

# Employment Status Matters

## *A Statewide Survey of Quality-of-Life, Prevention Behaviors, and Absenteeism and Presenteeism*

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**Objective:** To estimate quality-of-life (QoL), primary care, health insurance, prevention behaviors, absenteeism, and presenteeism in a statewide sample of the unemployed, self-employed, and organizationally employed. **Methods:** A statewide survey of 1602 Iowans included items from the Centers for Disease Control and Prevention QoL and Behavioral Risk Factor Surveillance System Survey prevention behavior questionnaires used to assess employee well-being; their indicator results are related to World Health Organization's Health and Work Performance Questionnaire-derived absenteeism and presenteeism scores. **Results:** The unemployed exhibited poorer QoL and prevention behaviors; the self-employed exhibited many better QoL scores due largely to better prevention behaviors than those employed by organizations. Higher QoL measures and more prevention behaviors are associated with lower absenteeism and lower presenteeism. **Conclusions:** Employment status is related to measures of well-being, which are also associated with absenteeism and presenteeism.

The 2010 Patient Protection and Accountable Care Act (ACA) maintained the US employer-based health insurance system, authorized higher quality and more efficient health care measures (Title III), and promoted chronic disease prevention and improved public health (Title IV). Title IV seeks to modernize disease prevention and public health systems, increase access to clinical preventive services, create healthier communities, and offer wellness grants to communities and small employers for comprehensive worksite wellness programs. Since passage of the ACA, numerous state-based insurance exchanges and publicly and privately supported accountable care organizations are being developed, and new statewide health improvement programs, including Iowa's Healthiest State Initiative ([www.iowahealthieststate.com](http://www.iowahealthieststate.com)), are being developed. A new report from *The Milbank Quarterly* documents improvements in health status among residents of Massachusetts after its health care reform legislation.<sup>1</sup>

ACA health improvement provisions, together with the growing challenge employers and employees face in maintaining health care benefits, provide two powerful incentives for employers to embrace employee well-being and control health care spending. Since 1999, Iowa family health insurance premiums have increased 164%, and single premiums 146%.<sup>2</sup> As health care and health insurance costs increase sharply, employers and employees struggle to maintain the quality of health care coverage and benefits. To provide pre-ACA baseline evidence-based data on the statewide workforce,

the University of Iowa Healthier Workforce Center for Excellence ([www.hwce.org](http://www.hwce.org)) developed the Real Iowan Research Initiative with a goal of providing statewide employment sector estimates of health status, prevention, and productivity measures.<sup>3</sup>

Although employment and unemployment are well-recognized health determinants in macroeconomic models of societal health, it is surprising there is not more occupational survey research on the role of employment status and health.<sup>4-6</sup> Nationally, more than 60% of employees receive their health insurance coverage through their employer; in Iowa this proportion was 70% at the time of this survey.<sup>7</sup> This places employers in a strong position to influence a health-based, prevention-oriented system of health insurance and health care. In the 1990s, large employers began to systematically implement employee well-being programs, a national trend documented by the Institute of Medicine<sup>8</sup> and further documented by 13 Iowa Annual Employer Benefits Studies.<sup>2</sup>

Research on integration of employee health protection and promotion programs among large employers has documented several benefits from reduced absenteeism, reduced health care costs, and reduced disability and workers' compensation costs.<sup>8</sup> This Institute of Medicine report makes the case for shifting the emphasis from traditional occupational health and safety programs to integrated employee health programs that emphasize quality-of-life (QoL) and well-being at work, a concept further described well by Schulte and Vainio.<sup>9</sup> Although national data on integrated employee health programs come almost entirely from studies of large employers, workplaces in rural states like Iowa are primarily small employers, nearly 90% of whom employ fewer than 9 workers and 98% of whom employ fewer than 50 workers.<sup>7</sup> Despite the predominance of small employers in American commerce, few employee health studies have focused on this segment of the workforce, especially those self-employed and the unemployed (those currently seeking employment and who consider themselves a part of the workforce). The University of Iowa Healthier Workforce Center for Excellence, one of four national NIOSH Total Worker Health Centers ([www.cdc.gov/niosh/TWH](http://www.cdc.gov/niosh/TWH)), seeks to contribute to a better understanding of employee well-being and provide program and policy guidance with a focus on small employers.<sup>10</sup>

The survey described here was designed to address three questions among a statewide sample of Iowa employees: (1) Are there demographic, primary care, health insurance, QoL, and prevention behavior differences between the self-employed, those employed by an organization, and the unemployed? (2) Do QoL and prevention behavior questionnaire items provide meaningful measures of sickness absenteeism and presenteeism? (3) Are ranked QoL and prevention measures related to sickness absenteeism and presenteeism?

### METHODS

The Real Iowans Health Survey used a stratified simple random sample of 1602 people from a list of voters aged 18 to 65 years found on the 2010 Iowa Voter Registration database maintained in real time by the Iowa Secretary of State.<sup>3</sup> Iowa counties were

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stratified into four strata, from rural to urban on the basis of population density; a simple random sample of voters with telephone numbers was drawn within each rural/urban stratum. Statewide estimates were computed by weighing stratum-specific responses on the basis of the proportion of the population 18 to 65 years of age in each stratum. The survey margin of error for statewide estimates was  $\pm 2.45\%$ . Interviews were conducted by survey research staff of the Department of Epidemiology of the College of Public Health from May through August 2010. The identified adult voter in each household was randomly selected to respond (SAS SURVEYSELECT with stratification).<sup>11</sup> Of 3396 voters contacted, 166 declined to be interviewed by the return letter, 11 completed only part of the interview, and 1603 completed the survey for an overall response rate of 47.2%. The data edit found that one respondent had not completed the entire survey, leaving a total of 1602 respondents for analysis. When compared with data available for all voters, there was no difference in response by age, but respondents were more often women and more often a member of a major political party, similarly distributed members of the Democratic and Republican parties. The proportion of respondents self-identifying themselves as unemployed (4.7%) was somewhat lower than Iowa unemployment figures (6.7% to 6.8%) for the months of the survey.<sup>12</sup> Because this analysis is limited to the workforce, composed of those identifying themselves as self-employed, employed by an organization, or a self-described member of the workforce but currently unemployed, respondents identifying themselves as homemakers ( $n = 101$ ), retired ( $n = 146$ ), or disabled ( $n = 54$ ) were not included in these analyses, nor were the 24 students and 6 others who did not provide an employment status (see [www.hwce.org—Iowans for data on the latter three groups](http://www.hwce.org—Iowans for data on the latter three groups)).<sup>3</sup> Consequently, the sample size was 1271.

