dL or treated to goal	<200 mg/dL
Blood pressure	SBP ≥140 mm Hg or DBP ≥90 mm Hg	SBP 120–139 mm Hg or DBP 80–89 mm Hg or treated to goal	<120 mm Hg/<80 mm Hg
Fasting plasma glucose	≥126 mg/dL	100–125 mg/dL	<100 mg/dL

AHA indicates American Heart Association; BMI, body mass index; DBP, diastolic blood pressure; PA, physical activity; and SBP, systolic blood pressure.

*Represents appropriate energy balance (ie, appropriate dietary quantity and PA to maintain normal body weight).

†Proposed questions to assess PA: (1) “On average, how many days per week do you engage in moderate to strenuous exercise (like a brisk walk)?” and (2) “On average, how many minutes do you engage in exercise at this level?”³⁸ Other options for assessing PA available.⁴¹

‡In the context of a healthy dietary pattern that is consistent with a Dietary Approaches to Stop Hypertension (DASH)-type eating pattern, to consume ≥4.5 cups/d of fruits and vegetables, ≥2 servings/wk of fish, and ≥3 servings/d of whole grains and no more than 36 oz/wk of sugar-sweetened beverages and 1500 mg/d of sodium.

Employers should include not only combustible products like cigarettes and cigars in their screening, but also the new electronic nicotine delivery systems (e-cigarettes), hookah products, smokeless tobacco, and dissolvable products that are in the marketplace. Employers should also offer access to a comprehensive cessation program that includes both pharmacological treatment and cessation counseling as part of their screening and wellness programs.

Lastly, as a standard practice, the writing group currently recommends having physical activity patterns quantified in a standardized fashion using 1 of several accepted methods (ie, questionnaire, diary/log, pedometers, or accelerometers)^{38,41,51} as opposed to directly measuring CRF during worksite health screenings. Admittedly, CRF is a more objective assessment compared with quantifying physical activity patterns and, as such, the former approach is potentially more reflective of the health status of relevant physiologic systems (ie, cardiovascular, pulmonary, and skeletal muscle). Moreover, evidence demonstrating the importance of actual CRF to overall health, functional independence, and longevity, beyond self-reported physical activity patterns, is irrefutable.^{52–54} As such, when recent (ie, ≈6 months or less) CRF data are available from a reliable and valid source outside of the worksite health screening event for a given employee (eg, stress test results conducted by the employee’s physician), and the employee is willing to share this information, it should be considered when biometric

measurements are assessed in totality. Moreover, the writing group finds no reason to dissuade employers from implementing an actual CRF assessment in a worksite screening if this is deemed important and feasible by a given organization.

Nontraditional/Novel Biometric Measures as Part of Worksite Health Screening

Despite the increased availability of nontraditional/novel biometric measurements and investigations in their role in the assessment of risk of CVD, there is currently insufficient evidence to support their inclusion in worksite health screening. Examples of nontraditional/novel biometric measurements include the following: (1) C-reactive protein, (2) coronary artery calcium score, (3) arterial stiffness, (4) lipoprotein(a) level, (5) lipoprotein-associated phospholipase A2, (6) homocysteine level, and (7) carotid intima-media thickness. A recent AHA guideline for assessment of CVD risk in asymptomatic adults also suggests there is no definitive benefit to screening with these nontraditional/novel biometric measurements and there may be harm in several situations.⁵⁵ Rather, the AHA has suggested further evaluation on the clinical utility, impact on clinical outcomes, and cost-effectiveness of nontraditional/novel biometric measurements before considering their implementation to improve clinical management.⁵⁶ The US Preventative Services Task Force shares the opinion that there is insufficient evidence to recommend routine

screening for novel nontraditional/novel biometric measurements in the assessment of risk of CVD among asymptomatic men and women.⁵⁷ In summary, it is currently recommended that current worksite health screenings entail the evaluation of biometric measurements related to traditional risk factors, as described earlier, intended to aid in recommendations for further assessment and lifestyle modifications to reduce risk.

Logistical Issues Surrounding Worksite Health Screenings

Who Should Administer the Worksite Health Screening?

Ideally, health professionals who regularly deliver wellness or medical services should perform the worksite health screening to ensure continuity and sustainability. If this resource is not available within the organization offering the worksite health screening, depending on local regulations and resources, contracted external vendors, qualified health professionals and technicians, or appropriately trained wellness screeners could be utilized. Considerations for an employer in selecting an external vendor are listed in Table 2.⁶

Frequency

The frequency of worksite health screenings should consider a number of factors; they should be frequent enough to become a routine which conditions employees to participate but not so frequent as to make employees' become bored or frustrated because their biometric measurements change slowly over time. The logistics of measuring a given variable (eg, blood lipids versus physical activity status) may impact assessment frequency. Moreover, when a variable indicates "increased health risk," the timing and frequency of follow-up assessments should also be considered.

Generally, organizations will adopt a 1- or 2-year cycle for conducting health screenings. Funds available to cover resources required to implement a worksite health screening (eg, external vendor contracts, healthcare professionals, space, cost of blood work, or biometric measure assessment tools) will impact the frequency of screening. Another influencing factor is the allotted time needed for employees to participate in the health screening and the workplace environment, the latter of which can be a particular logistical challenge in larger organizations or manufacturing environments. Employee demographic issues that influence assessment frequency are age and existing health risks of the employee population. Lastly, labor and employment agreements may also affect an employer's ability to schedule and conduct health screenings.

