

# **Current status on other health effects:**

## **Changes in Cardiovascular Risk Factors after the Great East Japan Earthquake**

**Tetsuya Ohira, MD, PhD.**

**Department of Epidemiology, Fukushima Medical University**

**School of Medicine, Fukushima, Japan**



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# Today's topics

- **Changes in cardiovascular disease (CVD) risk factors before and after the disaster**
- **Comparison of psychological stress between an evacuation area and non-evacuation areas in other prefectures**
- **Changes in CVD risk factors between 2011-2012 and 2013-2014**

# Background

- **Since the day of the disaster, more than 160,000 residents in the Fukushima prefecture were forced to evacuate their homes owing to a nuclear accident**
- **Many evacuees were forced to change particular aspects of their lifestyles, such as their diet, physical exercise, and other personal habits**

# Purpose

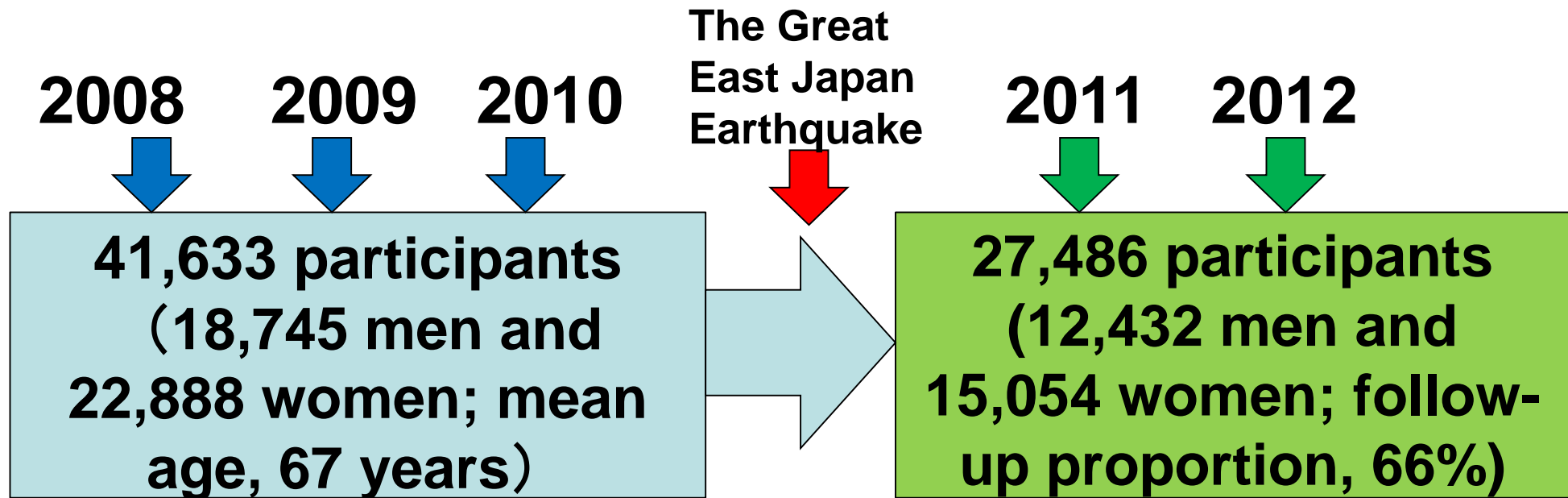
- **To examine the association between the evacuation and changes in cardiovascular disease (CVD) risk factors before and after the disaster**
- **To examine the association between the evacuation and incidence of CVD risk factors among residents in the evacuation area**

# Methods

- **A longitudinal study examined data collected from 41,633 Japanese participants aged 40-90 years sourced from general health checkups conducted in 13 communities in Fukushima between 2008 and 2010.**
- **Follow-up examinations were conducted from June 2011 through March 2013.**