The Real Iowans Health Survey Questionnaire was constructed from items from several standardized questionnaires including the Centers for Disease Control and Prevention (CDC) Health-Related QoL 14-Item Measure, the Agency for Healthcare Research and Quality Consumer Assessment of Healthcare Providers and Systems for primary care coverage, the CDC Behavioral Risk Factor Surveillance System Survey (BRFSS) for prevention behaviors, the Bureau of the Census for employment documentation, and the World Health Organization's Health and Work Performance Questionnaire for assessment of sickness absenteeism and presenteeism.<sup>13-17</sup>

Statistical methods included chi-square tests to examine differences in self-reported demographic, primary health care, insurance and prevention behaviors, and work schedules by employment status. Body mass index (BMI) was calculated from self-reported height and weight.<sup>15</sup> The association between dependent (response) variables was evaluated using stepwise logistic regression analysis to sequentially select from among a list of predictor variables on the basis of previous survey results. With the exception of age, all variables were dichotomized (or the variable vs two or three dummy variables) for logistic regression. The list of potential risk factors included age, male sex, currently married, self-employed, have health insurance, have a primary care doctor, attended college, had a college degree, had never smoked cigarettes, was an ex-smoker, was a current smoker, had a BMI of less than 30, had an income of less than \$35,000, had an income between \$35,000 and \$50,000, had an income between \$50,000 and \$75,000, had an income over \$75,000, worked for an organization with fewer than 20 employees, worked for an organization between 20 and 49 employees, worked for an organization between 50 and 249 employees, and worked for an organization with 250 or more employees.

Sickness absenteeism (total hours of missed work due to illness in the last 28 days) and absolute presenteeism (self-rated overall job performance during the last 4 weeks, a scale of 0 to 100, higher rank equates to lower presenteeism) were calculated using the employment module of the Health and Work Performance

Questionnaire and the methods described by Brooks et al.<sup>18</sup> Partial days missed because of illness were all counted as 4 hours of missed work. All analyses were conducted with SAS, version 9.2 (SAS Institute Inc, Cary, NC).<sup>19</sup>

## RESULTS

Demographic results of the self-employed, those employed by organization, or those seeking employment, but who were currently unemployed, are summarized in Table 1. Fewer men are found in all three employment categories, particularly men employed by an organization. Race and ethnicity varied between those currently employed and the unemployed, who were more often nonwhite, but not between the self-employed and the employed by an organization. Marked differences by employment status are observed by age category; very few of the self-employed are found in the youngest age group whereas more self-employed are found in the oldest age group. There was no significant difference in education among the three employment groups. A striking difference is observed between the currently employed and the unemployed in regard to marital status, with a lower proportion of the unemployed reported being married and a higher proportion never married, although the self-employed and employed by an organization were similarly distributed. Not surprisingly, there were significant differences between employment categories in regard to household income, with more of the self-employed and especially the unemployed, reporting lower incomes. Nearly two thirds of those employed by an organization reported annual household incomes of greater than \$50,000, whereas nearly 40% of the unemployed reported household incomes of less than \$25,000 and over 80% of the unemployed had household incomes of less than \$50,000.

Nearly 90% of the self-employed worked in workplaces with 9 or fewer employees, whereas over 85% of those employed by an organization worked in workplaces employing 10 or more and nearly 60% employed 50 or more (Table 2).

Over 95% of those employed by an organization reported some form of health insurance, nearly 70% provided through their employer, whereas only 87% of the self-employed reported any health insurance, which came primarily from private policies and through their spouse's employer (Table 3). Taken together, 82% of those currently employed received their health care insurance through their employer or their spouse's employer. Only 75% of the unemployed reported any health insurance, the primary source of which was their spouse's employer, whereas a fifth reported health insurance through a federal insurance program. Nearly 90% of those currently employed by an organization reported having a primary care doctor, significantly more than the self-employed and the unemployed. Nevertheless, when asked if they had visited a primary care doctor within the last 12 months, no significant difference was found between employment categories.

The self-employed more often worked fewer than 20 hours a week, but nearly one third reported working at least 50 hours a week (Table 4). Nearly a quarter of those identifying themselves as unemployed reported they held what they considered a "second job," but no further employment data were collected for these workers.

The "QoL healthy days" results found the unemployed had strikingly poorer indicators of general health, physical health, mental health, health-related restrictions in usual activities, and days when not feeling healthy and full of energy (Table 5). Conversely, the self-employed reported higher rates of indicators of excellent/very good general health, physical health, mental health, and fewer days when physical or mental health kept them from their usual activities. Nevertheless, multivariable modeling found that being self-employed only influenced the good physical health item model. Although male sex was negatively associated in the model for general health, male sex was positively associated in the models for having not missing work because of physical or mental health problems. Having a BMI

**TABLE 1.** Employment Status and Demographics

Characteristics	Self-Employed % (n)	Organizationally Employed % (n)	Unemployed % (n)	P
Sex, male	46.6 (108/232)	33.8 (326/963)	40.8 (31/76)	0.0011
Race/ethnicity, white	98.3 (227/231)	97.5 (929/953)	93.4 (71/76)	0.0082
Age, yr				<0.0001
18–30	3.4 (8/232)	11.5 (111/963)	10.5 (8/76)	
31–45	22.0 (51/232)	24.8 (239/963)	22.4 (17/76)	
46–55	33.6 (78/232)	37.0 (356/963)	29.0 (22/76)	
56–68	41.0 (95/232)	26.7 (257/963)	38.2 (29/76)	
Education				0.1221
Less than GED	0.4 (1/232)	0.7 (7/962)	1.3 (1/76)	
High school diploma or GED	31.0 (72/232)	23.0 (221/962)	27.6 (21/76)	
Some college	33.6 (78/232)	35.4 (265/962)	42.1 (32/76)	
College degree	25.0 (58/232)	27.6 (265/962)	23.7 (18/76)	
Postgraduate coursework	10.0 (23/232)	13.3 (128/962)	5.3 (4/76)	
Marital status				
Married	78.0 (181/232)	75.3 (725/963)	56.6 (43/76)	0.0006
Never married	7.8 (18/232)	11.8 (114/963)	29.0 (22/76)	<0.0001
Income				<0.0001
<\$25,000	12.4 (27/218)	8.8 (80/910)	38.6 (27/70)	
\$25,000–\$49,999	32.6 (71/218)	26.5 (241/910)	41.4 (29/70)	
\$50,000–\$74,999	20.6 (45/218)	28.0 (255/910)	11.4 (8/70)	
>\$75,000	34.4 (75/218)	36.7 (334/910)	8.6 (6/70)	

GED, Graduate Educational Development.