Timing

Timing of worksite health screening is important to consider in an effort to optimize employee participation. Employers should consider a "blitz" type event, so all employees are scheduled over a defined period, which makes it easier to promote and encourage participation. If there are multiple work shifts each day, having several screening sessions would be advantageous. Additionally, if relevant, employers should also take advantage of annual events, such as sales meetings, when field employees are together in 1 place to complete the health screening.

Table 2. Factors to Consider When Selecting an External Vendor to Deliver Worksite Health Screening and Health and Wellness Programs

- Vendor able to demonstrate sufficient history in delivering worksite health screening and health and wellness programs
- Ensure that the healthcare professionals employed by the vendor are licensed or properly credentialed
- Portfolio of current and past customers
 - Vendor provides contact list to discuss services provided
- Vendors proposed biometric measurements for health screenings follow current scientific guidelines/consensus statements
 - New/novel biomarkers, not supported by current evidence, should not be included as part of vendor services
- Vendor rigorously collects outcomes data; demonstrating effectiveness of services
 - Able to summarize benefits from employee biometric screening including return on investment or cost-effectiveness
- Cost of services by vendor are reasonable and favorable in relation to potential return on investment
- Vendor has established processes for the following:
 - Obtaining informed consent from employees
 - Managing protected health information and assuring employees of the privacy of their data
 - Individual result reporting with the employee and ideally with the employee's provider and aggregate reporting to the employer
 - Management of data, quality assessment of data, systems to monitor data turnaround times
 - Training and managing staff and staff development
 - Updating written policies and procedures and mechanisms for communicating same to staff
- Vendor demonstrates services are in compliance with all state and federal laws relevant to worksite health screening and health and wellness programs
- Vendor has obtained relevant certifications and accreditations
 - Centers for Medicare and Medicaid Services CLIA certification
 - NCQA Wellness and Health Promotion Accreditation
- Vendor employs health and wellness professionals who are able to proficiently deliver worksite health screenings and health and wellness programs
- Vendor able to meet needs of employer worksite health screening and health and wellness programs
 - Flexibility in scheduling
 - Ability to provide services to given number of employees
- Vendor demonstrates an ability to capitalize on currently available technology in delivering services
 - Smart phone applications
 - Web-based services

CLIA indicates Clinical Laboratory Improvement Amendments; and NCQA, National Committee for Quality Assurance.

Blood tests, when incorporated into worksite health screening, serve as another example as to why timing is important. The gold standard for measuring blood glucose and lipid profiles is a fasting sample, which requires timing considerations for the collection of these data. Nonfasting blood samples can also provide valuable information and allows for more flexibility in timing of measurement. However, compared with

fasting samples, values differ for certain cholesterol measurements as well as blood glucose, requiring consideration of different thresholds to define abnormal values and higher risk.⁵⁸⁻⁶⁰ With respect to assessment of blood glucose levels, measurement of hemoglobin A1C may be considered, if possible, when a nonfasting blood sample is going to be obtained during the worksite health screen.⁵⁸ With respect to screening for diabetes mellitus, if fasting is required, it may be advantageous for the employer to offer appointments early in the morning.

Associated Cost

Worksite health screenings do carry up-front costs to the employer. Health and wellness professionals, used to conduct the health screening, interpret results, discuss appropriate wellness interventions, or facilitate referrals to employees' personal physicians if a significant health risk is identified, can range in price according to their level of experience and whether they are employed by the company or contracted from another organization. There are costs associated with data collection; in particular those measurements requiring blood work (ie, lipids and blood glucose). As discussed in previous sections, available data support the employer investment in worksite health screenings, particularly if it is followed by participation in a worksite health and wellness program. Moreover, the shift in the healthcare environment from a postevent care (ie, those individuals included in a health plan who experienced a medical event and require care) to covered lives (ie, total population of individuals included in a health plan)⁶¹ paradigm may serve as an opportunity to reduce associated costs with health screenings incurred by the employer. Specifically, employers may negotiate with a healthcare organization to perform screenings at a reduced rate in exchange for the opportunity for the latter entity to expand its covered lives⁶¹ population. Additionally, smaller companies may want to consider collectively negotiating with a worksite health screening provider to share/reduce costs.

Space, Environmental, and Equipment Considerations

The physical space where the health screening is performed requires planning, and it should be prepared in advance of employees arriving for their assessment. Sufficient personnel, screening stations, equipment, and supplies should be available to ensure the event is well run and stays on schedule. This helps to ensure employees have a positive experience and return for subsequent health screenings. Strategic use of privacy screens for collection areas, such as body habitus measurements, as well as for brief coaching sessions or a review of sensitive health information, can protect the privacy of employees. When blood draws are undertaken, employers should ensure personnel performing these biometric measurements are appropriately trained and follow sterile precautions. Examine federal and state regulations when deciding between finger stick and venipuncture methods for blood draw. Also consider how each technique will be accepted by the employee population (ie, the finger stick may seem less invasive and therefore more acceptable to employees). A potential benefit of using a finger stick approach is that participants receive immediate results and feedback on those results, fostering a teachable moment. Venipuncture results are often not available for several days or even weeks after the screening. If a venipuncture is favored, consideration should be given to how results are provided to the employee at a later date. The finger stick method may lengthen each assessment because the blood is analyzed on-site. It may be advisable to plan the blood work station early in the health screening sequence, so that results are ready by the time the employee has completed the other portions of the screening. Figure 1 illustrates a proposed flow for worksite health screening stations. Onsite screenings provide one of the potentially few annual opportunities in which you have a captive audience. Take advantage of these events to promote other wellness initiatives; play relevant videos, provide health education pamphlets, sign up stations for health and wellness activities, etc. Capturing all biometric measurement information obtained at the health screening, both that



Figure 1. Proposed flow for worksite health screening.

are collected by the health and wellness professional and directly input by the employee, on an electronic tablet or handheld device with Wi-Fi capabilities can improve the data capture and storage process and improve upload time, resulting in enhanced integration of incentives and self-reported health assessments.