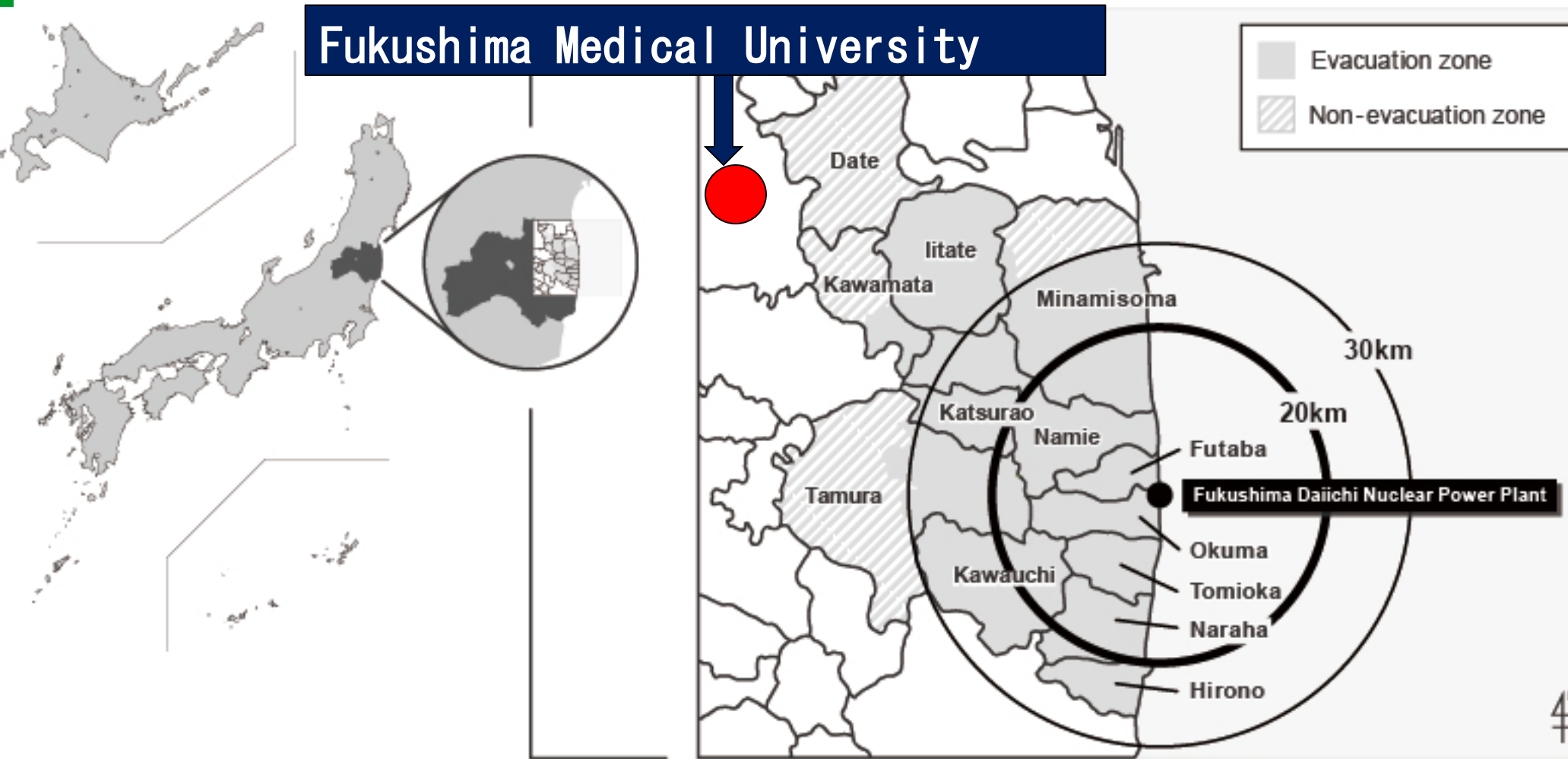
# Methods

## General health checkups

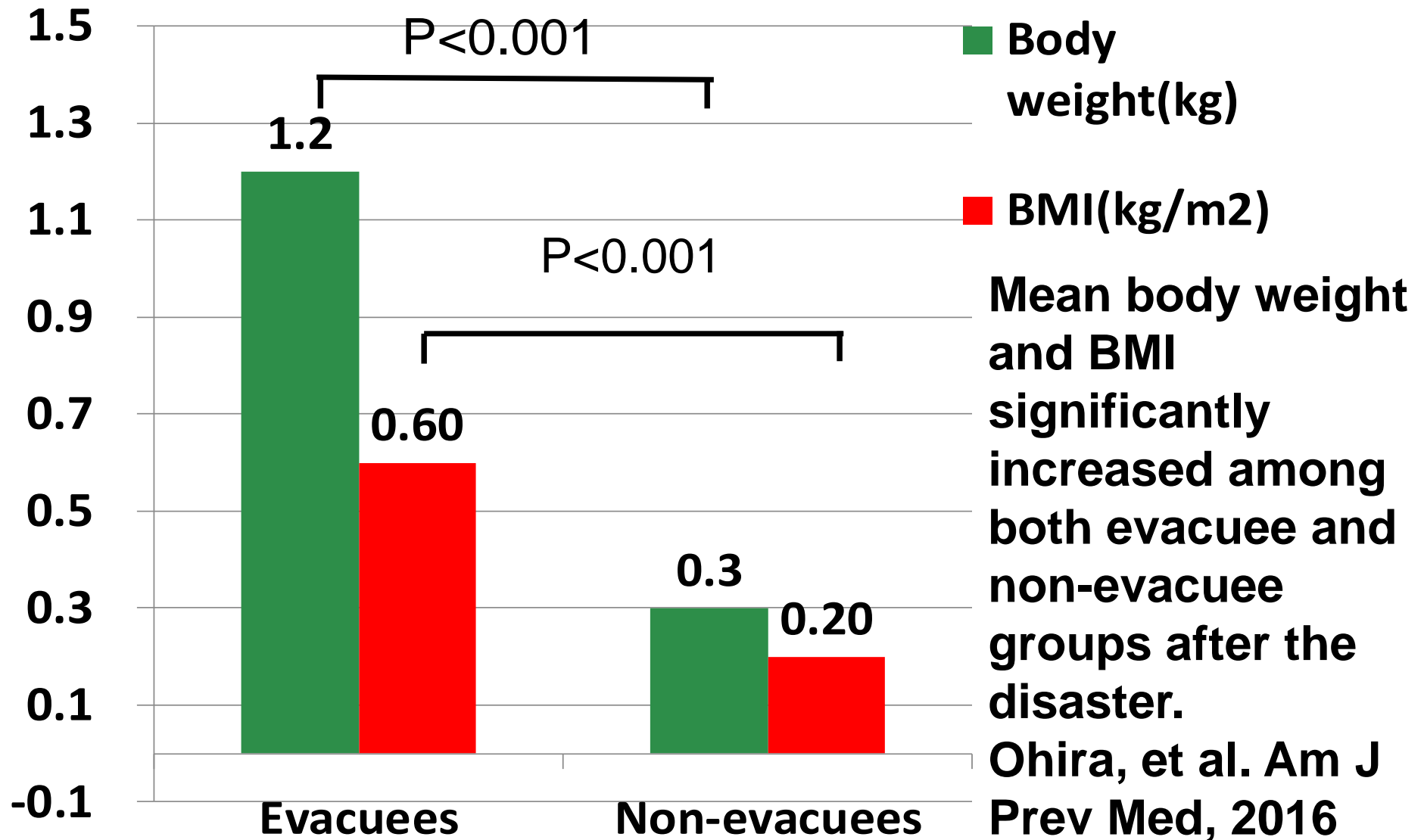


The nearest data from the Earthquake were used for analysis if the participants received the checkups more than two times, and an average follow-up duration was 1.6 years.

The participants were divided into two groups: evacuees ( $n=9,671$ ) and non-evacuees ( $n=17,815$ )

