

“FRUIT AND VEGETABLES IN THE WORLD”

## Editorial

The World Health Report 2003 published by WHO highlighted that low fruit and vegetable (F&V) intake is among the top 10 risk factors for disease prevention. If this is not enough to focus attention, then the fact that an estimated 2.7 million lives could be saved annually with sufficient levels of F&V consumption certainly should. But does it?

The fact is that wherever you live in the world a range of factors are impacting your health. Modern lifestyles and eating habits, more sedentary jobs, changed working environments, and a range of other factors have all combined to place each of us more at risk of chronic disease.

Consuming the recommended levels of F&V is a relatively simple and effective way of helping to reduce the impact of a wide range of serious - and largely preventable - health problems throughout the world.

Through activities such as this newsletter, the International Fruit & Vegetable Alliance is actively involved in encouraging efforts to increase the consumption of F&V globally for better health. While the science linking increased consumption to better health outcomes provides a strong foundation for action, there is no doubt that we need to better understand current consumption patterns and examine ways to effect behavioral change in order to make a long term difference.

The articles presented in this edition of the newsletter reflect this need to appreciate why consumption of F&V is not more in line with the potential health benefits.

If parents, doctors, public and private health practitioners, grower organizations, governments and other bodies are all convinced of the substantial health credentials, the question remains as to why consumption is not higher. Understanding the motivating factors for consumers is a critical part of this important health puzzle.

**Chris Rowley**

IFAVA Co-Chair & Horticulture Australia Limited Health Initiative Coordinator

## Editorial Board



- S. Ben Jelloun** • INSTITUT AGRONOMIQUE VÉTÉRINAIRE HASSAN II • RABAT • MORROCO  
**E. Bere** • UNIVERSITY OF AGDER • FACULTY OF HEALTH AND SPORT • NORWAY  
**E. Birlouez** • EPISTÈME • PARIS • FRANCE  
**I. Birlouez** • INAPG • PARIS • FRANCE  
**MJ. Carlin Amiot** • INSERM • FACULTÉ DE MÉDECINE DE LA TIMONE • MARSEILLE • FRANCE  
**B. Carlton-Tohill** • CENTER FOR DISEASE CONTROL AND PREVENTION • ATLANTA • USA  
**V. Coxam** • INRA CLERMONT FERRAND • FRANCE  
**N. Darmon** • FACULTÉ DE MÉDECINE DE LA TIMONE • FRANCE  
**H. Verhagen** • NATIONAL INSTITUTE FOR PUBLIC HEALTH AND THE ENVIRONMENT (RIVM) • BILTHOVEN • NETHERLANDS  
**ML. Frelut** • HÔPITAL SAINT-VINCENT-DE-PAUL • PARIS • FRANCE  
**T. Gibault** • HÔPITAL HENRI MONDOR • HÔPITAL BICHAT • PARIS • FRANCE  
**D. Giugliano** • UNIVERSITY OF NAPLES 2 • ITALY  
**M. Hetherington** • UNIVERSITY OF LEEDS • UK  
**S. Jebb** • MRC HUMAN NUTRITION RESEARCH • CAMBRIDGE • UK  
**JM. Lecerf** • INSTITUT PASTEUR DE LILLE • FRANCE  
**J. Lindstrom** • NATIONAL PUBLIC HEALTH INSTITUTE • HELSINKI • FINLAND  
**C. Maffei** • UNIVERSITY HOSPITAL OF VERONA • ITALY  
**A. Naska** • MEDICAL SCHOOL • UNIVERSITY OF ATHENS • GREECE  
**T. Norat Soto** • IMPERIAL COLLEGE LONDON • UK  
**J. Pomerleau** • EUROPEAN CENTRE ON HEALTH OF SOCIETIES IN TRANSITION • UK  
**C. Rémésy** • INRA CLERMONT FERRAND • FRANCE  
**E. Rock** • INRA CLERMONT FERRAND • FRANCE  
**M. Schulze** • TECHNISCHE UNIVERSITÄT MÜNCHEN • FREISING • GERMANY  
**J. Wardle** • CANCER RESEARCH UK • HEALTH BEHAVIOUR UNIT • LONDON • UK



## IFAVA Board of Directors

- J. Badham** • South Africa • 5-a-Day for better health TRUST  
**R. Baerveldt** • USA • Washington Apple Commission  
**S. Barnat** • France • “La moitié” • Aprifel  
**L. DiSogra** • USA • United Fresh  
**C. Doyle** • USA • American Cancer Society  
**P. Dudley** • New Zealand • 5+ A Day  
**M. Richer** • Canada • 5 to 10 a day  
**E. Pivonka** • USA • 5 A Day  
**C. Rowley** • Australia • Go for 2&5® • Horticulture Australia  
**V. Toft** • Denmark • 6 a day

## IFAVA Contact info

**HEAD OFFICE**  
**International Fruit And Vegetable Alliance**  
 c/o Canadian Produce Marketing Association  
 162 Cleopatra  
 Ottawa, Canada, K2G 5X2