Effective Employee to Screener Ratio

As a general guide, for each health and wellness professional available, 1 appointment should be scheduled every 10 to 15 minutes. An optimal screener ratio will, however, depend on the types of biometric measurements taken, the physical space, and the qualifications of the health and wellness professionals performing the assessment. This writing group proposes the following formulas as a general guideline for a 4-hour block using an Allied Health Professional model: (1) 1 Nurse/1 Wellness Professional = 20 people; (2) 2 Nurses/2 Wellness Professionals = 40 people; (3) 3 Nurses/3 Wellness Professionals = 60 people. It may also be advisable to factor in a certain number of unscheduled walk-in employees.

Potential for Future Delivery Models

Technology

Moving forward, technology can play a key role in scalability, engagement, and sustainability of worksite health screenings. As mentioned previously, the use of wirelessly connected devices can potentially improve the employee experience, data accuracy, and the ability to integrate with other data sources. Increased use of point-of-care testing tools will improve engagement through rapid results and higher levels of portability. As self-administered handheld device tools grow in popularity, screening can lead quickly into self-monitoring. Self-screening using technologically advanced health kiosks is another emerging area that holds high promise for worksite health screenings. These strategically placed health kiosks would allow employees to track key health data, such as blood pressure and body habitus, serially at their convenience. Cloud integration and alignment of worksite biometric measurements with the personal health record, if agreed to by the employee and appropriate data protection procedures are in place, will allow health screening data to be integrated with other health information and make it portable. Additionally, it will allow previous worksite health screening data to be integrated into current screening, providing individual trending and comparison information.

Communicating Results, Longitudinal Data, and Follow-Up for Workplace Health Screenings

Before a worksite health screening is performed, the screening provider should have a plan in place regarding how the following will be achieved: (1) employees and employers will be informed about the proposed procedures for collection and use of their collected biometric measurement data, (2) results will be communicated to the participants and employer, (3) abnormal results and emergency referrals to a physician for dangerously abnormal findings will be addressed, and (4) longitudinal tracking and follow-up will be performed. On the day of the health screening, employees should have the opportunity to discuss their results with a qualified health/

wellness professional and should receive a printed copy of their results. There are numerous commercial or free of charge public domain options that can be used to incorporate worksite health screening results into an overall health status/risk assessment. For example, "My Life Check," developed by the AHA, has a Web-based assessment that incorporates the core CVD risk factors (ie, tobacco use, body habits, physical activity, diet, blood pressure, lipids, and blood glucose).⁶² If the worksite health screen has computers and internet access, biometric measurement data can be entered in real time and be used to present an overall risk assessment. The "My Life Check" offers an example of a health screening in which results are entered manually during the process as a way to present a complete profile of health screening findings to the employee. Figure 2 illustrates how health screening information is used to generate a report using "My Life Check." If the "My Life Check" is completed in real time with the employee present, he/she can readily be taught how to use this online tool to longitudinally track health status independently. Moreover, the employee should be informed as to how and when components of the health screening that are not immediately available upon completion of the assessment (eg, blood lipids) will be communicated. Many health screenings incorporate temporal comparisons so employees will see how their screening and self-reported results have changed from one screening event to the next. However, because external vendors sometimes change, employees should be encouraged to independently maintain the information obtained from the health screening. They should consider adding biometric measurement results to their personal medical record if they have one, and they can be advised to bring the information to subsequent health screening events and visits with their personal physician, allowing for self-managed longitudinal tracking in partnership with their primary care physician.

In a reasonably designed worksite health and wellness program, the information obtained and communicated to the employee serves as the foundation for participation in a variety of programs offered in multiple learning modalities. If the health screening data are fully integrated with the overall health and wellness program offerings, the results of the screening lead simply and seamlessly to programs that satisfy the health priorities extant in the screening results. For example, if an employee is a current smoker and the worksite health and wellness program includes smoking cessation interventions, the employee can be informed of these resources, provided enrollment information, and encouraged to consider participation.

Worksite health screenings and health and wellness programs should be voluntary in nature. At the same time, the health and wellness provisions of the ACA have prompted more extensive use of incentives for the achievement of desirable biometric measurement targets (Table 1).⁶³ If the employer or employee wishes to maintain information obtained from the health screening or transmit information to a third party (eg, the employer's physician, health insurance plan, or a worksite health and wellness program), the employee should be informed in writing, before screening, about the incentive opportunity and the confidentiality assurances related to transmitting private health information to qualify for an incentive. Most health screenings have such confidentiality and data

usage agreement language incorporated into the process. For employees with low health literacy, verbal communications may also be needed to ensure comprehension of data sharing procedures. Given the understandable sensitivities related to collecting personal health information in the workplace, information about data collection should clearly include assurances such as the following: (1) de-identified aggregate data are maintained by an external entity with aggregate reporting back to the employer consisting of no fewer than 50 employees in a data set and aggregate health data reported to the employer are used to assist the employer in designing a health and wellness

program tailored to its workforce's health risk characteristics; health screening information is also used, only with the employee's permission, to facilitate communications about available health and wellness programs of interest to a given employee; and (2) if employees authorize that their health screening information can be shared with their physician, they should have an understanding that it is an effective way to facilitate appropriate management of identified risk factors.