**TABLE 2.** Employment Status and Organization Size

	Self-Employed % (n)	Organizationally Employed % (n)	P
1	49.4 (114/231)	0.5 (5/940)	<0.0001
2–9	39.0 (90/231)	14.0 (131/940)	
10–19	7.4 (17/231)	9.2 (86/940)	
20–49	1.7 (4/231)	15.6 (147/940)	
50–249	1.7 (4/231)	26.7 (251/940)	
250–999	0.9 (2/231)	16.3 (153/940)	
≥1000	0 (0/0)	17.8 (167/940)	

less than 30 was positively associated in models of excellent/very good general health, good physical health, days missed because of physical or mental health, and activity limitation. Smoking consistently and negatively influenced the models on excellent/very good general health, no days lost from physical or mental health, no days lost because of mental health, and no lost days because of activity restriction. Having a high household income positively influenced the model on excellent/very good general health and no lost days from mental health problems, whereas having a low household income negatively influenced physical health and mental health. Being currently married positively influenced the models on excellent/very good general health and reporting days lost because of physical or mental health problems. Having at least a college education positively influenced the model on excellent/very good general health, but negatively influenced in mental health.

Four of the five QoL “health symptoms” found the unemployed to have poorer scores (Table 6). Fewer than 50% of the unemployed reported no pain days or did not feel sad, blue, or depressed in the last month, compared with two thirds for both currently em-

ployed categories. Multivariable models for QoL “health symptoms” found never smoking to be associated with days with no pain or not feeling sad, blue, or depressed. Similarly, a low household income negatively influenced the model on days with pain, whereas having a high income was a positive (protective) factor in the models on feeling sad, blue, or depressed; days feeling worried, tense, or anxious and for getting enough sleep. Male sex consistently and positively influenced the model on not feeling worried, tense, or anxious, getting enough sleep, and feeling very healthy and full of energy. Being a college graduate positively influenced the model on no pain days in the last month, but was negatively associated with getting enough sleep. Aging positively influenced the model on getting enough sleep and days felt very healthy and full of energy. A BMI of less than 30 appeared in just one of these models, positively (protectively) affecting “pain keeping you from usual activities”.

The CDC QoL questionnaire also asks: “Are you limited in any way in any activities because of any impairment or health problem?” If the answer is “yes,” the next question is: “What is the major impairment or health problem that limits your activities?” By far the largest categories of impairment cited were musculoskeletal (47.1%) and arthritis (11.5%), whereas the chronic diseases—cardiovascular (5.1%), chronic obstructive pulmonary disease (4.5%), diabetes (4.3%), asthma (3.2%), cancer (1.6%), neurological disease (1.3%), and depression (1.3%)—constituted only 21.3% of these impairments. There was no pattern of, or any apparent difference in, cause of impairment by employment category.

Fewer than half of the unemployed had never smoked, whereas nearly two thirds of the self-employed, who reported the best smoking behavior, had never smoked and only 12% of them currently smoked—half that of the unemployed (Table 8). Nevertheless, significantly fewer of the self-employed reported receiving a flu vaccine in the last year compared with those employed by an organization and the unemployed, more than half of whom reported getting a flu vaccination. There were no overall differences in alcohol

**TABLE 3.** Health Insurance by Source and Primary Care Coverage

Health Care Coverage	Self-Employed % (n)	Organizationally Employed % (n)	Unemployed % (n)	P
Do you have health insurance? Yes	87.0 (201/231)	94.4 (909/963)	76.3 (58/76)	<0.0001
Source of health insurance				<0.0001
Employer	15.5 (31/200)	69.2 (629/909)	15.5 (9/58)	
Spouse's employer	33.0 (66/200)	20.6 (187/909)	44.8 (26/58)	
Private policy	45.0 (90/200)	6.0 (55/909)	8.6 (5/58)	
Federal program	3.5 (7/200)	1.1 (10/909)	20.7 (12/58)	
Out of pocket/other	3.0 (6/200)	3.1 (28/909)	10.3 (6/58)	
Do you have a primary care doctor? Yes	83.5 (192/230)	88.4 (850/961)	77.6 (59/76)	0.0063
Did you visit your primary care doctor in the past year? Yes	81.2 (157/192)	85.0 (720/847)	81.4 (48/59)	0.4435

**TABLE 4.** Hours Worked, Days Lost to Illness, and Second Jobs by Employment Status

Work Schedule	Self-Employed % (n)	Organizationally Employed % (n)	Unemployed % (n)	P
Hours worked in the last 7 d				<0.0001
0–20 hrs	22.6 (52/230)	17.1 (163/955)	NA	
21–40 hrs	26.5 (61/230)	40.2 (384/955)	NA	
41–50 hrs	19.1 (44/230)	26.1 (249/955)	NA	
> 50 hrs	31.7 (73/230)	16.6 (159/955)	NA	
Entire days missed in the last 4 wks because of physical or mental illness				0.1225
None	92.2 (213/231)	88.5 (833/941)	NA	
1–2	4.3 (10/231)	8.3 (78/941)	NA	
≥3	3.5 (8/231)	3.2 (30/941)	NA	
Held a second job	25.4 (59/232)	22.4 (216/963)	24.3 (18/74)	0.6018

NA, not applicable.

consumption by employment category, but a higher proportion of the unemployed reported no alcohol consumption in the last 30 days. Weekly exercise was more prevalent among the self-employed than those employed by an organization, and was much more prevalent than that of the unemployed, nearly 40% of whom reported exercising less than once per week. The self-employed reported much poorer seat belt use. Marginally different rates of BMI under 30 were observed between employment groups, but nearly 56% of the unemployed were found to be obese. A higher proportion of the self-employed reported eating fruits, vegetables, and whole grains one to two times per day, somewhat higher than those employed by an organization. Nearly a third of the self-employed and unemployed reported getting 8 or more hours of sleep each day, higher than that reported by those employed by an organization.

Multivariable models for health insurance, primary care, and prevention behaviors are presented in Table 3. Of interest is the prominence of male sex as a significantly negative factor, poor primary care, and prevention compliance in 9 of the 10 models; only for exercising at least 20 minutes a day, five times a week, did sex positively influence a prevention model. Despite being a smaller employment group, the self-employed appeared, with mixed influences, in several models—they smoked less, received a flu vaccination less often, more often reported healthy eating, more often reported sleeping 8 or more hours on a typical workday night, but used seat belts less. Those employed by an organization of fewer than 20 workers reported better primary care coverage, but did not see their doctor more often in the last 12 months, and correspondingly, less often received a flu vaccination. Having health insurance strongly influenced

having a primary care doctor, never smoking, and getting a flu vaccination. Similarly, having a primary care doctor positively influenced getting a flu vaccination, but was also associated with those who were obese. Smoking was negatively associated with several behaviors—including less often having a primary care doctor, less often using a seat belt, more often consuming alcohol, less often getting at least 8 hours of sleep, and less often having a BMI under 30. Having a BMI of 30 or more was similarly associated with several poor prevention behaviors—including less seat belt use, less healthy eating, and less physical exercise—but also with less alcohol consumption. Older employees often reported healthy behaviors including more often having a primary care doctor, never smoking, having a flu vaccination, and not drinking alcohol. Finally, income was a significant factor in several models; those with household incomes of less than \$35,000 often had a primary care doctor and consumed less alcohol, but more often had a BMI of 30 or more. Higher income was a positive factor for healthy eating and having a BMI less than 30, but was also associated with more alcohol consumption in the last 12 months.

