

# Prevalence of Chronic Disease Risk Factors among Vineyard and Winery Workers in Oregon.

Daniel Lopez Cevallos, PhD<sup>1</sup> Jeffrey Bethel, PhD<sup>1</sup> Gabriela Escutia, MPH<sup>1</sup> Leda Garside<sup>2</sup> RN, Yuritzy Gonzales, MPH

1. Oregon State University 2. Tuality Healthcare ¡Salud! Services



## INTRODUCTION

- Agricultural work is one of the most dangerous jobs in the United States due to its unique occupational health concerns.
- 85% of hired agricultural workers are foreign-born and 90% are Hispanics; mostly from Mexican origin.
- 5% of migrant farm workers are covered by employer-provided health insurance.<sup>1</sup>
- Data from Hispanic Health and Nutrition Examination Survey (NHANES) indicates that compared with non-Hispanic whites, Hispanics have higher rates of some chronic diseases, particularly, Type 2 diabetes (3.8% of Hispanics of Mexican origin, 20-44 year-olds versus 1.6% for 20-44 year-olds non-Hispanic whites). Yet, chronic disease research among Latino agricultural workers is limited. It is unclear if Hispanic Agricultural workers face similar trends in chronic diseases as those observed in the US Hispanic population.

### Study Purpose:

- To examine changes in chronic disease indicators: elevated blood sugar levels ( $\geq 140$  mg/dL), obesity (BMI  $\geq 30$ ), Hypertension ( $\geq 139$  mg/dL) and elevated cholesterol levels ( $\geq 200$  mg/dL) among Vineyard and Winery Workers in the North Willamette Valley, Oregon from 2004 to 2012.
- To study the association of health insurance status, and length of residency in the US, to chronic disease indicators.

### Tuality Healthcare ¡Salud! Program:

- Provides health education and mobile wellness screenings each summer at vineyards in the north Willamette valley in Oregon. ¡Salud! was created by a group of Oregon winery/vineyard owners and Tuality Health are physicians to address basic health needs faced by seasonal farmworkers.
- Run by Tuality Healthcare, a community-based health care hospital.

## METHODS

- Data sources:** Secondary cross-sectional survey and clinical data collected by Salud program during wellness clinics from 2004 to 2012.

- Participants:** 18 to 74 year-olds vineyard and winery workers of North Willamette Valley in Oregon. Participants with missing values for chronic disease indicators were excluded from the analysis (n= 2558).

- Chronic disease indicators definition:** Obesity (BMI  $\geq 30$ ); elevated cholesterol levels ( $\geq 200$  mg/dL); elevated glucose levels ( $\geq 140$  mg/dL); and hypertension ( $\geq 139$  mm/Hg).

- Univariate analysis was performed to explore demographic characteristics.

- Estimates of annual prevalence were obtained dividing the total number of prevalent cases for each chronic disease indicator by the total number of participants in the given year. Plotting the actual count numbers of people with elevated chronic disease indicators by year allowed for assessment of indicators trends.

- Multivariate logistic regression models were constructed to test whether there was an independent association between the dichotomous outcome variables (obese=1, non-obese=0), (elevated blood pressure=1, non elevated blood pressure=0), (high cholesterol=1, non-high cholesterol=0), (elevated blood glucose=1, non-elevated blood glucose=0) and predictor variables: health insurance status, and number of years living in the US. Covariates adjusted for included gender, age, marital status, and language.

## RESULTS

Figure 1. Prevalence trends in Vineyard and Winery Workers in the North Willamette Valley, 2004-2012