The employee should have the option to refuse having his/her information transmitted to a third party. If the employee refuses, he/she should still be allowed to fully participate in the

My Life Check™

SUMMARY REPORT



NAME: _____ DATE: _____

LIFE'S SIMPLE 7

	WHERE YOU ARE NOW	CHOOSE YOUR NEXT STEPS	WHERE YOU WANT TO BE
Smoking Status	Quit (more than 12 months ago) Excellent	<input type="checkbox"/> Keep up the good work <input type="checkbox"/> Stay physically active <input type="checkbox"/> Plan activities that don't involve smoking <input type="checkbox"/> Eat a healthy diet <input type="checkbox"/> Maintain a healthy weight	No smoking Excellent
Healthy Weight	193 pounds (BMI of 28.6) Needs Improvement	<input type="checkbox"/> Plan to lose 5% to 10% of my current weight, as a first step <input type="checkbox"/> Eat smaller portions and less food per day <input type="checkbox"/> See a dietitian for guidance on healthier eating decisions <input type="checkbox"/> Increase physical activity to burn more calories than I eat <input type="checkbox"/> Join a support group or comprehensive weight-loss program	125 to 168 pounds (BMI of 18.5 to 24.9) Excellent
Physical Activity	100 min. moderate and 0 min. vigorous (weekly) Needs Improvement	<input type="checkbox"/> Look for ways to move more - take the stairs more often <input type="checkbox"/> Be active longer each time - add 10 minutes to what I do now <input type="checkbox"/> Choose activities that work all the different parts of my body <input type="checkbox"/> Write down what may be holding me back from moving more <input type="checkbox"/> Be active with friends and family; a support network helps	150 min. moderate or 75 min. vigorous (or equivalent combination) Excellent
Healthy Diet	2 components Needs Improvement <input type="checkbox"/> 5 cups fruits/vegetables/day <input type="checkbox"/> 3.5 oz. or more whole grain/day <input type="checkbox"/> 2-3 servings fish/wk <input checked="" type="checkbox"/> Under 450 cal. added sugar/wk <input checked="" type="checkbox"/> Under 1,500 mg sodium/day	<input type="checkbox"/> Eat at least one fruit and vegetable with every meal <input type="checkbox"/> Eat more whole grain foods <input type="checkbox"/> Eat fish twice per week <input type="checkbox"/> Limit foods and beverages with added sugars <input type="checkbox"/> Choose processed foods less often to reduce sodium intake	4-5 components Excellent It is important to follow the guidelines for other dietary components like fats, etc.
Blood Pressure	SYSTOLIC 120 mm Hg DIASTOLIC 75 mm Hg Needs Improvement You should discuss this factor with your healthcare provider.	<input type="checkbox"/> See my healthcare provider to recheck my blood pressure <input type="checkbox"/> Learn to read food labels and choose foods with less sodium <input type="checkbox"/> If I'm overweight, lose weight - even 10 lbs makes a difference <input type="checkbox"/> Be more physically active; aim for at least 150 minutes per week <input type="checkbox"/> Speak to my healthcare provider about medication options	SYSTOLIC Less than 120 mm Hg DIASTOLIC Less than 80 mm Hg Excellent
Blood Cholesterol (total cholesterol)	220 mg/dL Needs Improvement You should discuss this factor with your healthcare provider.	<input type="checkbox"/> Speak to my healthcare provider about medication options <input type="checkbox"/> Speak to a dietitian to improve my eating habits <input type="checkbox"/> Eat fewer saturated and trans fats <input type="checkbox"/> Be more physically active <input type="checkbox"/> If overweight, work on losing weight	Less than 200 mg/dL Excellent
Blood Sugar (fasting)	95 mg/dL Excellent (no medication)	<input type="checkbox"/> Make good food choices and eat modest food portions <input type="checkbox"/> Work with a dietitian for guidance on how to eat a healthy diet <input type="checkbox"/> If I'm overweight, lose weight - even 10 lbs makes a difference <input type="checkbox"/> Be more physically active; aim for at least 150 minutes per week <input type="checkbox"/> Learn to read food labels to avoid added sugars	Less than 100 mg/dL Excellent

Figure 2A. Example of an American Heart Association My Life Check Assessment Summary Report.⁶² BMI indicates body mass index.