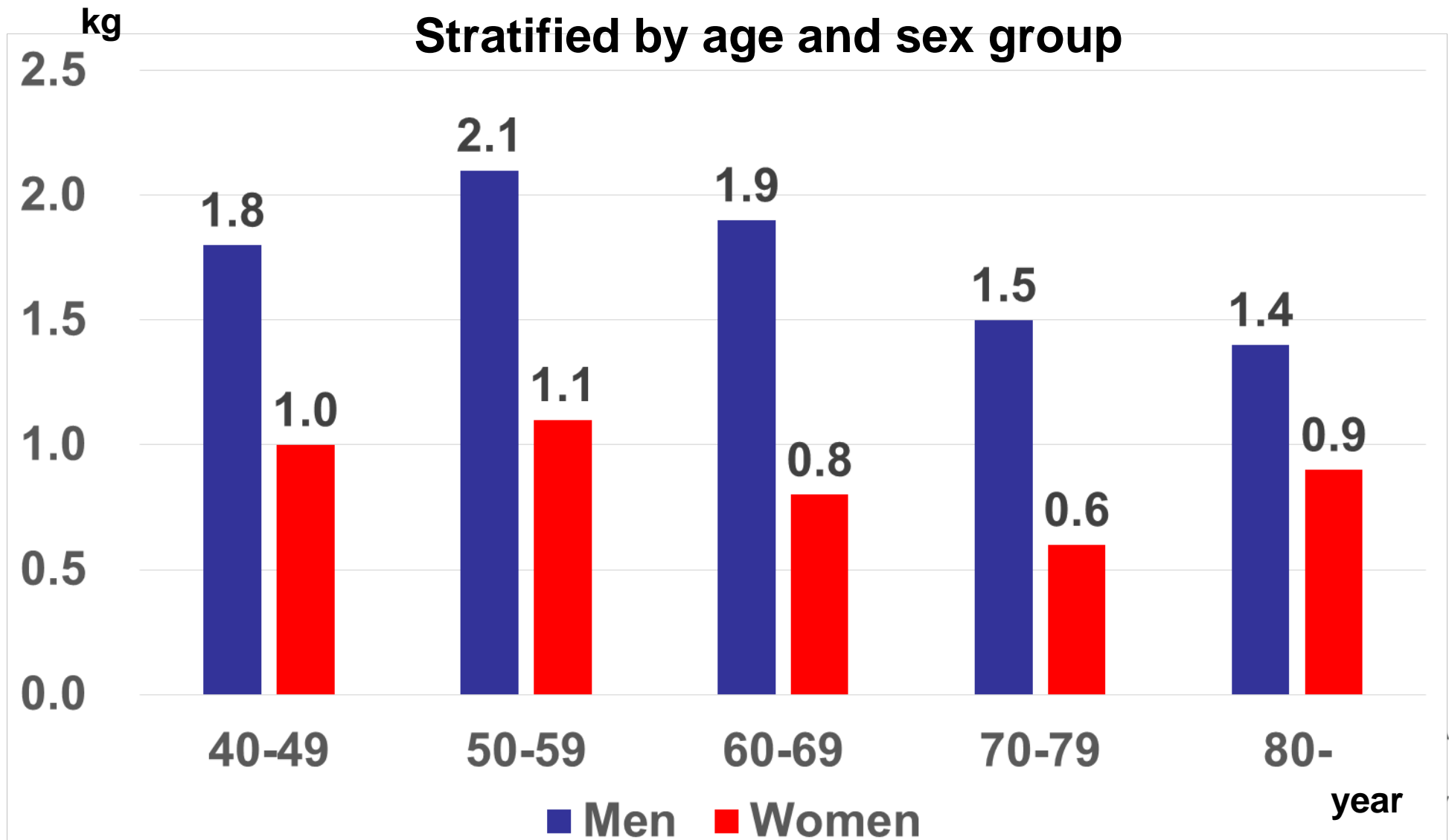


# Changes in Body Weight

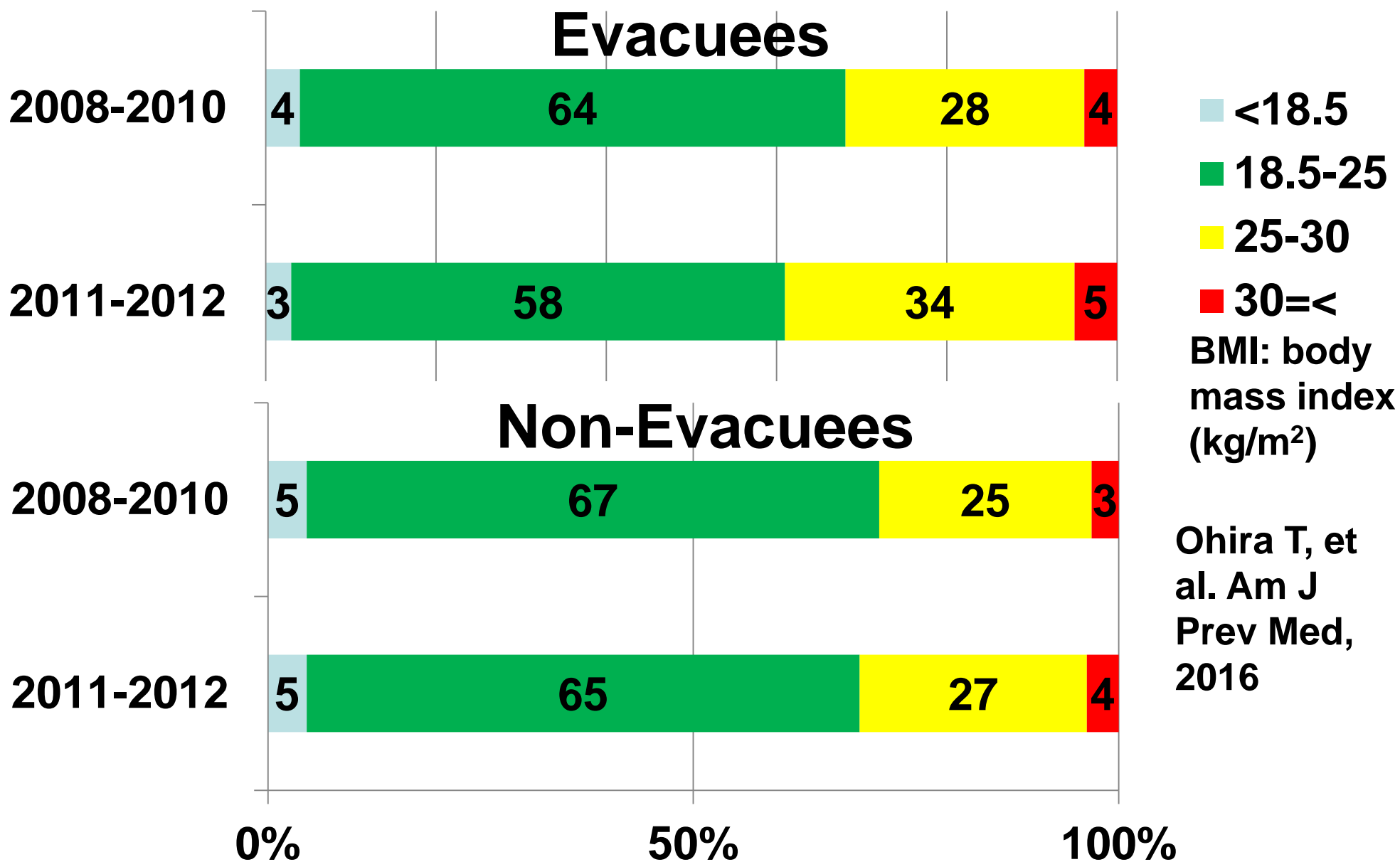




# Changes in Body Weight



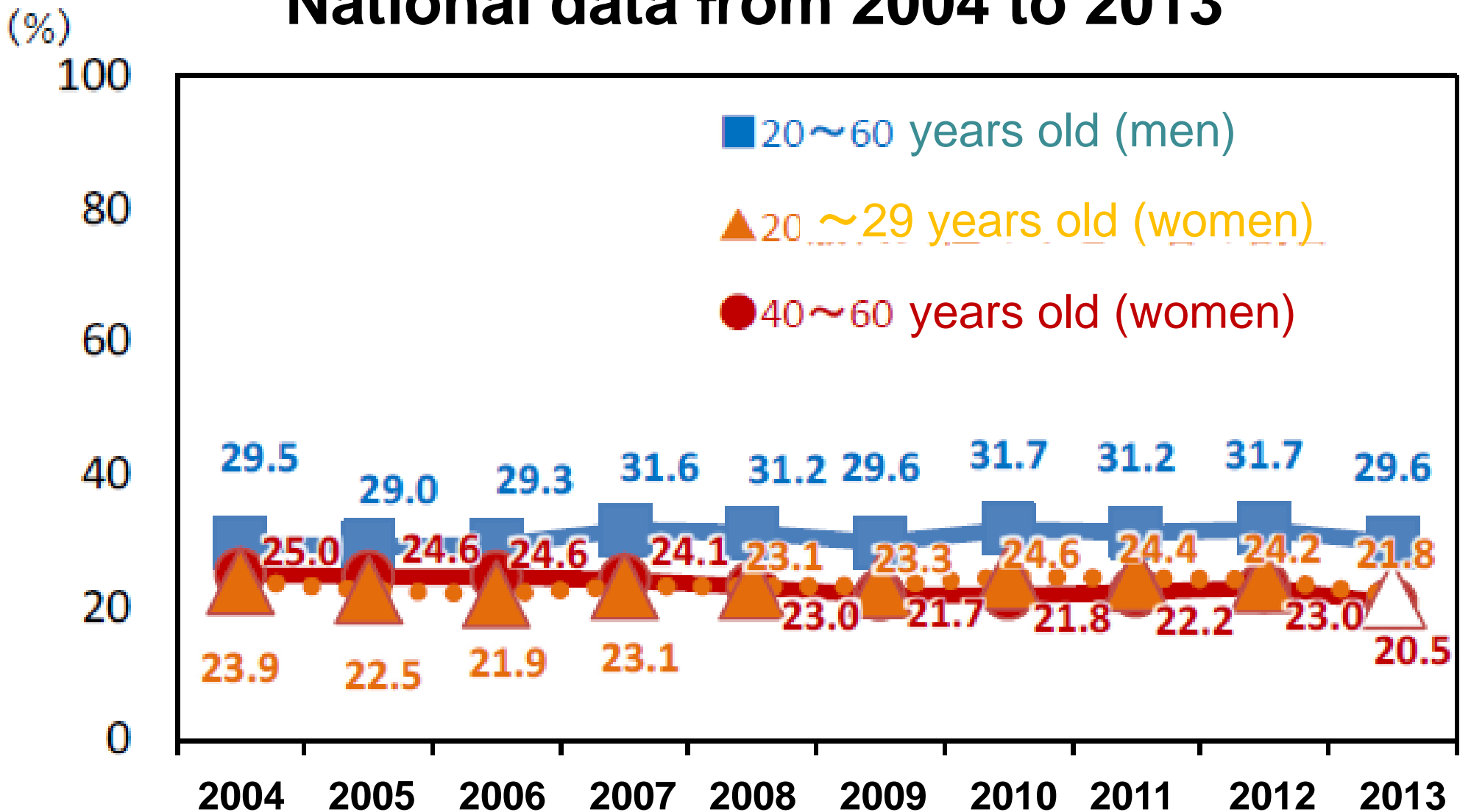
# Proportion of Overweight



Ohira T, et al. Am J Prev Med, 2016

# Changes in Proportion of Overweight

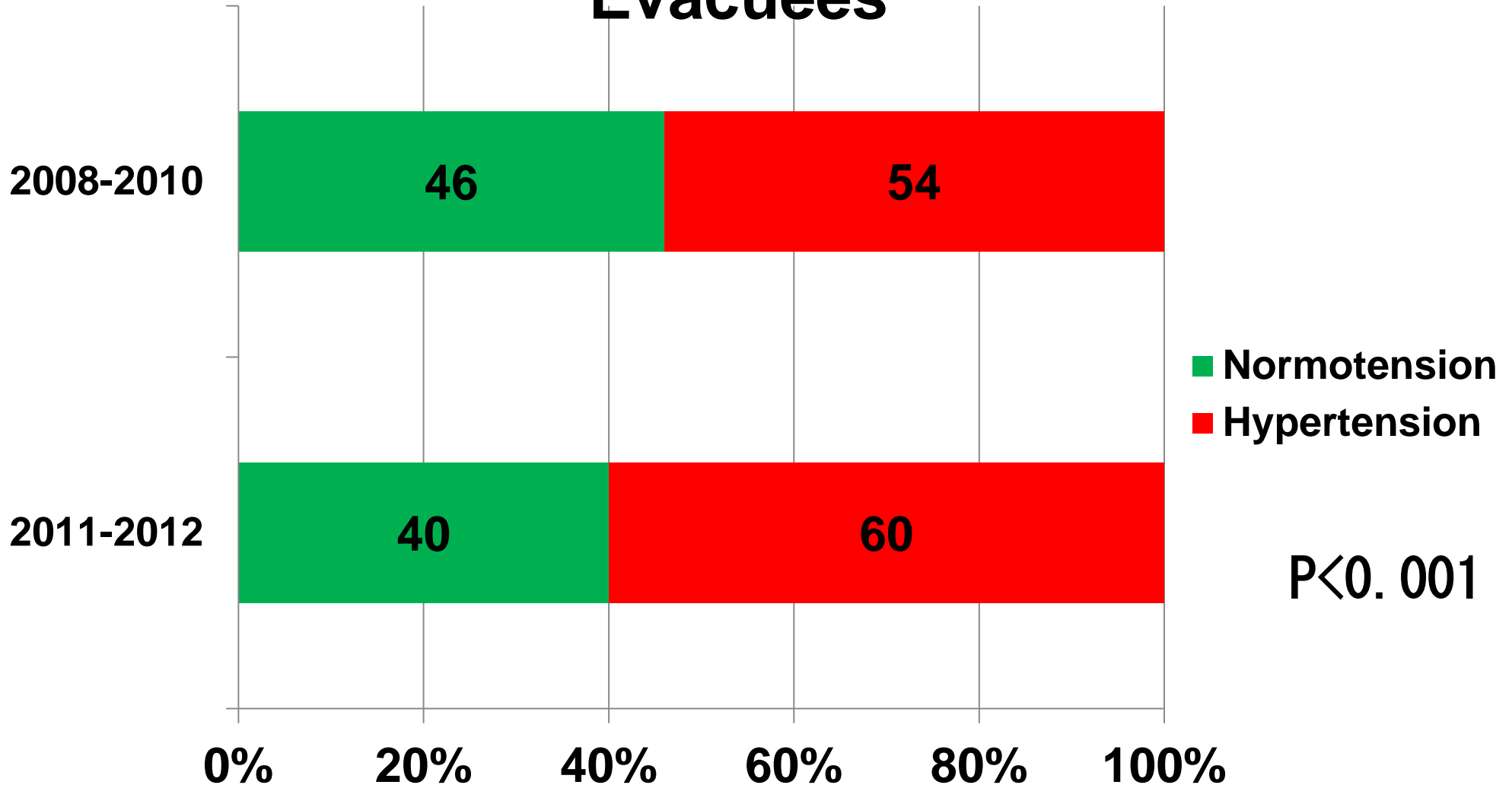
## National data from 2004 to 2013



National Survey for Health and Nutrition, 2013

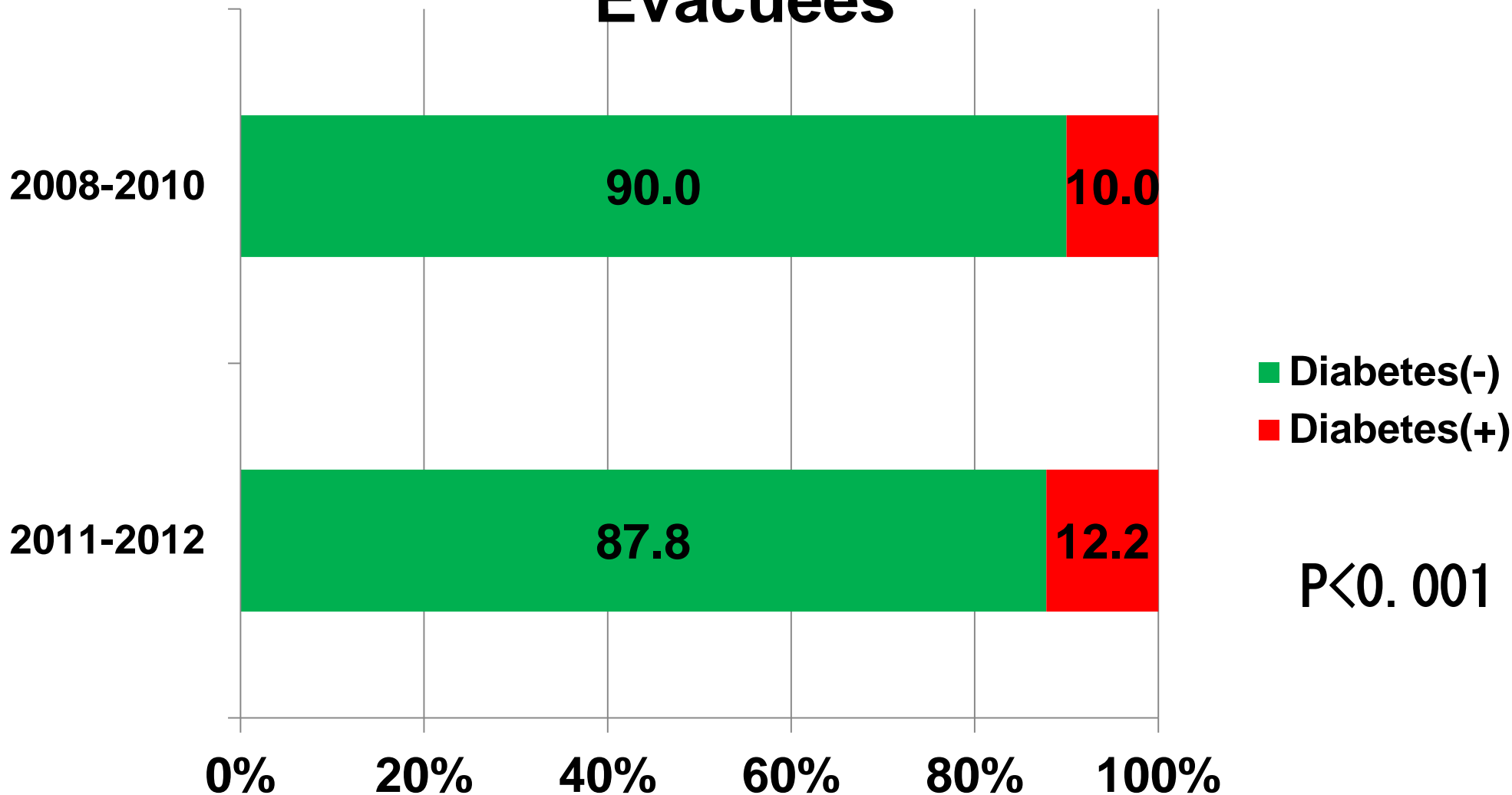
# Prevalence of Hypertension

## Evacuees



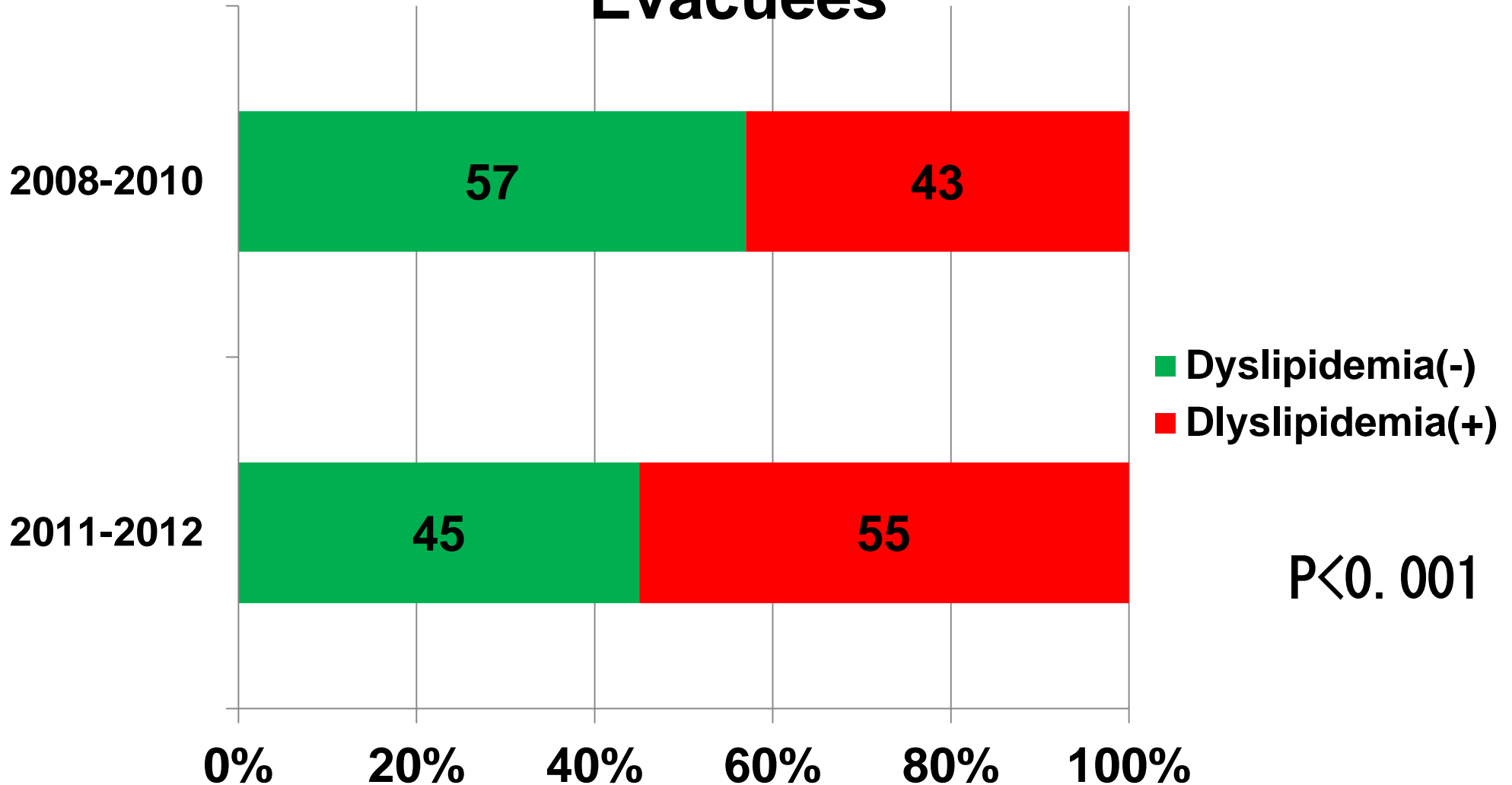
# Prevalence of Diabetes Mellitus

## Evacuees



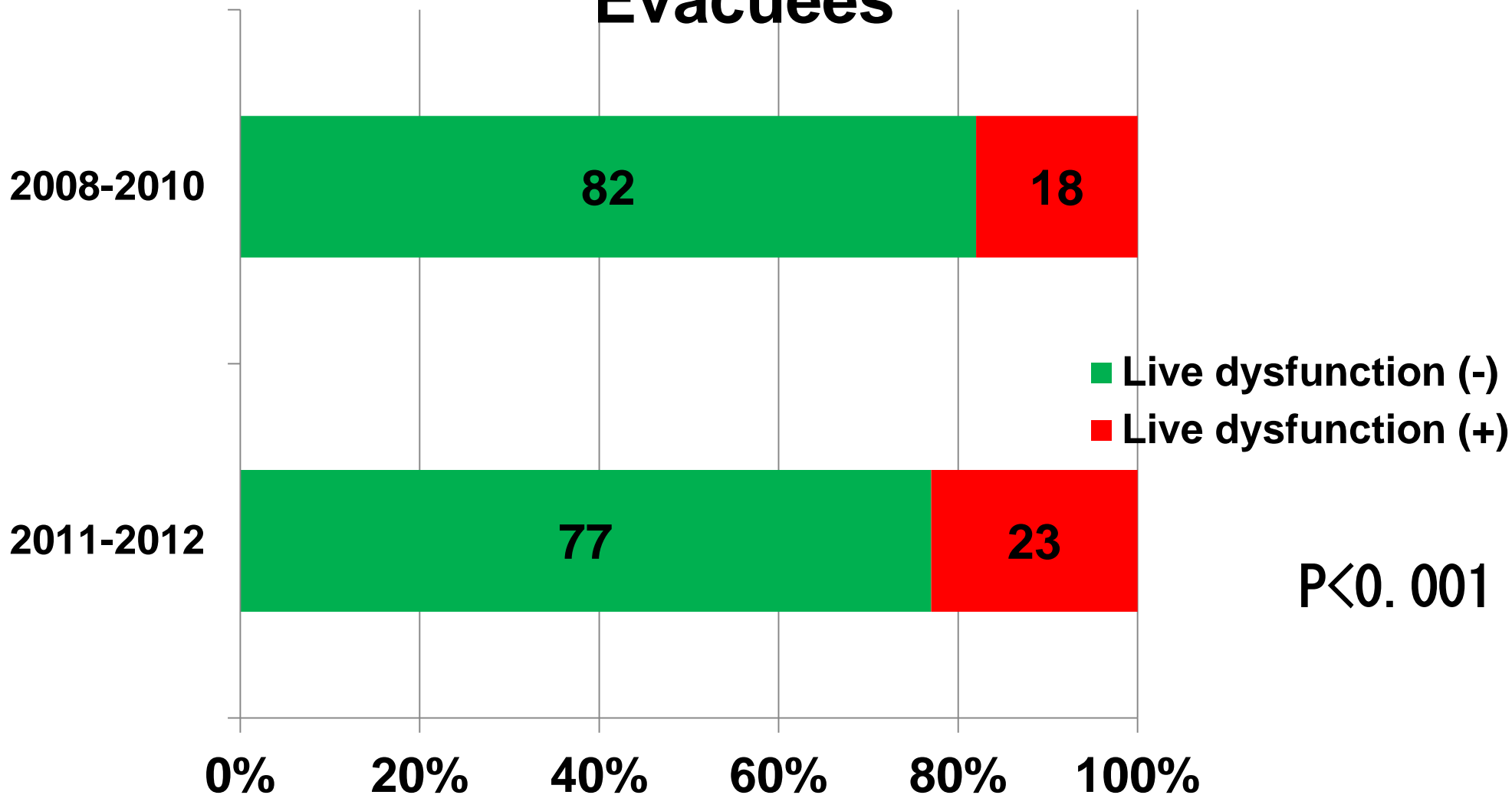