The five QoL “healthy day” indicator results, by employment category and for sickness absenteeism and presenteeism, are presented in Table 9. In general, consistently lower absenteeism and higher presenteeism scores were found, and nearly all were statistically significant for all five of these indicators for both employment categories. Those employed by an organization consistently reported somewhat higher presenteeism scores.

The six QoL “health symptoms” by employment status for sickness absenteeism and presenteeism are presented in Table 10.

**TABLE 5.** Quality-of-Life “Healthy Days” by Employment Status and Final Models for the Self-Employed and Organizationally Employed Groups Combined

	Self-Employed	Organizationally Employed	Unemployed	
General health—excellent/very good, % ( <i>n</i> )	69.9 (162/232)	65.2 (627/962)	48.0 (36/75)	0.0026
	<b>Odds Ratio Point Estimate (95% Wald Confidence Limits)</b>			
	<b>Effect</b>			
	Male sex	0.728 (0.550–0.962)		
	Age	0.972 (0.959–0.985)		
	Currently married	1.491 (1.072–2.073)		
	Attended college	1.459 (1.068–1.994)		
	Never smoked cigarettes	2.334 (1.577–3.454)		
	Never smoked	1.594 (1.029–2.468)		
	Income over \$75,000	1.628 (1.191–2.224)		
	Body mass index less than 30	2.732 (2.061–3.622)		
Days in which physical health was not good—none, % ( <i>n</i> )	77.9 (180/231)	69.9 (672/961)	55.3 (42/76)	<0.0001
	Self-employed	1.554 (1.077–2.241)		
	Income less than \$35,000	0.556 (0.392–0.788)		
	Body mass index less than 30	1.817 (1.371–2.407)		
Days in which mental health was not good—none, % ( <i>n</i> )	68.1 (158/232)	65.3 (626/959)	56.0 (42/75)	0.0039
	Male sex	1.658 (1.263–2.176)		
	College degree	0.669 (0.503–0.889)		
	Current smoker	0.611 (0.423–0.883)		
	Income less than \$35,000	0.654 (0.455–0.939)		
	Income over \$75,000	1.479 (1.091–2.004)		
Days in which physical or mental health kept you from usual activities—none, % ( <i>n</i> )	87.1 (202/232)	83.6 (805/963)	63.2 (48/76)	<0.0001
	Male gender	1.595 (1.117–2.279)		
	Currently married	1.721 (1.197–2.474)		
	Never smoked cigarettes	1.462 (1.044–2.047)		
	Body mass index less than 30	1.840 (1.313–2.579)		
Are you limited in any way? No, % ( <i>n</i> )	80.2 (186/229)	82.4 (793/962)	57.9 (44/76)	<0.0001
	Age	0.964 (0.948–0.980)		
	Never smoked cigarettes	1.707 (1.237–2.355)		
	Body mass index less than 30	1.874 (1.352–2.596)		

Similar patterns for absenteeism and presenteeism are observed for both employment groups for all items, except for the self-employed for the “days felt worried, tense, or anxious” item, which found a higher sickness absenteeism score among those reporting “no days” than those reporting “one or more days,” unlike that observed among those employed by an organization. Among the self-employed, only two of the five items for sickness absenteeism, but only one for presenteeism, reached statistical significance, although patterns were consistent and nearly all statistically significant among those organizationally employed.

Sickness absenteeism and absolute presenteeism scores associated with 10 prevention behaviors are presented in Table 11. All prevention behaviors, except having a primary care doctor, resulted in less sickness absenteeism among those employed by another, only three of which reached or approached statistical significance—

exercising, having a BMI of less than 30, and getting 8 or more hours of sleep. Sickness absenteeism results among the self-employed were mixed for prevention behaviors, with more sickness absence associated only with having a primary care doctor, typically not considered a prevention behavior. Nine of the 10 positive prevention behaviors among those employed by another resulted in higher presenteeism scores (less presenteeism), the exception being smokers who had a marginally significantly higher presenteeism score than nonsmokers. Among the self-employed, better prevention behaviors resulted in higher presenteeism scores, except among smokers and among those who reported drinking alcohol; but the only significant difference (negative) was among the self-employed for always wearing a seat belt.

Given the similarity in absenteeism and presenteeism scores among the self-employed and those employed by another, combined

**TABLE 6.** Quality-of-Life “Health Symptoms” by Employment Status and Final Models for the Self-Employed and Organizationally Employed Groups Combined

	Self-Employed	Organizationally Employed	Unemployed	
Days pain made it hard—none, % (n)	69.6 (160/230)	70.1 (672/959)	45.3 (33/75)	<0.0001
	<b>Odds Ratio Point Estimate (95% Wald Confidence Limits)</b>			
<b>Effect</b>				
College graduate	1.395 (1.045–1.863)			
Never smoked cigarettes	1.700 (1.291–2.239)			
Income less than \$35,000	0.681 (0.478–0.969)			
Body mass index less than 30	1.959 (1.482–2.588)			
Days you felt sad, blue—none, % (n)	67.4 (155/230)	64.9 (623/960)	47.4 (36/76)	<0.005
Never smoked cigarettes	1.301 (1.002–1.689)			
Income between \$50,000 and \$75,000	1.643 (1.192–2.263)			
Income over \$75,000	1.981 (1.467–2.674)			
Days you felt worried, tense—none, % (n)	43.5 (101/232)	39.9 (383/959)	31.6 (24/76)	0.1784
Male sex	1.516 (1.175–1.958)			
Currently married	1.391 (1.016–1.907)			
Income over \$75,000	1.418 (1.085–1.855)			
Days you felt you could not get enough sleep—none, % (n)	20.7 (48/232)	20.0 (192/962)	29.0 (22/76)	0.1758
Male sex	1.447 (1.063–1.971)			
Age	1.016 (1.002–1.031)			
College graduate	0.615 (0.436–0.868)			
Income over \$75,000	1.406 (1.003–1.971)			
Employed by a company with 20–49 employees	1.663 (1.106–2.500)			
Days you felt very healthy and full—every day, % (n)	24.0 (50/208)	24.4 (217/891)	24.1 (14/58)	0.9951
Male sex	1.554 (1.153–2.094)			
Age	1.016 (1.003–1.030)			

QoL “healthy day” and “health symptoms” items and prevention behaviors scores are presented in Table 12. Consistent trends are observed between combined QoL and prevention behavior scores and decreased sickness absenteeism and increased presenteeism scores. The lowest health rank for sickness absenteeism (fewer than eight items or less) resulted in a mean sickness absenteeism of 16.5 days among 137 employees. The same lowest rank for absolute presenteeism was 78.9, meaning that the highest presenteeism was reported among 133 employees, 21.1% of the time for the reporting period.