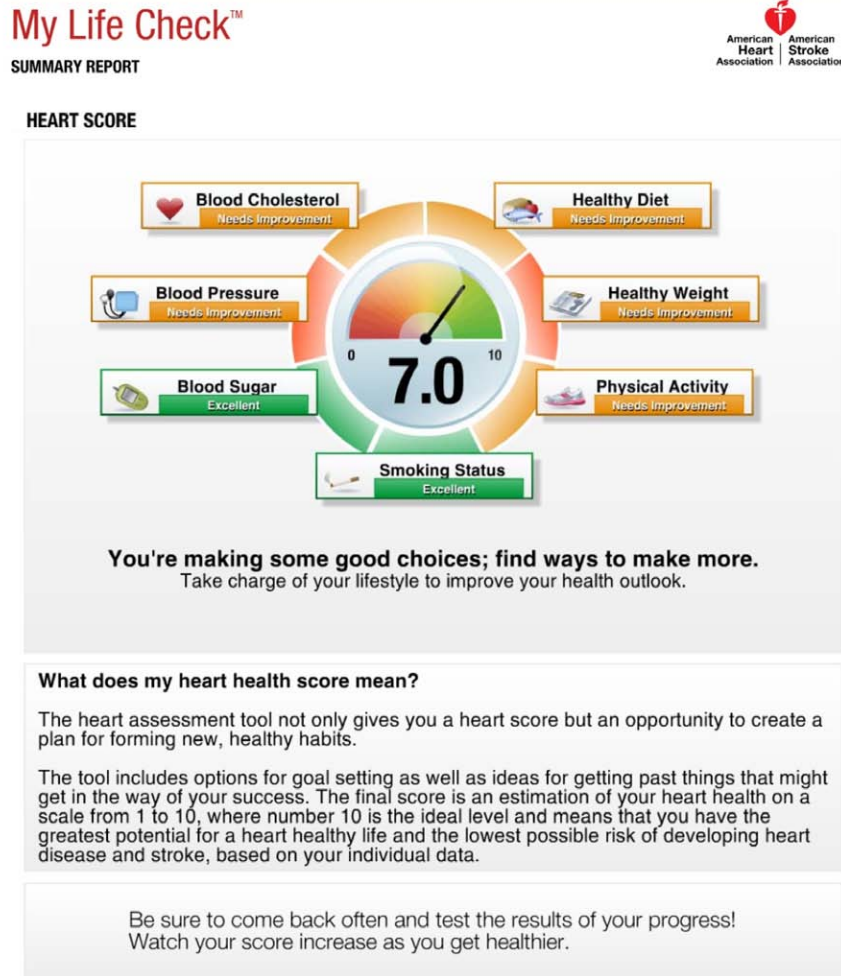


Figure 2B. Example of an American Heart Association My Life Check Assessment Heart Score.⁶²

worksite health screening event. However, because the wellness provisions of the ACA allow for the use of biometric measurements to qualify for financial incentives, refusal to authorize use of health screening data may disqualify the employee for certain kinds of incentives. The ACA rules require employers to offer a “reasonable alternative standard” for employees who consider that participating in a health screening or the results of their biometric measurements should not apply to them given their unique circumstances (ie, employees with medical conditions that make it unreasonably difficult to participate, or for whom it is medically inadvisable to participate).

The employee should be given the opportunity to ask any questions he/she may have regarding an employer’s proposed health screening plan and their approach to the use of financial incentives and, once all questions have been satisfactorily answered, the employee should sign a written informed consent. The employer should maintain this written informed consent within the employees’ permanent personnel file and provide a copy to the employee.

Considerations for Disclosure of Health Information

Reporting and other uses of health information obtained as part of worksite health screening or health and wellness program

are subject to numerous state and federal laws. Failure to comply with these laws can subject employers and employer group health plans to civil and criminal penalties. Planning the design and implementation of any worksite health screening or health and wellness program must take into account the complex legal requirements for protecting an individual employee’s personal health information. Assuring the use of worksite health screening or health and wellness program information does not result in employment discrimination is also an important consideration. Key laws applicable to information generated in health and wellness programs include the following: (1) the Health Insurance Portability and Accountability Act of 1996, as amended, and its accompanying regulations (HIPAA),⁶⁴⁻⁶⁶ (2) the Genetic Information Nondiscrimination Act of 2008,⁶⁷ (3) the Americans with Disabilities Act (ADA) of 1990,^{68,69} the Employee Retirement Income Security Act (ERISA),⁷⁰ and (4) state laws.

HIPAA

HIPAA is the most comprehensive law governing the use of personal health information. It applies to “covered entities” as defined in the statute.^{71,72} A worksite health screening or health and wellness program is subject to HIPAA if it is part of an employer group health plan as defined by HIPAA.⁷² Under

HIPAA, personal health information consists of virtually any information relating to the physical or mental health of an individual or to the provision of or payment for health care to an individual.⁷² HIPAA establishes as a general rule that personal health information may not be disclosed unless authorized by the individual or specifically permitted by HIPAA or a state law not preempted by HIPAA. An employer group health plan is subject to the protections afforded personal health information and may not disclose this information to an employer without the employee's authorization, except in the limited circumstances set forth in the HIPAA regulations (eg, for plan administrative purposes or to fulfill the employer's obligations under state or federal occupational health and similar laws).^{73,74} The plan may not disclose employee personal health information to the employer for employment related purposes, such as terminating employees with high-cost illnesses.⁷⁵

Genetic Information Nondiscrimination Act of 2008

The Genetic Information Nondiscrimination Act of 2008 generally prohibits employers from requiring, requesting, or purchasing genetic information of their employees.⁷⁶ Individually identifiable information can be provided to the participating employee and to certain medical professionals, but should not be released to those who make employment decisions (eg, managers, supervisors). However, if participation in a worksite health screening or health and wellness program is voluntary, the program may report employee genetic information to the employer, provided that (1) before participating, the employee gives written, informed authorization; (2) the genetic information disclosed is in aggregate form; and (3) the employee is not offered a financial incentive to provide the genetic information as part of the voluntary programming, unless the employer makes clear that the incentive is available to the employee regardless of whether or not the participant answers the questions regarding genetic information, such as via an express disclosure on form to that effect.^{76,77}

ADA

The ADA generally prohibits an employer from conducting involuntary medical examinations or disability-related inquiries that are not job-related or arise from business necessity.⁷⁸⁻⁸⁰ If a worksite health screen or health and wellness program is voluntary, however, the employer may obtain medical information from an employee, provided it maintains the information as confidential and separate from its employment records. The Equal Employment Opportunity Commission defines a "voluntary health and wellness program" as one that is not required by the employer and in which penalties do not apply for non-participation.⁸¹ The question of the extent to which an employer may offer employees financial participation incentives within a voluntary worksite health and wellness program was addressed by the Federal Circuit Court of Appeals for the Eleventh Circuit (*Seff v. Broward County, Florida*), which found in favor of the employer. Specifically, the court determined that an insurance plan requiring covered employees to complete a health risk assessment and undergo a health screen to receive a \$20 per paycheck discount on their health insurance premium did not violate the ADA.⁸² That issue of the voluntariness of a worksite health and wellness program remains

unresolved and one that the Equal Employment Opportunity Commission has yet to provide definitive guidance on.⁸²