# Prevalence of Dyslipidemia

## Evacuees



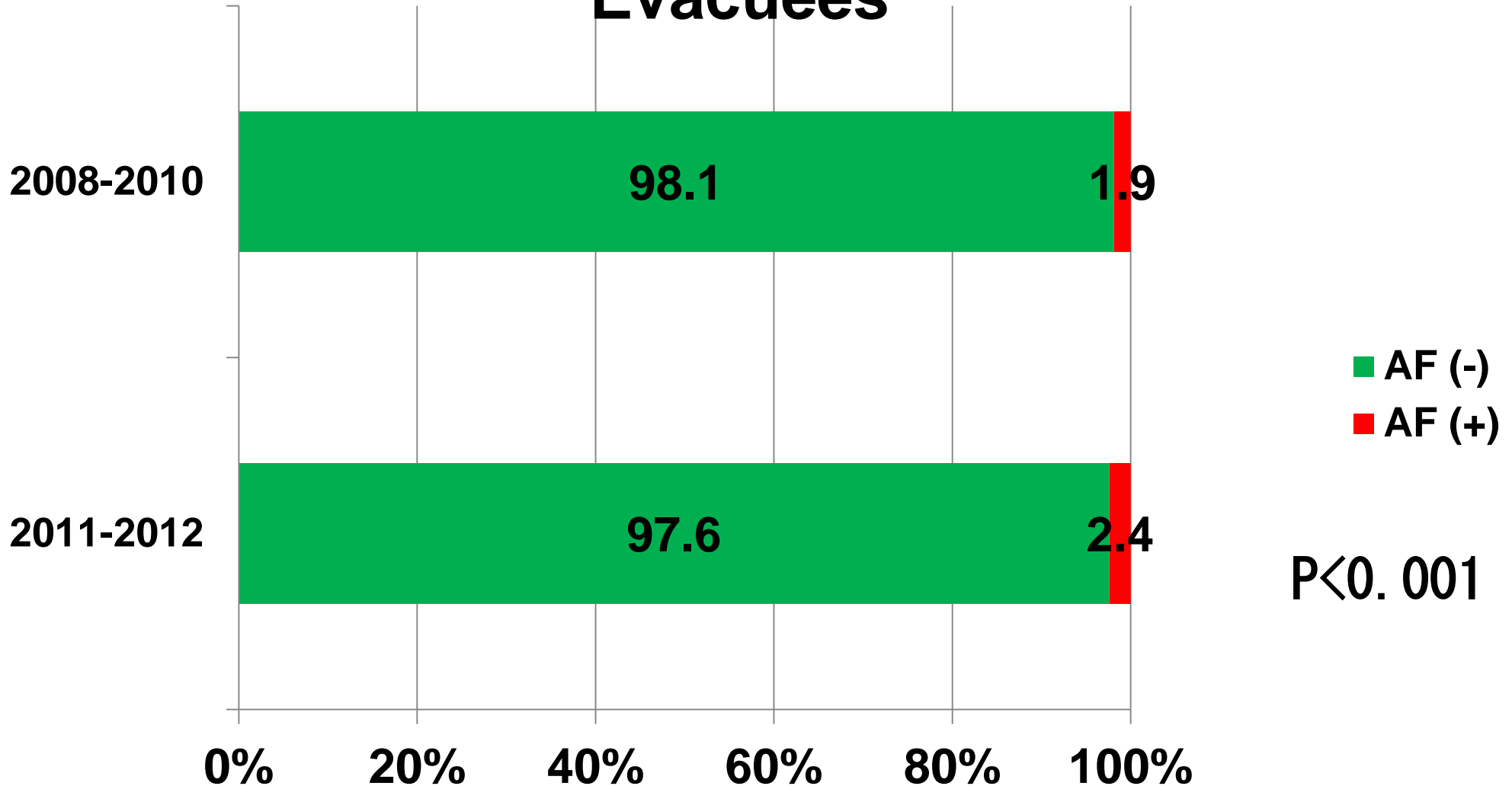
# Prevalence of Liver Dysfunction

## Evacuees



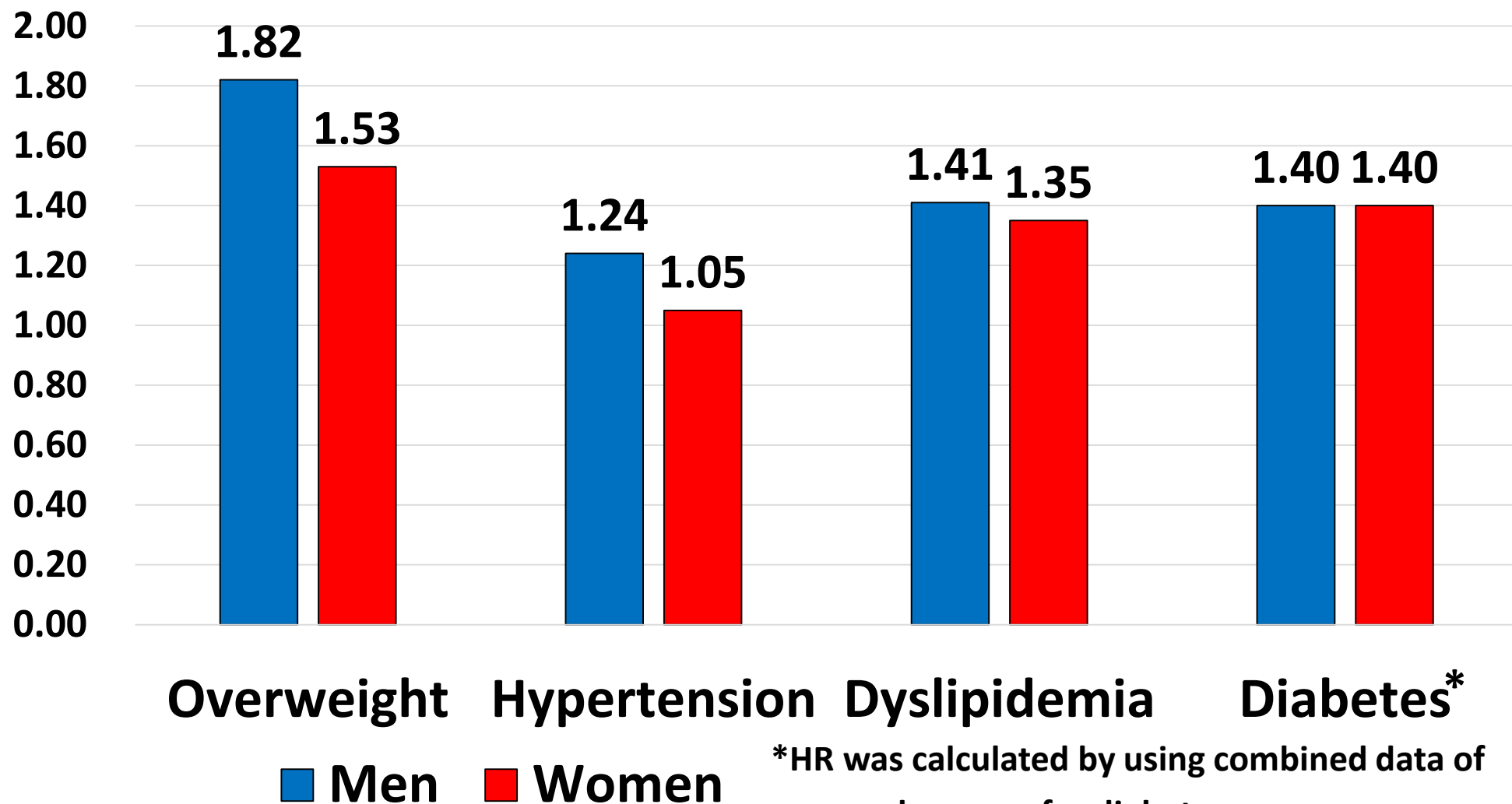
# Prevalence of Atrial Fibrillation

## Evacuees





# Multivariable-adjusted Hazard Ratios of Overweight, Hypertension, Dyslipidemia, and Diabetes Mellitus for Evacuation



# Mechanisms

- **The proportion of current drinkers unchanged and the proportion of current smokers decreased after the disaster**
- **More than half of evacuees did not exercise regularly**