## IFAVA Committees

### Global Leadership Committee

- J. Badham** • South Africa  
**S. Barnat** • France  
**P. Dudley** • New Zealand  
**C. Rowley** • Australia

### Scientific Clearing House Committee

- S. Barnat** • France  
**K. Hoy** • USA  
**E. Pivonka** • USA

### Communications Committee

- J. Badham** • South Africa  
**P. Dudley** • New Zealand  
**C. Rowley** • Australia

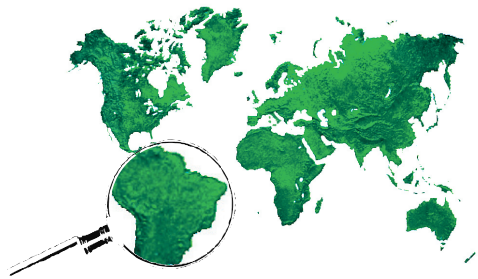
## IFAVA



**CHAIRMAN:**  
 C. Rowley, Australia  
 E-mail : [chairman@ifava.org](mailto:chairman@ifava.org)

**VICE CHAIRMAN:**  
 P. Dudley, New Zealand  
 E-mail : [vicechairman@ifava.org](mailto:vicechairman@ifava.org)

**INFORMATION OFFICER:**  
 J. Lemaire  
 E-mail : [jeanne@ifava.org](mailto:jeanne@ifava.org)



# Factors associated with fruit and vegetable intake among adults of the city of São Paulo, Southeastern Brazil

— Figueiredo ICR, Jaime PC, Monteiro CA —

School of Public Health - University of Sao Paulo

## Dietary recommendations and intake of fruits and vegetables in Brazil

Encouraging consumption of fruit and vegetable (F&V) occupies an important position among the directives in nutrition policy for promotion of a healthy diet. WHO's Global Strategy on Diet, Physical Activity and Health recommends an increase in F&V intake as a strategy for preventing chronic diseases. In Brazil, the Ministry of Health recommends, in its food based dietary guidelines, daily intake of three portions each of F&V, and highlights the importance of varying the items consumed throughout the week.

In order to guide and encourage the implementation of public policies for increasing F&V intake, it is necessary to know not only the current level of consumption among the population, but also the factors associated with intake. To this end, the present study aimed at describing the frequency of F&V intake among Brazilian adults and the factors associated with this intake.

## Study to determine factors associated with intake of fruits and vegetables

We conducted an observational, population-based, cross-sectional study. The study population was composed of men and women aged 18 years or older who, in 2003, lived in households in the city of Sao Paulo and had access to telephone land lines. Data were obtained by means of telephone interviews carried out in 2003 by the System for Monitoring Risk Factors for Non-Transmissible Chronic Diseases by telephone interview, in operation in the city of Sao Paulo. The outcome variable was the frequency of consumption of F&V. Intake frequency scores for F&V ranged from zero to three.

In order to simultaneously evaluate the entire set of factors associated with F&V intake, we grouped these factors into three blocks: 1. sociodemographic characteristics, 2. behavioral variables, and 3. habitual intake of healthy foods other than F&V (beans and fish) and of foods or preparations associated with unhealthy dietary patterns, such as fried foods, processed meats, soft drinks, whole milk, butter or margarine, free sugar, chicken with skin, and red meat with fat.

The study population comprised 2 122 subjects, of which 1 267 were female and 855, male. Mean age was 40.55 years,

for women and 39 years for men. Women had on average 7.91 years of education and men, 8.17 years. Among women, 48.6% reported not having a paid job; this was also true for 19.1% of men.

## What are the important factors associated with intake?

Daily intake of fruit was more frequent among women (51.7%), and daily intake of cooked vegetables was two times greater among women than among men. The mean intake frequency scores for F&V were 1.67 among women and 1.50 among men.

For the female population, sociodemographic factors that positively correlated with frequency of F&V intake were age and more education. The only variable in the behavioral block positively associated with the outcome was having been on diet in the year preceding the interview. Among other foods, only sugar intake was significantly correlated with lower F&V intake.

Among men, sociodemographic factors that significantly correlated with F&V intake were older age, more education and having a paid job. In the behavioral block, frequent meals outside home and physical activity during leisure time were associated with greater intake of these foods. As to consumption of other foods, there was a positive correlation between the habit of eating fish and F&V intake.

Regarding behavioral variables, having been on diet in the year preceding the interview was positively correlated with frequency of F&V intake among women only. Among men, physical activity during leisure time was positively correlated with the outcome.

## Conclusions

Generally speaking, our results are consistent with the literature on the subject. Our analyses show that consumption of foods rich in sugar and fat is inversely associated with F&V intake.

Based on our results, we conclude that frequency of F&V intake in the adult population of the municipality of Sao Paulo falls short of current recommendations, especially among the younger and less educated population. Knowledge of factors associated with F&V intake frequency may help guide initiatives aiming to promote consumption of these foods by the population of the city of Sao Paulo.

RESEARCH FUNDED BY THE BRAZILIAN MINISTRY OF HEALTH (GRANT MS/FUSP, PROC. No. 1390/2002).