ERISA

ERISA does not mandate that any employer offer a pension plan. However, when one is offered, ERISA sets minimum standards for pension plans offered by private companies.⁷⁰ ERISA defines (1) employee eligibility criteria, (2) years of employment before having a non-forfeitable interest pension, (3) duration employee can be away from their job before there is an impact of pension eligibility, and (4) spousal rights to part of an employee's pension in the event of the employee's death. Relevant to this policy statement, section 510 of ERISA stipulates that an employer may not terminate, fine, or discipline an employee to prevent the employee from receiving his or her benefit rights. Thus, worksite health screening or health and wellness program information may not be used to prevent dispersal of benefits from a pension plan.

State Laws

HIPAA generally preempts state laws, but permits states to enact laws that provide greater privacy protection for individual health information or grant greater rights to individuals with respect to their health information. As the public's awareness of and sensitivity to government and corporate intrusions into individuals' privacy have increased, states have enacted stringent health information privacy statutes that are exempt from HIPAA preemption. These state laws frequently address highly sensitive health information, such as that related to HIV/AIDS, mental health conditions, and alcohol and drug abuse.

There are a number of state laws that have potential implications for worksite health screening and health and wellness programs. The majority of states have laws that protect an employee's right to engage in lawful activities when not in the workplace, such as tobacco or alcohol use. Michigan includes height and weight as protected categories under its antidiscrimination law. Other states list "medical conditions" as a category protected from employment discrimination. These variable state laws may create a perception that implementation of worksite health screening or health and wellness programs may expose an employer to legal liability, creating a potential barrier to program implementation. Although the implications of these state laws on worksite health screening and health and wellness programs should be considered to ensure compliance and minimize unnecessary legal liability, they should ultimately not dissuade employers from offering these programs in the workplace. The National Conference of State Legislatures Web site is an excellent resource to search for laws that have a potential impact on worksite health screening and health and wellness programs.⁸³

Generally, under federal and state health information privacy laws, a worksite health screening or health and wellness program that is not an employer group health plan may report health screening results to the employee, the employer, and the employer's group health plan if disclosures are authorized by the employee and meet the requirements of any applicable law. A program that is a covered employer group health plan may not disclose personal health information to anyone, except as permitted by HIPAA or applicable state law.

A breach of a privacy law can undermine employee participation and confidence in even the most highly effective worksite health screening and health and wellness programs. Therefore, given the scope and complexity of federal and state law governing health information, employers, particularly employers with multi-state operations, must examine applicable federal and state law carefully as part of their program planning and implementation. The assistance of legal counsel with expertise in health information privacy and security laws is essential in planning and executing these health and wellness initiatives in the workplace.

Affordable Care Act and Regulatory Environment

As has already been mentioned, there are a plethora of state and federal laws that apply to employee health management programs. Most recently, on May 29, 2013, the US Departments of Health and Human Services, Labor, and the Treasury issued the final rule on employment-based health and wellness programs from the ACA, supporting workplace health promotion and prevention as a means to reduce the burden of noncommunicable diseases, improve health, and limit growth of healthcare costs. It is effective for plan years beginning on or after January 1, 2014.

The new rule increases the size of the financial reward or penalty employers can use to help motivate employees to improve their health, and it is anticipated that many employers will use this increased flexibility to continue to manage upwardly spiraling healthcare costs and address the health of their employees. Most employers will implement their programs with some kind of health screening combined with lifestyle intervention and disease management. Often, the incentive is tied to the screening component.⁸⁴ Evidence shows there is a small effect of incentives in promoting health screening completion (about 4% increase for every \$25 invested),⁸⁴ but that the effects of incentives are considerably greater if accompanied by strong culture and communications.¹⁷

The final ACA rules give employers the opportunity to vary healthcare premiums/deductibles by up to 30% for achieving a given health factor such as lower BMI or reduced blood pressure and up to 50 percent for tobacco use. For employees who do not achieve the standards in this “health-contingent” incentives program option, the employer must offer a “reasonable alternative standard” which will typically mean the employee can earn the incentive via participation in qualifying health and wellness program activities. Currently, employers are not near the 30% differential, coming in around 9%,² but with the final wellness rule, premium differentials and use of these incentives/disincentives is expected to increase.⁸⁵ The regulation also adds additional consumer protections to ensure worksite health and wellness programs do not shift costs from healthy employees to unhealthy ones, and to prevent employers from penalizing individuals if they have a preexisting condition or are genetically predisposed to a disease or risk factor.

The final rule requires that health-contingent worksite health and wellness programs be reasonably designed, uniformly available, and accommodate recommendations made by an individual’s physician based on medical appropriateness. It allows significant flexibility for employers to design

programs that fit the needs of their employee populations and provides some clarity about how these programs should be structured to avoid discriminatory practices. In addition to clarifying “health-contingent” incentives standards, the final rule also supports “participatory wellness programs” incentives. This approach provides incentive to employees without regard to an individual’s health status and can include programs that reimburse for fitness center memberships, and ones that reward employees for attending monthly, free health education seminars, and completing health screenings, without requiring them to take further action.