- **The proportion of evacuees with sufficient sleep decreased after the disaster from 75.8% to 67.5% for men and from 69.9% to 57.4% for women**

# Today's topics

- Changes in cardiovascular disease (CVD) risk factors before and after the disaster
- **Comparison of psychological stress between an evacuation area and non-evacuation area in other prefectures**
- Changes in CVD risk factors between 2011-2012 and 2013-2014

# Methods

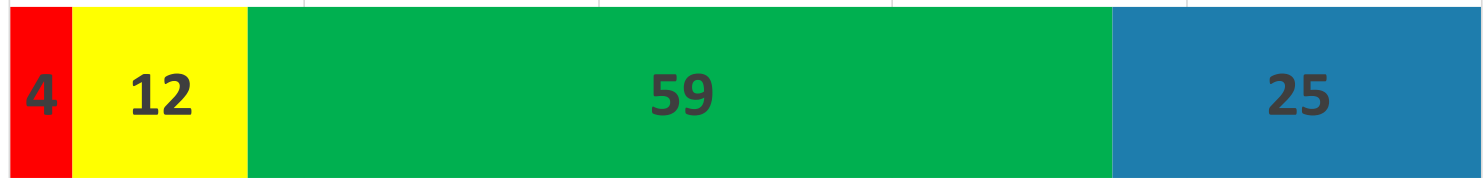
**Psychological factors, assessed by questionnaire, were compared between a town in the evacuation area (n=1,020, mean 62.1 years) and communities in Osaka and Akita (n=3,150, mean 62.8 years) in 2013**