**DISCUSSION**

The smallest of the employment groups considered in this survey, those who self-describe themselves as unemployed, are not surprisingly quite different from the self-employed or employed by an organization.<sup>6</sup> They are racially more diverse, somewhat less well educated, less often married, over three times more often never married, and have much lower household incomes—nearly 40% reporting less than \$25,000 annually. They less often report having a primary care doctor. Those who report health insurance most frequently get their health insurance via their spouses’ employment-based insurance (45%). Of interest, nearly a quarter of the unemployed stated that they held a “second job,” employment that

they apparently felt did not meet the US Census employment definition used in this survey. What is striking about the unemployed group is how much poorer their self-assessed QoL health indicators are than are their currently employed counterparts. Although unemployment itself, and associated depression, may well contribute to lower QoL indicators, it is also clear they have comparatively poorer prevention behaviors than those currently employed—double the current smoking prevalence, much less weekly exercise, and significantly more obesity (56%)—findings that do not appear in multivariable models, likely because of the small sample size. Because of the well-recognized healthy worker effect, which includes selection of healthier workers into the workforce and the loss of sicker workers from the workforce over time, it is not surprising, as found in the very limited available literature, that the unemployed are less fit as a group.<sup>19–21</sup> These findings are also consistent with those of Dolinsky and Caputo,<sup>22</sup> who found unemployment associated with negative health status, and economics studies, which consistently find less well-being among the unemployed.<sup>4–6</sup> These statewide estimates of the relative lack of fitness and well-being among the unemployed, as reflected by their self-assessed QoL items and their poor prevention behaviors, should be of concern to workforce development officials and to policy makers as they seek to fill employment

**TABLE 7.** Prevention Behavior Final Models for Self-Employed and Organizationally Employed Groups Combined

Effect	Odds Ratio Point Estimate (95% Wald Confidence Limits)
Has health insurance	
Age	1.034 (1.011–1.057)
Currently married	2.382 (1.297–4.376)
Current smoker	0.340 (0.186–0.620)
Income less than \$35,000	0.101 (0.047–0.218)
Income between \$35,000 and \$50,000	0.171 (0.079–0.370)
Employed by a company with fewer than 20 employees	0.136 (0.069–0.269)
Employed by a company with 20–49 employees	0.380 (0.153–0.942)
Has a primary care doctor	
Male sex	0.485 (0.332–0.707)
Age	1.045 (1.029–1.062)
Current smoker	0.452 (0.282–0.722)
Have health insurance	3.084 (1.732–5.489)
Never smoked cigarettes	
Male sex	0.644 (0.495–0.838)
Age	0.980 (0.968–0.991)
Currently married	1.413 (1.041–1.918)
Self-employed	1.553 (1.109–2.174)
College degree	1.966 (1.505–2.568)
Have health insurance	1.867 (1.106–3.150)
Had either the flu shot injection or the nasal mist	
Male sex	0.527 (0.405–0.684)
Age	1.021 (1.009–1.034)
Self-employed	0.667 (0.447–0.994)
Have a primary care doctor	1.818 (1.216–2.719)
Have health insurance	1.796 (1.027–3.140)
Employed by a company with fewer than 20 employees	0.595 (0.429–0.824)
Always use seat belts	
Male sex	0.533 (0.383–0.741)
Self-employed	0.368 (0.258–0.525)
Never smoked	0.592 (0.416–0.843)
Body mass index less than 30	1.469 (1.050–2.057)
No alcoholic beverages in the past 30 d	
Male sex	0.733 (0.551–0.975)
Age	1.041 (1.028–1.055)
Never smoked	1.464 (1.101–1.948)
Income less than \$35,000	1.475 (1.019–2.135)
Income over \$75,000	0.437 (0.320–0.599)
Body mass index less than 30	0.702 (0.529–0.933)
Eat one to two servings daily, each of whole grains, fruits, and vegetables	
Male sex	0.373 (0.277–0.503)
Age	1.022 (1.009–1.035)
Self-employed	1.753 (1.247–2.466)
College degree	1.631 (1.238–2.149)
Income between \$50,000 and \$75,000	1.565 (1.160–2.111)

(continues)

**TABLE 7.** (Continued)

Effect	Odds Ratio Point Estimate (95% Wald Confidence Limits)
Employed by a company with 20–49 employees	1.536 (1.039–2.271)
Body mass index less than 30	1.386 (1.030–1.864)
Exercises continuously for at least 20 min at least five times a week	
College degree	1.417 (1.058–1.898)
Body mass index less than 30	1.521 (1.096–2.112)
Body mass index less than 30	
Male sex	0.732 (0.559–0.959)
Current smoker	1.565 (1.044–2.346)
Have a primary care doctor	0.606 (0.398–0.924)
Income between \$50,000 and \$75,000	2.018 (1.448–2.813)
Income over \$75,000	2.354 (1.725–3.212)
Sleeps ≥8 hrs on a typical workday night	
Male sex	0.588 (0.435–0.794)
Self-employed	1.765 (1.262–2.466)
Current smoker	0.528 (0.331–0.840)

needs from the documented pool of 11.3 million unemployed Americans.<sup>23</sup>