Further Consideration of the Impact of the ACA on Worksite Health Screenings and Health and Wellness Programs: Change That Will Create Opportunities and Debate

Employer investment in worksite health screening and health and wellness programs has increased significantly in recent years.^{86,87} The wellness provisions of the ACA¹⁸ reinforced the opportunity employers have to link financial incentives, often in the form of healthcare premium differentials, to an employee’s health status.⁸⁸ These outcomes-based, or “health-contingent,” incentive approaches are likely to substantially increase employer sponsored health screenings and health and wellness programs.⁸⁵ One of the requirements for employers using health-contingent incentives is that employees must be provided an annual opportunity to earn the incentive (or avoid a penalty). Consequently, worksite health screenings will have the added role of providing annual feedback associated with attaining financial incentives along with the usual function of early detection and referral.⁸⁹

The annual worksite health screening requirement that satisfies ACA rules is inconsistent with the intermittent, sex- and age-adjusted, health screening intervals recommended by certain national scientific consensus guidelines.^{90,91} The Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure recommends screening every 2 years in people with blood pressure <120/80 mmHg and every year with systolic blood pressure of 120 to 139 mmHg or diastolic blood pressure of 80 to 89 mmHg.⁹¹ Guidelines by the American Diabetes Association state that testing for diabetes mellitus should be considered in all adults who are overweight (BMI ≥ 25 kg/m²) and have additional risk factors. If results are normal, testing should be repeated at least at 3-year intervals; however, individuals with prediabetes should be tested yearly.⁹² In addition to considerations about the lack of cost effectiveness of more frequent screenings, science panels have been intentional about recommending against more frequent screenings because the potential harms from a cascade of additional tests associated with false positive results outweigh the benefits of obtaining a true positive in young populations with lower probabilities of undetected diseases.⁹² Currently, this writing group encourages employers to consider revising their screening protocols as possible, while adhering to regulation and logistical considerations, to account for current guideline recommendations related to frequency of testing. This writing group understands the potential challenges, especially in a large employee population, of having different

employees, with different health characteristics, on different health screening timetables. However, employers and vendors should strongly consider adhering to current guidelines with respect to frequency of assessing certain biometric measures. Moving forward, the growth of health-contingent employer-based screenings should allow for more definitive analyses to determine whether annual worksite health screenings for select employees is a cost-effective component of a comprehensive worksite health and wellness program.⁹³

In addition to inconsistencies between the ACA rules and clinical recommendations per screening intervals, the Equal Employment Opportunity Commission has sought testimony on whether health contingent incentives connected to worksite health screenings may be inconsistent with precepts of the ADA.⁹⁴ In particular, the use of incentives to induce greater participation in worksite health screenings is considered by some to be at odds with the voluntariness standards that infer a safe harbor on worksite health and wellness program sponsors.⁹⁵ Some have suggested that health-contingent incentives are a fair and cost-effective means of increasing accountability⁹⁶ for health, whereas others are concerned that such incentives would become a subterfuge for insurance underwriting.⁹⁷ A “progress-based” approach (ie, rewarding employees for making meaningful progress toward, but not yet reaching, specific health goals) has also been proposed as a way to ensure that health screenings are deemed fair and that incentive levels are felt to be attainable by all employees regardless of their baseline health status.⁹⁸

Directions for Future Research and Policy Considerations

Changes in the healthcare landscape, in particular implementation of the ACA, will substantially increase the number of employers offering health screening and health and wellness programs. Although there is a growing body of evidence that worksite health screening and health and wellness programs have a positive impact, additional research is needed. There is no clear consensus on the optimal model(s) for these health-related worksite initiatives. Thus, a primary focus should be to explore different models to determine the approach(es) that identify all of an employee’s key health risks in a way that produces the best improvement in outcomes and the highest ROI. The ACA will allow for an employer to use funds to reward employees that adopt healthier behaviors or penalize those who do not. As new incentive programs are implemented, research and evaluation on their effectiveness is essential. Future research needs to evaluate the short- and long-term impact of financial incentives on behavior change, the quality of worksite health and wellness programs, worksite culture, access to affordable health care, whether positive or negative incentives have the greatest impact, whether there are unintended consequences, and the impact of extrinsic motivation, like incentives, compared with intrinsic motivation and a person’s readiness to change. Technological advances will continue to offer potentially more efficient ways to perform worksite health screening, allowing for more employees to be reached and tracked serially while creating a seamless network for merging all key health information and making it readily available to health providers overseeing care. Research is needed to assess these

technological advances as they emerge to determine whether they have a positive and meaningful impact to the worksite screening process. Unless identification of higher health risk is addressed with appropriate interventions, such as a well developed health and wellness program, it is unlikely that employee outcomes will improve. For a number of employees found to be at higher risk, a significant proportion will likely not be compliant with health interventions. Even more will initially make a positive change in health behaviors but will become less compliant over time. Research examining predictors of noncompliance in adopting a healthier lifestyle in employees found to be at higher risk would help to identify individuals who need additional attention in making a meaningful and long-lasting change. The worksite health screening process requires careful consideration and necessary steps taken to protect an employee’s personal health information as well as avoidance of using information gained to inappropriately make decisions regarding employment. Delivery models for worksite health screenings should be assessed to ensure best practices are followed with respect to protecting health information and an individual’s employment status. Lastly, given the growing interest in using the workplace to perform health screenings and deliver health and wellness programming, there will be an

Table 3. Summary Policy Recommendations

Worksite health screenings help to assess the health status of all individuals with respect to the following:

- Their potential to improve cardiovascular health and preferably achieve/maintain ideal cardiovascular health as defined in Table 1
- Their risk for development of noncommunicable diseases, untoward events, and premature morbidity and mortality.