# Perceived Stress

Evacuation  
area



Akita,  
Osaka



0% 20% 40% 60% 80% 100%

Always Often Sometimes Rarely

# Depressive Symptoms

Evacuation  
area

19

81

Akita,  
Osaka

5

95

0%

20%

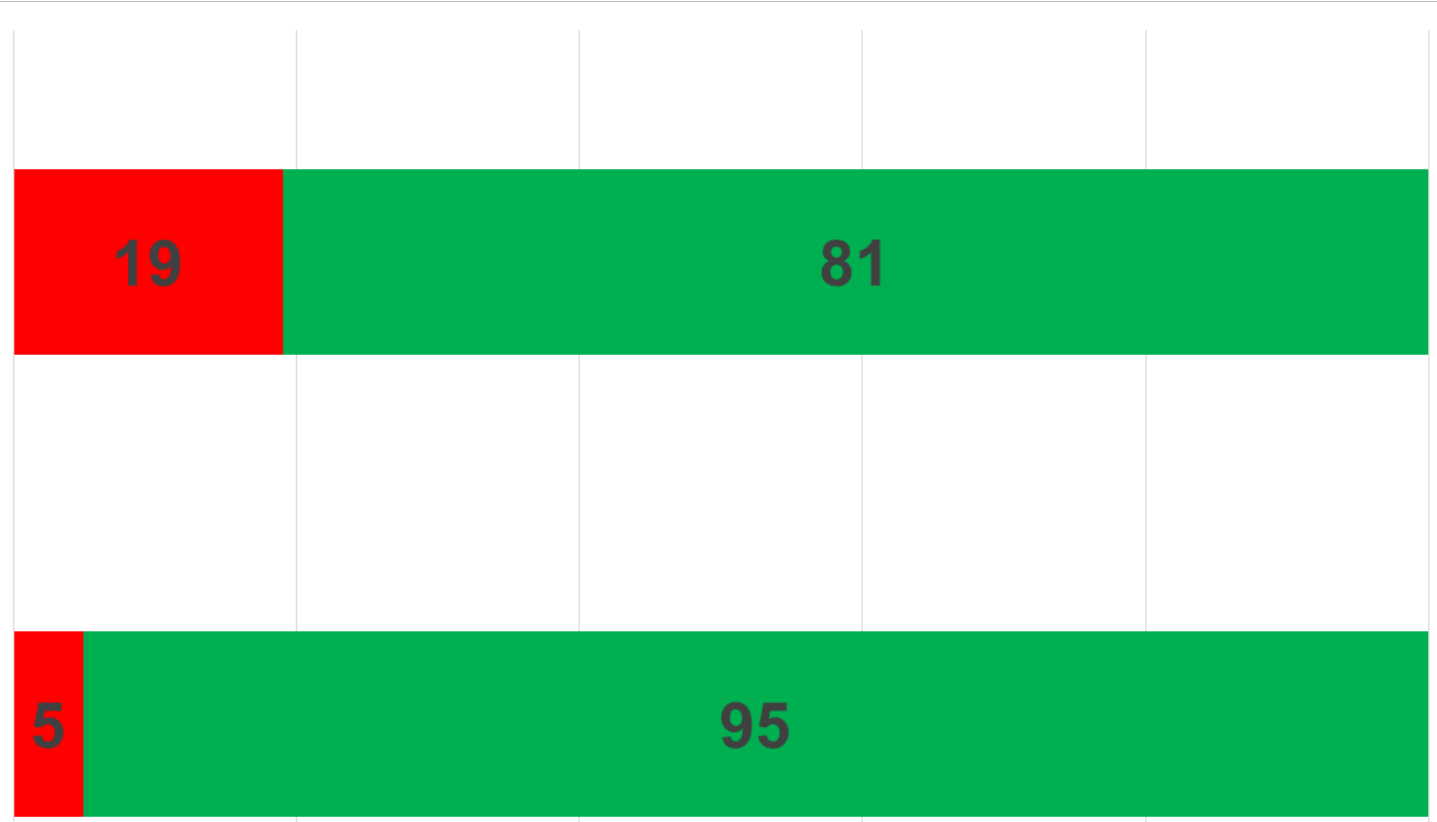
40%

60%

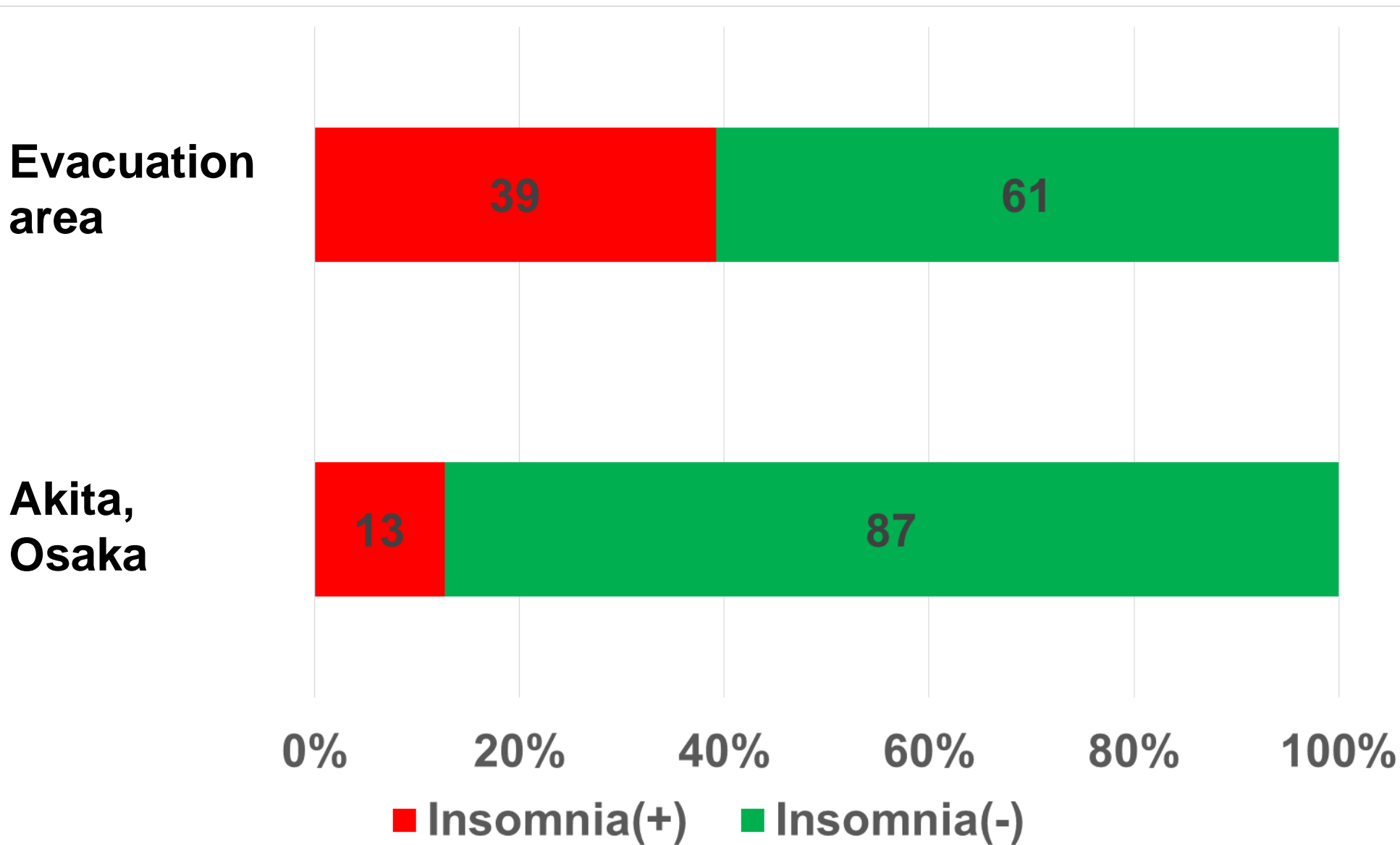
80%

100%

■ Depression(+) ■ Depression(-)