By contrast, this statewide sample of the self-employed differed demographically from those employed by an organization—more often men, older, more often married, but more often earning less than \$50,000. Because they are more often responsible for their own health insurance, they are far more dependent (45% in this survey) on private self-insured small segment health insurance, and frequently are insured through their spouse’s employment-based health policy, a third in this survey. As a result, the self-employed are less well insured, have less access to primary care, and see their doctor less frequently than those employed by an organization. Independent annual surveys of small employers in Iowa have documented a progressive erosion in the adequacy of health insurance among small employers, as insurance rates increase dramatically, up 16.4% for small employers with two to nine employees in 2010.<sup>7</sup> Despite the comparative disadvantages in primary care and health insurance coverage, the self-employed nevertheless reported several better QoL indicators than those employed by an organization, most of which, as suggested by multivariable models, is explained by better prevention behaviors—less smoking, more healthy eating, and more sleep during the work week. Nevertheless, the self-employed also less often received a flu vaccination, consistent with their less adequate health insurance coverage, and less often reported always wearing a seat belt, consistent with their more frequent rural location where poorer seat belt compliance is well documented, especially among farmers.<sup>24</sup> The self-employed much more often work at least 50 hours a week, nearly double of those employed by an organization, yet less often missed an entire day of work in the last 4 weeks. The self-employed, nearly 90% of whom are found in workplaces employing fewer than 10 employees, exhibit excellent QoL outcomes, many healthy behaviors, often work longer hours and are necessarily a more self-reliant segment of the workforce. These findings are consistent with those of others who report the self-employed work longer hours, exhibit high job control, often experience more stress from job and financial insecurity—but generally cope well, and more often consume less health care associated with traits associated with less

**TABLE 8.** Prevention Behaviors and Employment Status

Prevention Behavior	Self-Employed % (n)	Organizationally	Unemployed % (n)	P
		Employed % (n)		
Smoking history				0.0138
Never smoked	64.2 (147/229)	61.0 (581/952)	42.7 (32/75)	
Ex-smoker	23.6 (54/229)	25.2 (240/952)	33.3 (25/75)	
Current smoker	12.2 (28/229)	13.8 (131/952)	24.0 (18/75)	
Received flu vaccine—yes	37.2 (56/231)	55.6 (535/963)	51.3 (39/76)	<0.0001
Alcohol consumption				0.1200
None	36.4 (84/231)	32.2 (310/961)	46.0 (35/76)	
1–9	47.2 (109/231)	51.6 (496/961)	36.8 (28/76)	
10–20	11.7 (27/231)	11.6 (112/961)	9.2 (7/76)	
≥21	4.8 (11/231)	4.5 (43/961)	7.9 (6/76)	
Weekly exercise				0.0065
Less than once a week	18.0 (41/228)	22.6 (213/941)	39.7 (29/73)	
1–2 d/wk	26.8 (61/228)	27.7 (261/941)	19.2 (14/73)	
3–4 d/wk	30.3 (69/228)	25.9 (244/941)	27.4 (20/73)	
≥5 d/wk	25.0 (57/228)	23.7 (223/941)	13.7 (10/73)	
Always wear seat belt visits—yes	69.6 (160/230)	84.7 (816/963)	85.5 (65/76)	<0.0001
BMI <30	67.2 (154/229)	67.4 (631/936)	54.2 (39/72)	0.0697
Eat healthy (fruits, vegetables, and whole grains 1–2 times a day)	39.0 (90/231)	31.1 (299/961)	35.1 (26/74)	0.0671
Hours of sleep (≥8 hrs)	33.2 (76/229)	24.5 (236/962)	32.0 (24/75)	0.0156

BMI, body mass index.

**TABLE 9.** Quality-of-Life “Healthy Days” Indicators\*

Indicators		Self-Employed				Organizationally Employed			
		N	Mean	SD	P	N	Mean	SD	P
Would you say that, in general, your health is . . .									
Sickness absenteeism	Excellent/very good	162	2.5	11.8	0.3919	627	2.3	14.8	0.0038
	Good, fair, or poor	70	4.6	19.0		335	6.3	22.2	
Presenteeism†	Excellent/very good	157	85.1	11.6	0.0012	588	85.8	10.6	0.0347
	Good, fair, or poor	70	79.3	13.8		321	84.0	12.5	
How many days during the past 30 d was your physical health not good?									
Sickness absenteeism	No days	180	1.4	9.6	0.0217	672	1.1	9.4	<0.0001
	≥1 d	51	9.4	23.7		289	9.6	28.5	
Presenteeism	No days	176	84.0	12.1	0.1401	639	86.0	10.6	0.0006
	≥1 d	50	81.0	14.0		269	83.0	12.6	
How many days during the past 30 d was your mental health not good?									
Sickness absenteeism	No days	158	2.2	13.7	0.1379	626	2.4	12.4	0.0189
	≥1 d	74	5.2	15.4		333	5.9	25.0	
Presenteeism	No days	154	85.3	11.1	0.0013	592	86.3	10.7	<0.0001
	≥1 d	73	79.0	14.4		314	83.0	12.3	
How did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?									
Sickness absenteeism	No days	202	1.4	9.1	0.0212	805	1.2	8.8	<0.0001
	≥1 d	30	15.2	30.2		158	16.7	37.4	
Presenteeism	No days	197	84.4	11.9	0.0010	767	85.9	10.4	0.0002
	≥1 d	30	76.3	14.7		143	81.0	14.7	
How many days very healthy and full of energy?									
Sickness absenteeism	No days	50	0.9	4.7	0.0484	217	1.7	15.5	0.1449
	≥1 d	158	3.5	14.2		674	3.4	14.5	
Presenteeism	No days	46	87.8	11.1	0.0039	201	88.3	9.9	<0.0001
	≥1 d	158	81.9	12.4		643	84.6	11.3	

\*Sickness absenteeism and presenteeism by employment status and quality-of-life indicators.

†Higher presenteeism scores = lower presenteeism.

SD, standard deviation.

**TABLE 10.** Quality-of-Life “Health Symptoms” Indicators\*

Indicators		Self-Employed				Organizationally Employed			
		N	Mean	SD	P	N	Mean	SD	P
How many days did pain make it hard for you to do your usual activities									
Sickness absenteeism	No days	160	1.0	6.0	0.0145	672	1.5	9.8	<0.0001
	≥1 d	70	8.2	23.7		287	8.5	28.1	
Presenteeism†	No days	155	84.1	12.6	0.1370	634	85.8	10.6	0.0132
	≥1 d	70	81.4	12.5		272	83.7	12.5	
How many days have you felt sad, blue, or depressed?									
Sickness absenteeism	No days	155	2.2	13.8	0.1504	623	2.7	13.2	0.0481
	≥1 d	75	5.1	15.3		337	5.5	24.3	
Presenteeism	No days	151	84.7	11.9	0.0159	591	86.0	10.4	0.0024
	≥1 d	74	80.4	13.5		316	83.4	12.7	
How many days have you felt worried, tense, or anxious?									
Sickness absenteeism	No days	101	3.7	17.5	0.6129	383	2.8	17.9	0.2240
	≥1 d	131	2.7	11.2		576	4.2	17.9	
Presenteeism	No days	98	84.6	11.2	0.1785	363	86.1	11.5	0.0284
	≥1 d	129	82.3	13.4		543	84.5	11.2	
How many days you felt you did not get enough rest or sleep?									
Sickness absenteeism	No days	48	1.7	9.4	0.2899	192	3.4	23.3	0.8521
	≥1 d	184	3.5	15.3		770	3.7	16.2	
Presenteeism	No days	45	85.6	13.4	0.1797	174	87.8	11.0	0.0005
	≥1 d	182	82.7	12.3		735	84.5	11.3	
Are you limited in any way in any activities because of any impairment or health problem?									
Sickness absenteeism	No	186	1.3	8.0	0.0202	793	2.1	10.8	0.0013
	Yes	46	10.8	26.6		169	11.1	34.9	
Presenteeism	No	181	82.7	12.9	0.1559	753	85.3	11.1	0.4393
	Yes	46	85.7	10.7		156	84.5	12.3	