Health screening is most effectively done in combination with disease management and wellness programming to catalyze and tailor interventions rather than just as a stand-alone initiative.

Employers not only should comply with all state, federal, and local laws pertaining to health screening and the privacy of data, but should take extraordinary measure to assure employees of the privacy of their data. Delivery models for worksite health screenings should be assessed to ensure best practices are followed with respect to protecting health information and an individual’s employment status.

Although health contingent programs will require annual health screenings and logistically it may be easier to do annual screening for all employees even outside of these programs, further analyses should determine whether it is possible to bring these screenings more in compliance with scientific guidelines, tailoring the frequency based on initial results and initiating appropriate longitudinal follow-up.

Employers and vendors should assess technological advances and emerging mobile technologies to determine when they can be used to perform worksite health screening more efficiently, creating seamless integration with electronic health records and primary care delivery to achieve optimal longitudinal follow-up and tracking.

Further research should examine predictors of noncompliance in adopting a healthier lifestyle after screening in employees found to be at less than ideal cardiovascular health to determine the best approaches for fostering meaningful, long-lasting change.

A national registry encompassing data across different industries and geographical regions will improve our understanding of the optimal approach to health screening programs in combination with employee health management programs on longitudinal behavior change, the quality of programming, cost-effectiveness, and return on investment.

opportunity to merge efforts and prospectively construct registries across different industries and geographical regions. A well-constructed registry project in worksite health screening and health and wellness programs will allow for many of the aforementioned directions for future research to be addressed with a high level of statistical power.

Summary Policy Recommendations and Conclusions

Summary policy recommendations of this writing group are listed in Table 3. Worksite health screenings and health and wellness programs appear to have the potential to positively impact an employee’s health profile at a favorable ROI. However, this

writing group acknowledges that additional research is needed to further substantiate the value of worksite health screenings and health and wellness programs. Moreover, ever-evolving legal precedence and legislation will likely continue to influence the way worksite health screenings and health and wellness programs are implemented. Nevertheless, the landscape of health care in the United States is on the verge of significant change; from a post-event to covered lives⁶¹ model, an increasing focus on primary prevention, and consideration of healthy lifestyle as a credible and highly valuable medical intervention. Capitalizing on the potential for workplace initiatives to positively impact employee health and outcomes strongly aligns with the changing US healthcare landscape.

Disclosures

Writing Group Disclosures

Writing Group Member	Employment	Research Grant	Other Research Support	Speakers' Bureau/Honoraria	Expert Witness	Ownership Interest	Consultant/Advisory Board	Other
Ross Arena	University of Illinois at Chicago	None	None	None	None	None	None	None
Donna K. Arnett	University of Alabama at Birmingham	None	None	None	None	None	None	None
Lynne Braun	Rush University Medical Center	None	None	None	None	None	None	None
Mercedes Carnethon	Northwestern University	None	None	None	None	None	None	None
Fikry Isaac	Johnson & Johnson	None	None	None	None	None	None	Employed by Johnson & Johnson and is responsible for its employee health management program and services†
Suihui Li	The George Washington University	None	None	None	None	None	None	None
Lori Mosca	Columbia University Medical Center	None	None	None	None	None	None	None
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William H. Roach, Jr	Retired partner, McDermott Will & Emery LLP	None	None	None	None	None	None	None
Paul E. Terry	StayWell Health Management	None	None	Paid presentations at Health Promotion conferences*	None	StayWell Health Management†	None	Employed by StayWell Health Management†
Eduardo Sanchez	American Heart Association	None	None	None	None	None	None	Formerly Chief Medical Officer - Blue Cross and Blue Shield of Texas (a division of Health Care Service Corporation) †
Laurie P. Whitsetl	American Heart Association	None	None	None	None	None	None	None

This table represents the relationships of writing group members that may be perceived as actual or reasonably perceived conflicts of interest as reported on the Disclosure Questionnaire, which all members of the writing group are required to complete and submit. A relationship is considered to be “significant” if (1) the person receives \$10,000 or more during any 12-month period, or 5% or more of the person’s gross income; or (2) the person owns 5% or more of the voting stock or share of the entity, or owns \$10,000 or more of the fair market value of the entity. A relationship is considered to be “modest” if it is less than “significant” under the preceding definition.

*Modest.

†Significant.

Reviewer Disclosures

Reviewer	Employment	Research Grant	Other Research Support	Speakers' Bureau/Honoraria	Expert Witness	Ownership Interest	Consultant/Advisory Board	Other
Lawrence Cahalin	University of Miami	None	None	None	None	None	None	None
Ron Goetzel	Emory University	None	None	None	None	None	None	None
Leonard A. Kaminsky	Ball State University	NIH (Co-investigator: 1 R01 AG038576)*	None	None	None	None	None	None
Carl Lavie, Jr	Ochsner Clinic	None	None	None	None	None	None	None
Audrey Mross	Munck Wilson Mandala LLP	None	None	None	None	None	None	None
Jane Nayagam	American Express	None	None	None	None	None	None	None

This table represents the relationships of reviewers that may be perceived as actual or reasonably perceived conflicts of interest as reported on the Disclosure Questionnaire, which all reviewers are required to complete and submit. A relationship is considered to be "significant" if (1) the person receives \$10 000 or more during any 12-month period, or 5% or more of the person's gross income; or (2) the person owns 5% or more of the voting stock or share of the entity, or owns \$10 000 or more of the fair market value of the entity. A relationship is considered to be "modest" if it is less than "significant" under the preceding definition.

*Modest.

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