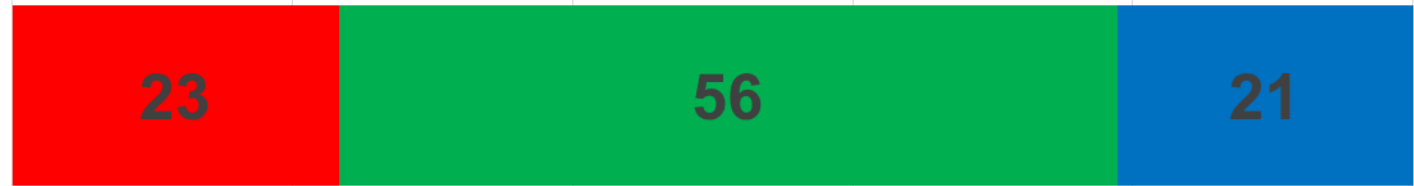
# Insomnia



# Happiness

Unhappy <sup>1</sup> ←————→ <sup>10</sup> Happy

Evacuation  
are



Akita,  
Osaka



0% 20% 40% 60% 80% 100%

■ 1-4 ■ 5-7 ■ 8-10



# Hopelessness

Evacuation  
area

24

76

Akita,  
Osaka

5

95

0%

20%

40%

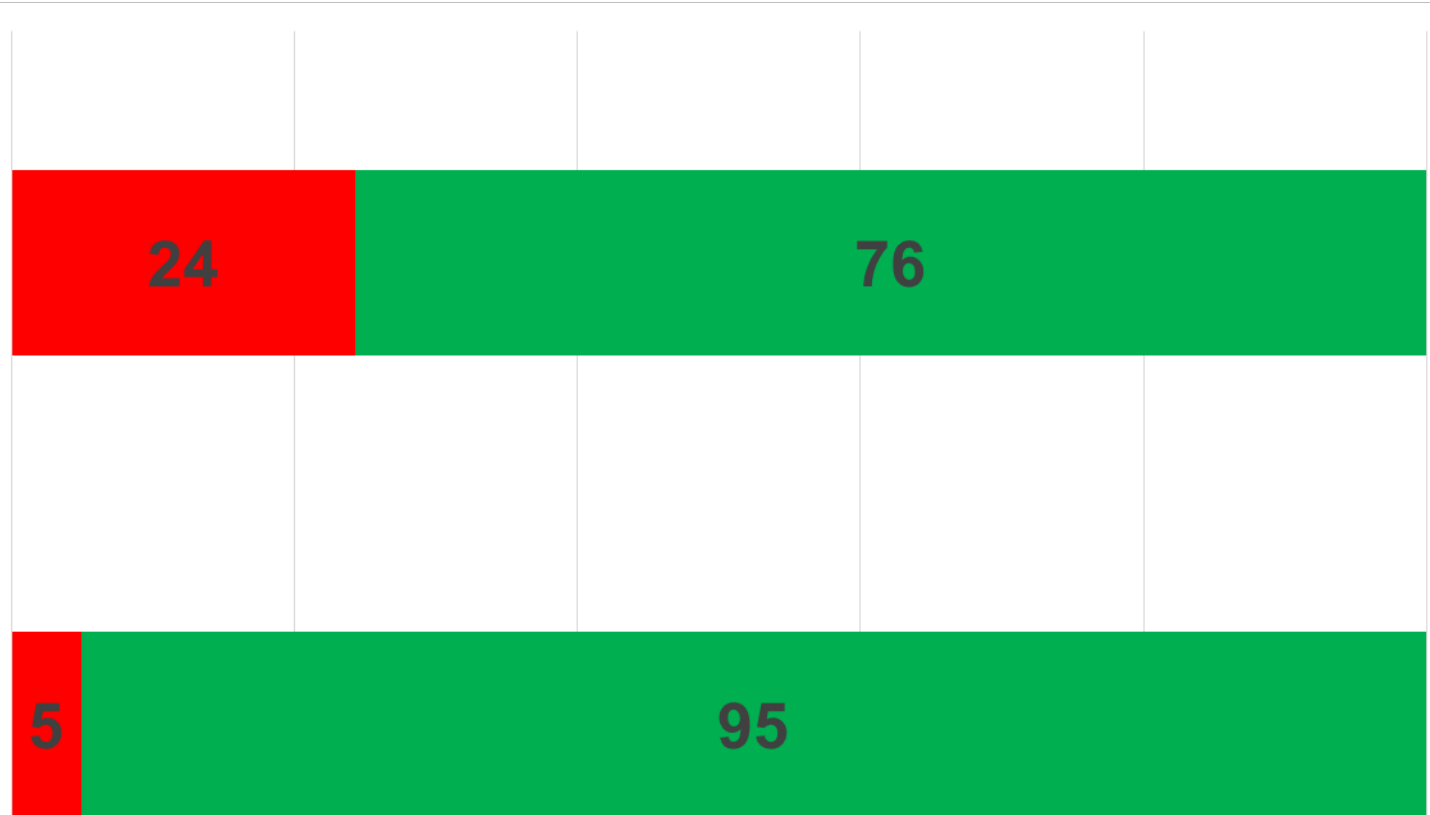
60%

80%

100%

■ Hopelessness(+)

■ Hopelessness(-)



# Summary

- **Prevalence of obesity, hypertension, dyslipidemia, diabetes mellitus, liver dysfunction, and atrial fibrillation were increased among evacuees after the disaster**
- **Changes in lifestyles and psychological stress may be effected**
- **Cardiovascular diseases, such as stroke and myocardial infarction, may increase among evacuees in the future**

# Today's topics

- Changes in cardiovascular disease (CVD) risk factors before and after the disaster
- Comparison of psychological stress between an evacuation area and non-evacuation area in other prefectures
- **Changes in CVD risk factors between 2011-2012 and 2013-2014**

# Methods

The Great  
East Japan  
Earthquake



## General health checkups, A City

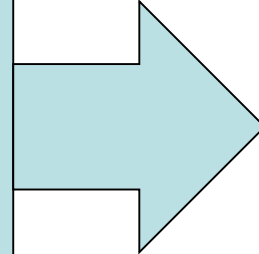
2011



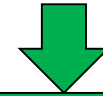
2012



4,686 participants  
(2,174 men and  
2,512 women, mean  
62.5 years)



2013



2014



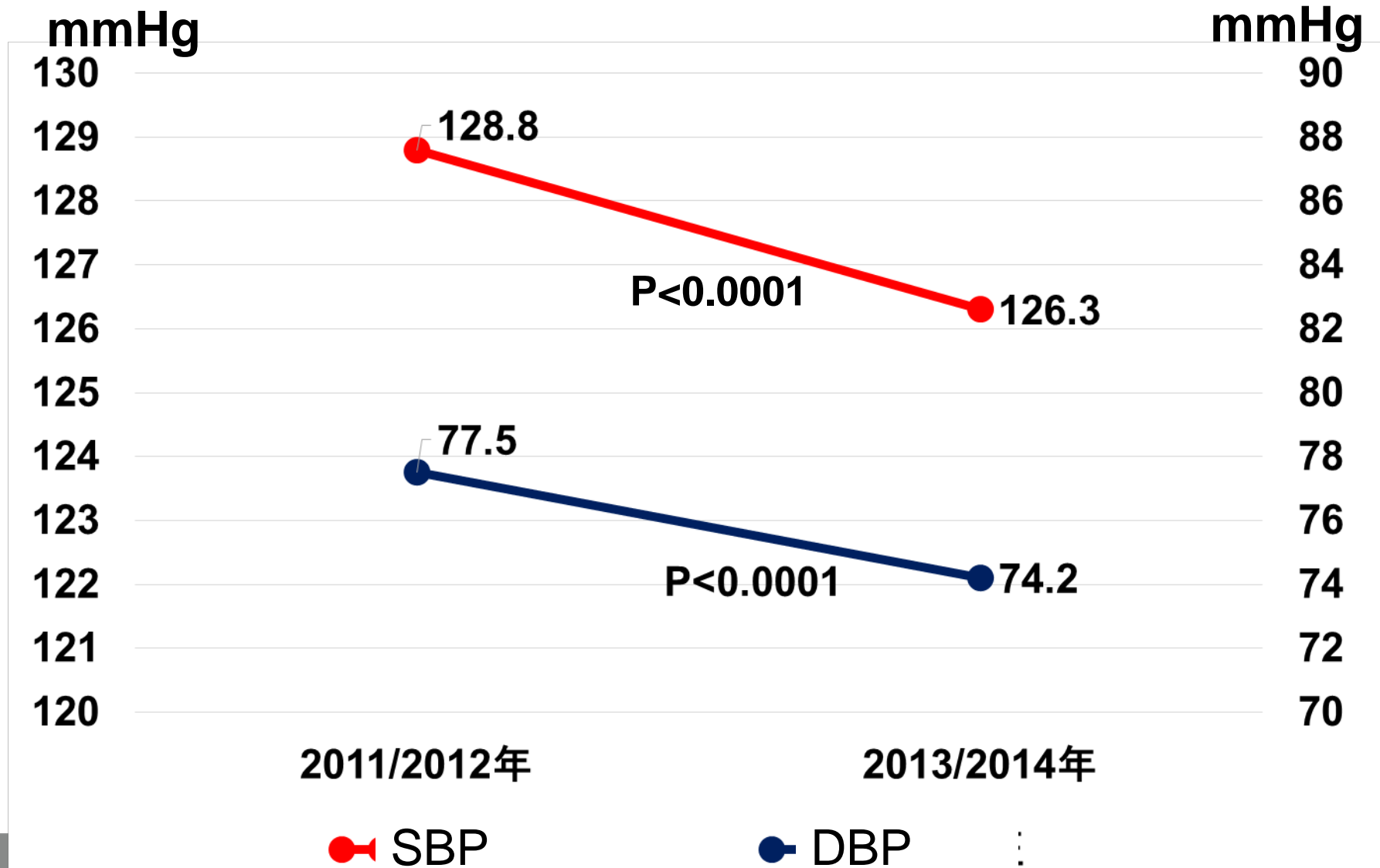
3,470 participants  
(1,596 men and 1,874  
women, follow-up  
proportion, 74%)