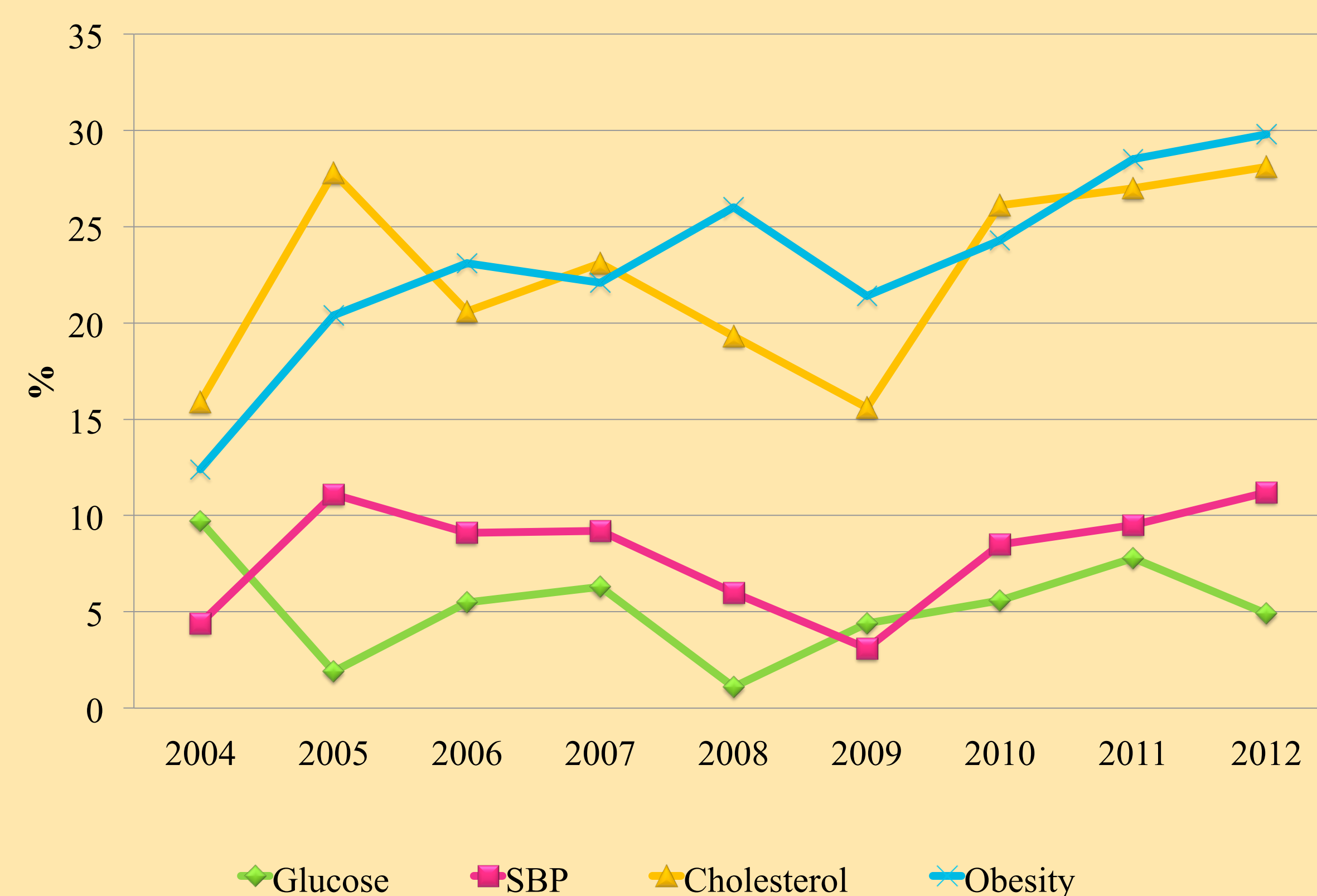


Table 1. Demographic characteristics of Vineyard and Winery Workers in the North Willamette Valley, Oregon 2004-2012 (N= 2558)

Characteristic	
Age, years	
Mean (SD)	34.19 (11.10)
Range	18-74
Gender, n %	
Male	2,067 (80.81)
Female	491(19.19)
Language, n%	
Spanish	2,467 (96.44)
Other	91 (3.56)
Years in the USA, n %	
< 1 year	1,357 (53.05)
1 – 5 years	246 (9.62)
6 – 9 years	283 (11.06)
> 10 years	640 (25.02)
US-born	
	32 (1.25)
Marital Status, n %	
Married	1,490 (58.25)
Single	1,056(41.28)
Other	12 (0.47)
Health Insurance	
Yes	214 (8.37)
No	2,344 (91.63)

Table 2. Multivariate-adjusted Odds ratio of annual prevalence of elevated- Glucose, Systolic Blood Pressure, cholesterol and obesity in Vineyard and Winery Workers in Oregon