\*Sickness absenteeism and absolute presenteeism by employment status and quality-of-life indicators.  
 †Higher presenteeism scores = lower presenteeism.  
 SD, standard deviation.

health care demand.<sup>25–30</sup> This labor force segment of 9.1 American workers, employed predominantly by small employers, who despite their job creation capacity, continue to sustain the most rapidly rising health care and health insurance rate burdens.<sup>23</sup> They too should be of particular concern to workforce development officials and policy makers and the focus of more research.

The findings of generally good QoL and prevention metrics among the employed are consistent with statewide assessments of health care that have found that Iowans enjoy comparatively good health care, ranking second tied with Hawaii in the 2008 Commonwealth Fund state-by-state assessment of access, quality, and cost.<sup>31</sup> Another statewide assessment, of access and quality of health care among Medicare enrollees, also ranked Iowa highly.<sup>32</sup> Consistent with these conclusions are our survey results using CDC QoL questionnaire indicators, which found two thirds of working Iowans to report excellent or very good general health—positively influenced by less often smoking, being relatively well educated, currently married, and older (within the age limits of this survey). Although only 13% of those currently employed smoked, less than the statewide average of 18% at the time of the survey,<sup>15</sup> smoking nevertheless adversely influenced several QoL indicators—general health, mental health days, physical and mental health kept from usual activity days, activity limitation days, pain days, and days feeling sad, blue, and depressed, as further discussed in the Surgeon General’s 50-year report.<sup>33</sup> Although over two thirds of the currently employed

reported being overweight or obese, higher than the national prevalence of 61%,<sup>34</sup> it was only obesity (BMI ≥30) that adversely influenced multivariable models on five QoL indicators—general health, physical health, days physical and mental health kept from usual activities, activity limitation, and days in pain—self-reported impacts of obesity now reported to be responsible for 10% of all medical spending.<sup>35</sup> Although exercise is widely recognized as a healthy behavior, and our findings were similar to the national prevalence for this item,<sup>36</sup> exercise did not appear in any multivariable model of QoL items. Overall, these observations are important as they show that these widely used QoL questions, while controlling for other risk modifiers, identify smoking and obesity as the two predominant modifiable risk factors in this statewide sample of the Iowa workforce.

The basis for PPACA Title IV, Prevention of Chronic Disease and Improving Public Health, is that primary prevention is paramount, but also that disease risk factors can be identified and through prevention and chronic disease management, be modified to extend health over time. Incentives are provided by PPACA for employers to implement workplace wellness programs, even as the evidence base for these programs is being developed and evaluated. Goetzel and colleagues<sup>37</sup> identified 10 modifiable health risk factors in their Health Enhancement Research Organization (HERO) study of employees of six large companies. Recently updated and extended, their HERO study confirmed the importance of modifiable

**TABLE 11.** Prevention Behaviors\*

			Self-Employed				Organizationally Employed			
			<i>N</i>	Mean	SD	<i>P</i>	<i>N</i>	Mean	SD	<i>P</i>
Do you currently have health insurance?										
Sickness absenteeism	Yes		200	3.0	12.8	0.7050	890	3.6	18.2	0.8269
	No		30	4.5	22.0		52	3.9	8.5	
Presenteeism†	Yes		197	83.2	12.6	0.9537	858	85.2	11.3	0.3298
	No		29	83.1	12.0		52	83.7	12.2	
Do you have a primary care doctor or doctor you usually see when you need medical help?										
Sickness absenteeism	Yes		191	3.6	15.6	0.0471	830	3.7	17.3	0.8557
	No		38	1.1	3.7		110	3.3	21.7	
Presenteeism	Yes		189	83.0	12.7	0.4577	801	85.5	11.3	0.0146
	No		36	84.7	12.1		107	82.6	11.4	
Do you now smoke cigarettes . . . ?										
Sickness absenteeism	Not at all		203	3.2	14.9	0.9282	807	3.3	17.0	0.1849
	Any smoking		28	3.0	8.4		135	5.9	22.1	
Presenteeism	Not at all		199	83.1	12.3	0.5479	778	84.8	11.3	0.0550
	Any smoking		28	84.6	14.5		132	86.9	11.2	
In the past 12 mos, have you had either the flu shot injection or the nasal mist?										
Sickness absenteeism	Yes		86	4.3	17.0	0.3946	521	3.1	14.6	0.2950
	No/DK/refused		145	2.5	12.4		421	4.4	21.2	
Presenteeism	Yes		84	83.1	12.9	0.8483	502	85.4	10.9	0.4873
	No/DK/refused		143	83.4	12.4		408	84.9	11.9	
During the past 30 d, have you had at least one drink of any alcoholic beverage?										
Sickness absenteeism	No/DK/refused		83	4.0	17.2	0.5619	301	3.4	16.1	0.7233
	Yes		148	2.7	12.4		641	3.8	18.6	
Presenteeism	No/DK/refused		82	82.9	11.9	0.7344	292	85.4	11.7	0.6692
	Yes		145	83.5	12.9		618	85.0	11.2	
How often do you exercise continuously for at least 20 min . . . ?										
Sickness absenteeism	5 times/wk		47	3.1	10.8	0.9772	210	1.9	7.9	0.0120
	LT 1 time/wk		181	3.2	15.2		722	4.2	19.9	
Presenteeism	5 times/wk		55	86.2	10.5	0.2399	208	87.2	10.3	0.0042
	LT 1 time/wk		41	83.7	10.2		203	83.9	12.3	
How often do you use seat belts when you drive or ride in a car?										
Sickness absenteeism	Always		159	3.2	15.1	0.9770	797	3.2	15.4	0.3657
	All other responses		72	3.1	12.3		145	5.9	27.6	
Presenteeism	Always		156	84.5	12.3	0.0350	772	85.5	11.1	0.0418
	All other responses		71	80.7	12.8		138	83.3	12.3	
Body mass index less than 30										
Sickness absenteeism	Yes		153	1.5	7.1	0.2353	615	2.5	14.3	0.0371
	No		75	3.5	12.5		300	5.5	22.6	
Presenteeism	Yes		150	83.9	11.8	0.237	595	85.6	10.4	0.075
	No		74	81.8	13.8		288	84.0	13.0	
Eat healthy (fruits, vegetables, and whole grains)										
Sickness absenteeism	Once or twice a day		89	3.7	16.7	0.6817	292	2.9	15.1	0.3316
	Less often		141	2.8	12.6		649	4.0	19.0	
Presenteeism	Once or twice a day		86	84.0	14.1	0.5533	279	87.5	10.6	<0.0001
	Less often		140	82.9	11.6		631	84.1	11.5	
How many hours of sleep do you get in a typical workday night?										
Sickness absenteeism	≥8 hrs		76	3.7	13.9	0.6872	227	2.3	8.8	0.0649
	<8 hrs		152	2.9	14.7		714	4.1	19.9	
Presenteeism	≥8 hrs		74	83.4	13.5	0.9502	222	86.5	10.6	0.0397
	<8 hrs		150	83.3	12.1		687	84.7	11.5	