**Average follow-up duration was 1.9 years.**

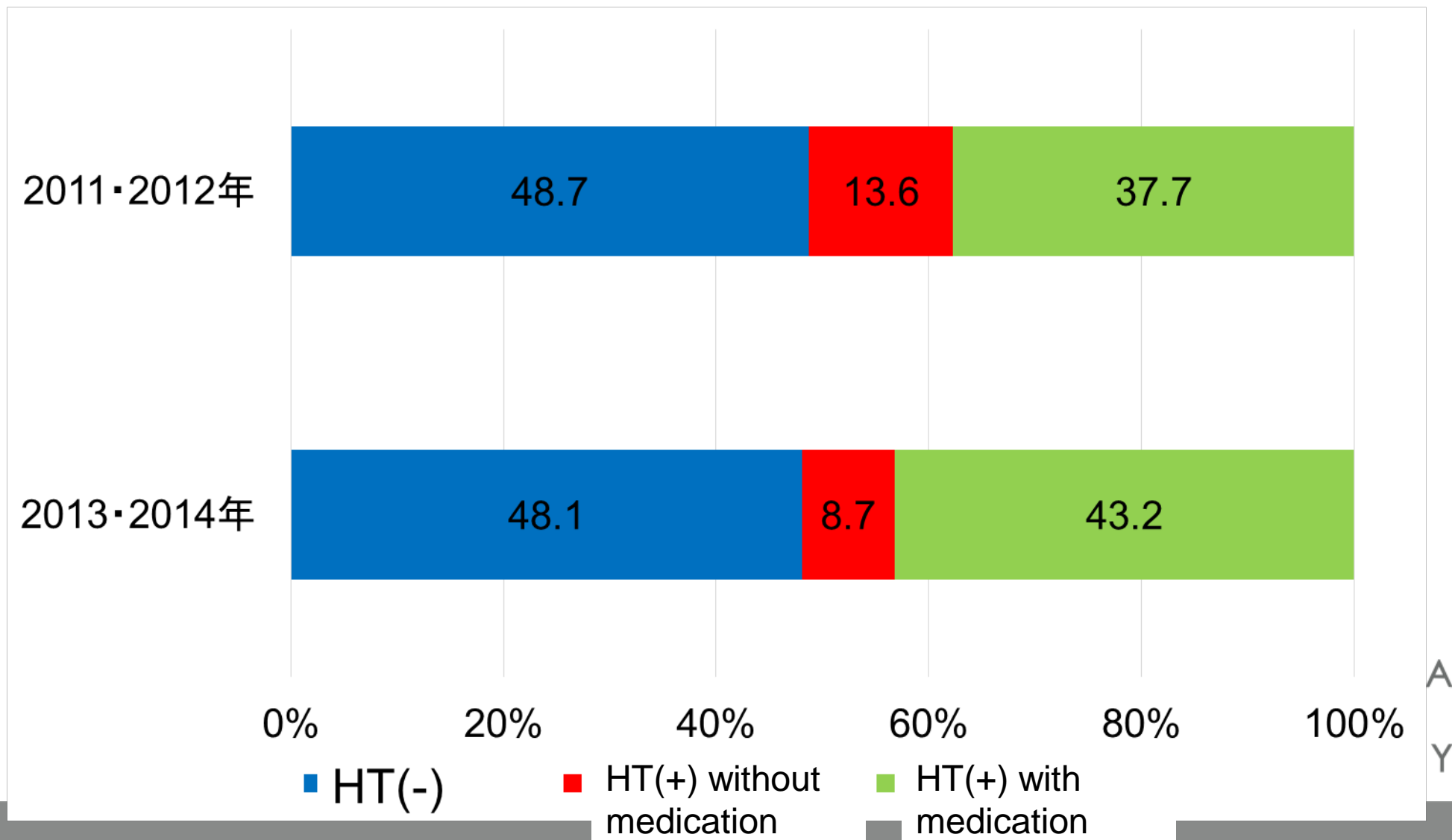


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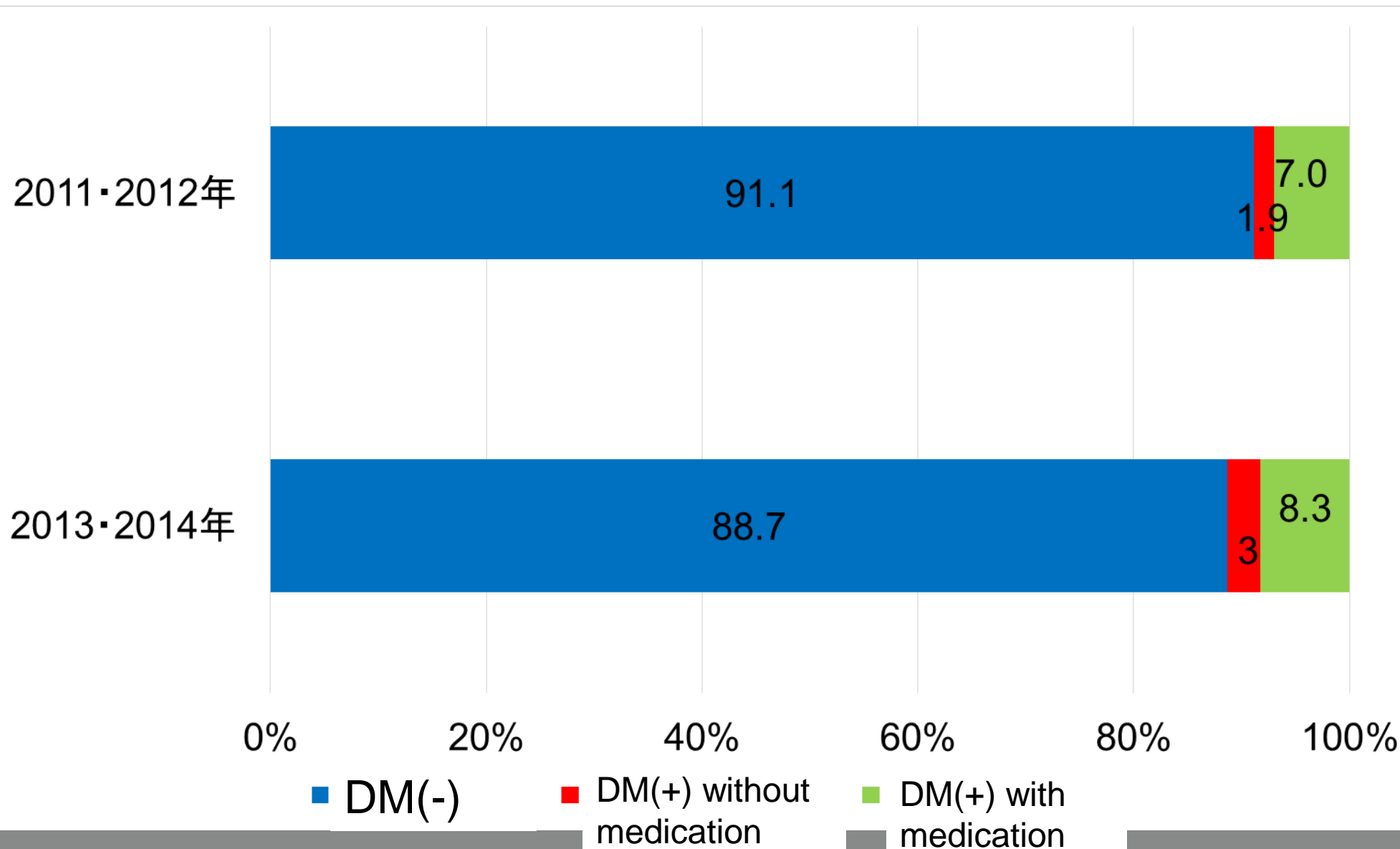
# Changes in Blood Pressures



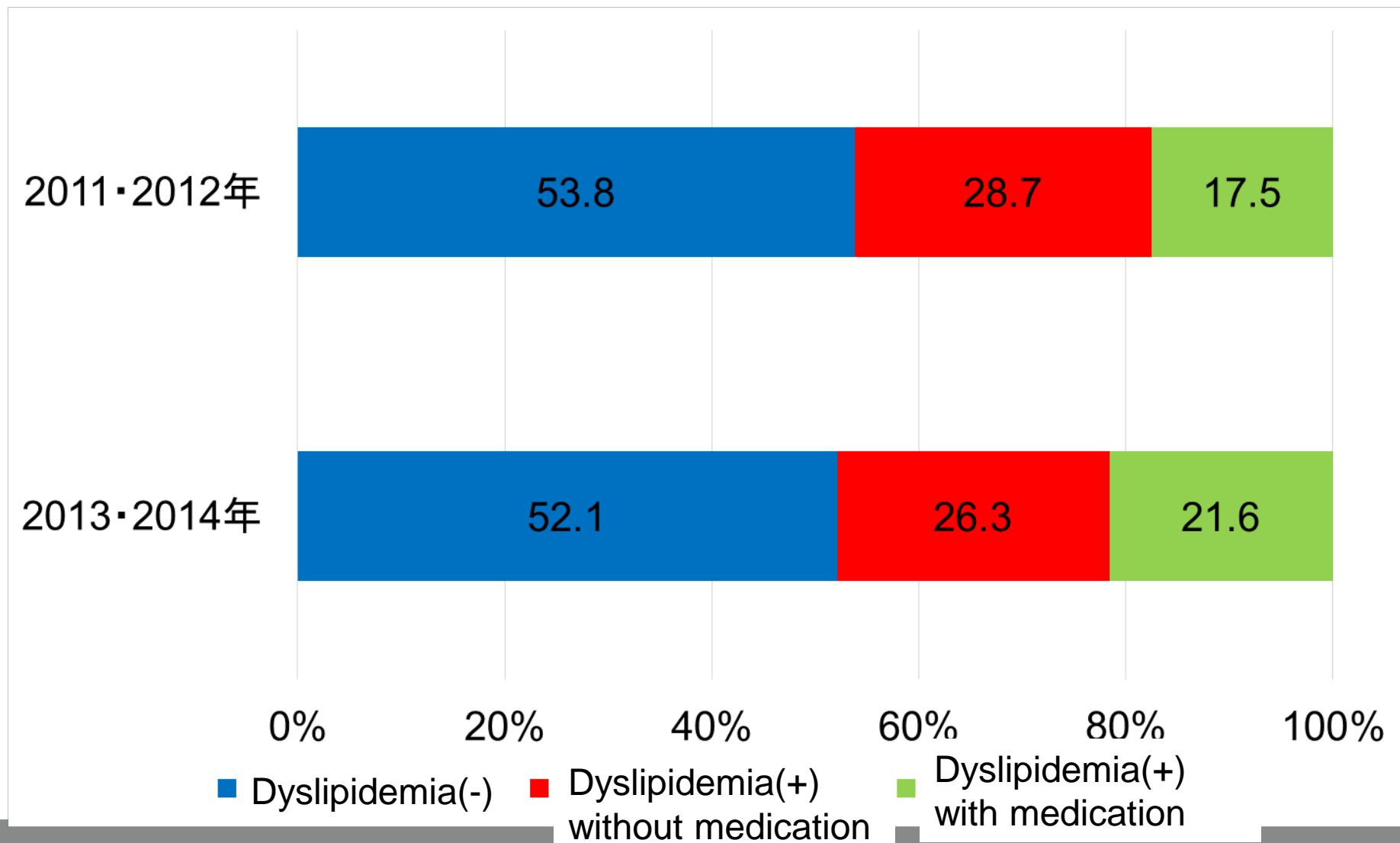
# Prevalence of Hypertension



# Prevalence of Diabetes Mellitus



# Prevalence of Dyslipidemia





# Summary

- **Prevalence of obesity, hypertension, were dyslipidemia unchanged among residents in the evacuation area after the disaster**
- **Prevalence of diabetes mellitus increased among residents in the evacuation area after the disaster**
- **Surveillance of cardiovascular diseases should be needed in Fukushima**