Variable	Logistic Regression Model elevated glucose ( $\geq 140$ mg/dl)**	Logistic Regression Model- Hypertension- Systolic ( $\geq 139$ mg/dL)	Logistic Regression Model-Elevated cholesterol ( $\geq 200$ mg/dL)	Logistic Regression Model- Obesity (BMI $\geq 30$ )
	Multivariate OR (95% CI)	Multivariate OR (95% CI)	Multivariate OR (95% CI)	Multivariate OR (95% CI)
<b>Sex</b>				
Male	Reference	Reference	Reference	Reference
Female	1.16 (.75-1.80)	.67 (.44-1.0)	.51 (.39-.67)*	1.95 (1.57-2.44)*
<b>Age</b>				
18-44 years old	Reference	Reference	Reference	Reference
45-64 years old	3.72 (2.53-5.46)*	3.88 (2.85-5.27)*	2.22 (1.76-2.79)*	1.62 (1.29-2.04)*
64-75 years old	6.83 (2.68-17.44)*	5.77 (2.56-12.96)*	1.01 (.44-2.3)	.83 (.35-1.97)
<b>Marital status</b>				
Single	Reference	Reference	Reference	Reference
Married	1.33 (.90-1.98)	1.44 (1.04-1.98)*	1.38 (1.12-1.69)*	1.82 (1.49-2.23)*
Other	5.70 (1.16-27.86)*	1.60 (.19-13.35)	2.2 (.62-7.84)	1.06 (.28-4.08)
<b>Health insurance</b>				
Any health Insurance	Reference	Reference	Reference	Reference
No insurance	1.18 (.59 - 2.37)	1.11 (.66 -1.86)	.69 (.49 - .96)	.86 (.62 - 1.2)
<b>Years living in US</b>				
US-born	Reference	Reference	Reference	Reference
0 to 5 years	.76 (.16 - 3.48)	1.12 (.25 - 5.01)	1.06 (.43 - 2.63)	1.49 (.53 - 4.22)
6 to 9 years	1.04 (.22 - 4.97)	1.16 (.25 - 5.46)	1.14 (.81 - 1.56)	1.63 (.56 - 4.72)
> 10 years	.62 (.14 - 2.84)	1.65 (.37 - 7.36)	1.45 (.58 - 3.59)	2.62 (.93 - 7.38)

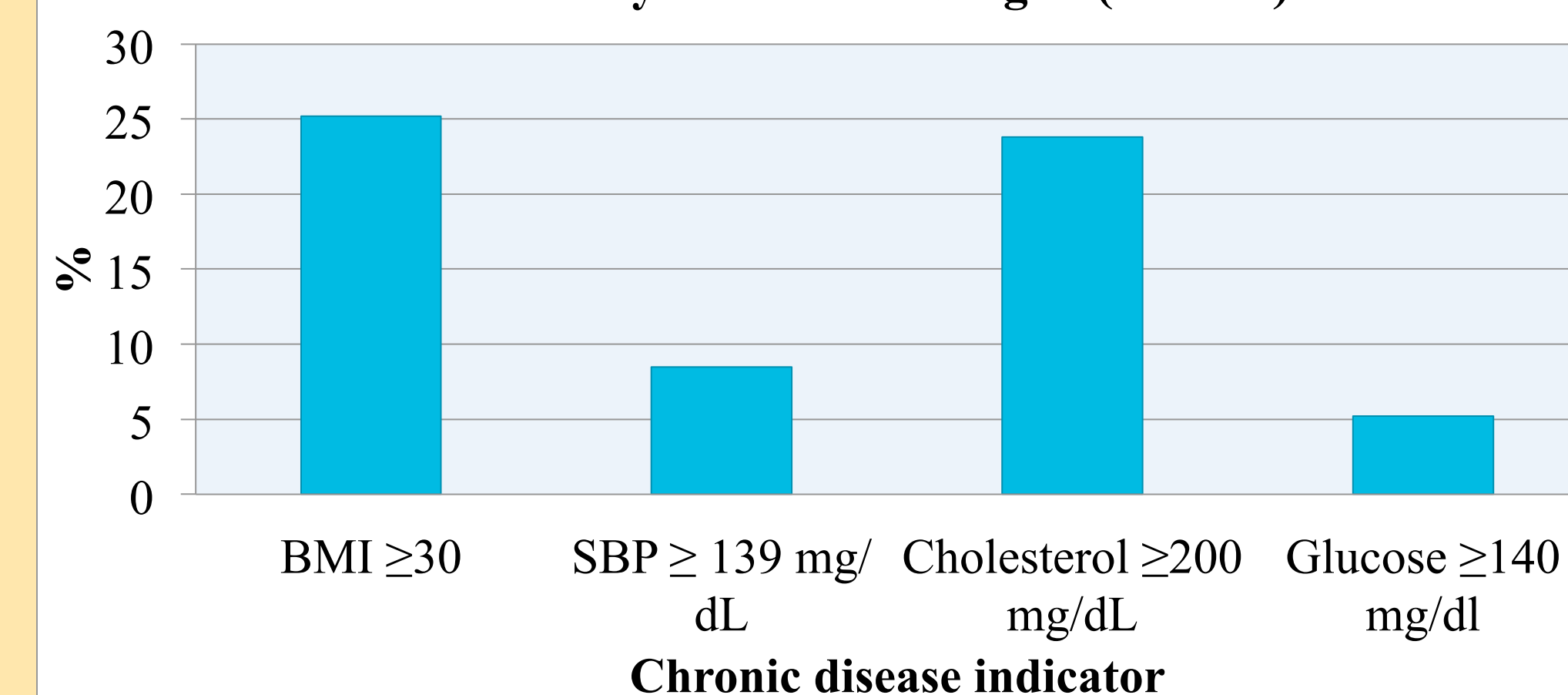
\*\*= P<. 05; Non-significant Hosmer-Lemeshow test was obtained for all models (p-values <0.05)