\*Sickness absenteeism and absolute presenteeism by employment status and prevention behaviors.

†Higher presenteeism scores = lower presenteeism.

DK, don't know; LT, less than; SD, standard deviation.

**TABLE 12.** Sickness Absenteeism and Absolute Presenteeism by Prevention Behavior and Quality-of-Life Health Rank\*

	Absenteeism			Presenteeism†		
	N	Mean	P	N	Mean	P
QoL healthy days rank			<0.0001			<0.0001
5 positives	421	0.8	†	405	86.5	†
4 positives	326	1.4	†	318	85.2	†
1–3 positives	426	7.9		414	82.8	
QoL health symptoms rank			<0.0001			0.0014
5 positives	67	3.3	†	57	88.9	†
4 positives	142	0.9	†	136	88.1	†,‡
1–3 positives	846	3.2	†	828	84.1	‡,§
0 positive	118	9.6		116	83.9	§
Prevention behavior rank			0.2792			0.0006
7–10 positives	267	2.2	†	258	97.2	
4–6 positives	797	3.8	†	771	84.1	†
0–3 positives	109	5.1	†	108	83.5	†
All health rank categories			<0.0001			<0.0001
≥15	163	0.3	†	153	90.1	
13–14	265	0.8	†	257	85.3	†
10–12	445	2.4	†	434	85.2	†
8–9	163	3.4	†	160	82.6	
≤7	137	16.5		133	78.9	

\*Means with the same symbol (†, ‡, or §) do not differ at the 0.05 level within the rank comparisons.

†Higher presenteeism scores = lower presenteeism.

QoL, quality-of-life.

risk factors and linked them to health care spending, but not worker productivity, in decreasing order—depression, high blood glucose, high blood pressure, obesity, tobacco use, physical inactivity, and high stress—responsible for over 22% of health care costs among seven large employers.<sup>38</sup> Although prevention-based savings in health care costs are critically important, they do not capture the much larger losses in productivity from sickness absenteeism and presenteeism, estimated to exceed \$150 billion annually, three times what employers pay for pharmacy and medical claims.<sup>39–41</sup>

Despite concerns about varying definitions and methodologic approaches,<sup>18,42</sup> population-based studies on the basis of sickness absenteeism and presenteeism have continued in the last decade. Their focus has been on large employer databases<sup>43,44</sup> and the impact of medical conditions, especially depression and mental distress.<sup>45–47</sup> None have assessed workplace productivity measures among small employers. The roles of health insurance and primary care are not adequately addressed in these studies, yet are widely recognized as essential to the quality of overall health care for any population.<sup>48</sup>

A strength of the current study, especially relevant for small employers, is the use of the CDC QoL questionnaire, items from which provided consistent associations with lower sickness absenteeism and lower presenteeism (higher presenteeism scores). Prevention behavior items, almost all from the CDC BRFSS questionnaire, provided similar but less consistent associations, especially among the self-employed, with lower absenteeism and lower presenteeism. But, used together as “health ranks” in this statewide survey, these survey items provide consistent and significant trend results. Measures of better QoL and better prevention behavior, with the exception of having a primary care doctor, are associated with lower sickness absenteeism and lower presenteeism. These findings

are consistent with modifiable health risks and productivity measure associations among large employers.<sup>49,50</sup> This study identifies three readily available survey instruments with questionnaire items available to any small employer, the vast majority of whom cannot afford a medical surveillance program to capture biometric risk factor data, or even use of a health risk assessment, most commonly provided by a third party.

## LIMITATIONS

Like all surveys, this study has a number of limitations. In undertaking the Real Iowan Research Initiative, it was recognized that a survey on the basis of a statewide registry of current voters would undersample immigrant and poorer Iowans who are less often registered to vote. To address this limitation, we undertook eight focus groups seeking the views of underrepresented Iowans (see [www.hwce.org](http://www.hwce.org)). Because we were interested in the role of rurality in these results, the survey was designed to provide random samples of equal size for three categories of rural counties ranked by population density. This effectively oversampled rural Iowans, where higher proportions of small employers are found. But this understudied segment of the workforce is especially relevant to rural states like Iowa and is therefore a research priority for the Healthier Workforce Center for Excellence. The response rate of 47.2% is a limitation because of nonresponse bias. The survey was conducted in the summer when the survey staff was available, and also at a time of a good deal of Iowa Caucus candidate phone calling, targeting especially more conservative rural counties. Finally, a higher proportion of women responded to this survey. Although all of these factors are limitations, the survey also had a number of unique strengths including statewide estimates of workforce QoL, prevention behavior, work productivity-related sickness absenteeism and presenteeism for three employment segments, good small employer representation, a

relatively large sample size, and a very acceptable statewide margin of error.

## CONCLUSIONS

This study successfully addressed its three primary aims: (1) Self-employed workers reported better QoL scores and prevention behaviors than those employed by organizations, largely because of better prevention behaviors. The self-identified unemployed exhibited much poorer QoL scores, in part, because of poorer prevention behaviors. Smoking and obesity were the two predominant modifiable risk factors in this statewide sample of the Iowa workforce. (2) QoL questionnaire items especially and BRFSS prevention items were both associated with measures of sickness absenteeism and presenteeism among both the self-employed and organizationally employed. (3) When combined in “health ranks,” significant trends are observed between higher “health rank” and lower sickness absenteeism and lower presenteeism (higher scores). These survey results support the use of QoL and prevention behavior measures as useful tools to evaluate workforce productivity measures among employers of all sizes.

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