\*\*Note: Language not included due to lack of variability

## RESULTS CONT...

- Overall, obesity and elevated cholesterol levels represented higher frequencies among vineyard and winery workers.
- 25% had elevated cholesterol levels ( $\geq 200$  mg/dL) while 23.8% of our sample were obese.

Frequencies of chronic disease indicators among Vineyard and winery workers in Oregon (n=2558)



## KEY FINDINGS

- The mean age of the study population was 34.19 years-old.
- 8.4% of our sample had health insurance, slightly higher frequency than the one reported by National Agricultural Survey in 2002.
- Figure 1 elevated glucose prevalence dropped almost double from 2004 to 2012; while elevated systolic blood pressure prevalence remained high during 9 years. A significant increase in SBP prevalence can be observed in 2005 slightly dropping in 2006. Compared to other indicators, obesity has continued to grow from 2004 to 2012. On the other hand, elevated cholesterol fluctuated from 2004 to 2009 increasing significantly in 2010 and staying constant during the last two years.

### Multivariate logistic regression analysis:

- Married individuals were statistically more likely to present elevated cholesterol levels.
- Females were statistically more likely to be obese.
- Age was significantly associated with most chronic disease indicators.

## CONCLUSION

- Analyses of 2004 – 2012 Tuality Healthcare ¡Salud! summer wellness clinics data reveals that prevalence of chronic disease indicators in this group have been increasing, particularly obesity and cholesterol.
- Our findings reflect the high frequencies of obesity found nationally in low-income minority populations,<sup>2</sup> and congruent with previous research done in similar populations, which found high prevalence of obesity among farm workers.<sup>3</sup> Indeed, previous studies have recognized that obesity, high blood pressure, and hypercholesterolemia are a major threat in approximately half of all farm workers.<sup>4,5,6</sup>
- Future research should focus on longitudinally examining changes on chronic health indicators means among those who attend screening clinics yearly.

## REFERENCES

- Carroll D, Samardick R, Bernard S, Gabbard S, Hernandez T, US Department of Labor. Findings from the National Agricultural Workers Survey (NAWS) 2001-2002. A Demographic and Employment Profile of United States Farm Workers. 2005; [http://www.doleta.gov/agworker/report9/naws\\_rpt9.pdf](http://www.doleta.gov/agworker/report9/naws_rpt9.pdf). Accessed April 28th, 2015.
- Larson NI, Story MT, Nelson MC. Neighborhood environments: disparities in access to healthy foods in the U.S. *Am J Prev Med.* 2009;36(1):74-81. doi:10.1016/j.amepre.2008.09.025.
- Villarejo D, McCurdy SA, Bade B, Samuels S, Lighthall D, Williams D. The health of California's immigrant hired farmworkers. *Am J Ind Med.* 2010;53(4):387-397. doi:10.1002/ajim.20796.
- Villarejo-D, Lighthall D, Williams III-D, et al. *Suffering in Silence: A Report on the Health of California's Agricultural Workers.* Davis, CA: California Institute for Rural Studies; 2000:1-37.
- Emmi KE, Jurkowski JM, Codru N, Bell EM, Kaica MA, Carter TP. Assessing the health of migrant and seasonal farmworkers in New York State: statewide data 2003-2005. *J Health Care Poor Underserved.* 2010;21(2):448-463. doi:10.1353/hpu.0.0279.
- Seppan CM, Bailey ST, Bhat S, et al. The hormone resistin links obesity to diabetes. *Nature.* 2001;409(6818):307-312. doi:10.1038/35053000.