## REFERENCES

Rev. Saúde Pública. 2008, v. 42, n. 5, pp. 777-785. ([http://www.scielo.br/pdf/rsp/v42n5/en\\_6775.pdf](http://www.scielo.br/pdf/rsp/v42n5/en_6775.pdf))



# Changes in knowledge, beliefs and behaviors related to fruit and vegetable consumption among Western Australian adults, 1995 to 2004

— Christina Pollard —

School of Public Health - Curtin University of Technology - Perth - Australia

## Dietary recommendations

Throughout the world, governments use dietary guidelines to develop policies and programs to improve dietary intakes. The Dietary Guidelines for Australians provide advice to the general population about healthy food choices<sup>1</sup>. They address issues such as balance and variety in the diet, eating enough fruit, vegetables and cereal foods, limiting fat, salt, and sugar intakes, and infant feeding. The guidelines represent the best consensus of scientific knowledge and public health advice currently available. They are currently being updated to keep abreast of changes in disease patterns and new scientific knowledge.

Community concerns about food and nutrition usually extend far beyond the health issues addressed by the Dietary Guidelines.

## Measuring community attitudes and behaviors

There is an urgent need to promote dietary behaviors consistent with dietary guidelines to assist consumers by making "healthy food choices the easy choices". Understanding consumer attitudes, beliefs and perceptions related to dietary guidelines helps governments to develop effective strategies to promote change. Monitoring attitudes and beliefs as well as self-reported dietary behaviors provides useful insights. The Health Department in Western Australia conducted Nutrition Monitoring Surveys in 1995, 1998, 2001 and 2004. The telephone surveys measured changes in knowledge, attitudes, and beliefs in relation to the Dietary Guidelines and identified dietary concerns, barriers to, and promoters of healthy eating behavior. The survey sample was 2854 adults aged 18 to 64 years residing in metropolitan Perth, Western Australia<sup>2</sup>.

## Go for 2&5®

The Australian National Nutrition Survey found that Australian adults were eating about half the recommended amount of fruits and vegetables (F&V) every day. At the time, evidence of the considerable health benefits of eating diets high in F&V was emerging. The Government considered increasing fruit and vegetable intake a priority that would result in longer-term health care system savings. There was very little advertising and promotion of F&V compared to less nutritious competing foods at that time. In 2002, the Health Department in Western Australia developed the Go for 2&5® social marketing campaign to

promote F&V. (Visit [www.gofor2and5.com.au](http://www.gofor2and5.com.au) for more information about the campaign). Results of the Nutrition Monitoring Surveys helped to develop the campaign and assisted in evaluating its impact overtime.

## Changes in knowledge of recommended servings

Adults were three and a half times more likely to know that they should be eating two servings of fruit each day in 2004 than they were in 1995. They were four times more likely to know that they should eat the recommended five servings of vegetables every day. Women were usually more likely than men to know the recommendations.

The main barriers to increasing F&V intake were similar, but more people reported barriers to increasing vegetable intake. "Because I already eat enough" was the main reason people did not eat more fruit or vegetables. Over time people were less likely to think they were eating enough fruit or vegetables. A lack of variety, poor quality, a lack of time, and the effort required to prepare F&V were barriers to increasing intake.

## Time scarcity is an issue

Adults were much more likely to say that "lack of time" was a barrier to eating a healthy diet in 2004 than in 1995. Strategies to support quick easy meals and snacks featuring F&V are required to meet this demand for convenience. Industry has responded to the consumer focus on convenience by developing value-added fruit and vegetables (chopped onion, peeled and chopped pumpkin, salad mixes etc.).

## So what next?

Although most people thought that F&V were good for them, there was a common misconception that they already ate enough. This was the key reason they did not think they needed to eat more. People were more likely to report barriers to increasing vegetable intake. Practical barriers, like availability, cost and quality, were reported once people realised that they should eat more. There were differences between the barriers to eating fruit and those for vegetables. Consumers thought vegetables were difficult and time-consuming to prepare. Education about the ideal number of servings of F&V and assisting consumers to discover practical solutions to addressing the barriers to increasing vegetable consumption in particular, is a priority.



Go for 2&5®  
FRUIT VEG

## REFERENCES

1. Dietary Guidelines for all Australians  
<http://www.nhmrc.gov.au/PUBLICATIONS/synopses/dietsyn.htm>
2. Pollard C, Miller M, Woodman R, Meng R, Binns C: Changes in

Knowledge, Beliefs, and Behaviors Related to Fruit and Vegetable Consumption Among Western Australian Adults, 1995 to 2004. American Journal of Public Health 2009, 99(2):355-361



# Trends in fruit and vegetable consumption among U.S. men and women, 1994-2005

— Heidi M. Blanck —

US Public Health Service - Atlanta - USA

## Tracking consumption of fruits and vegetables

Consuming a diet high in fruits and vegetables (F&V) as part of an overall healthy diet can help lower chronic disease risk and aid in weight management. Increasing the percentage of Americans who consume enough F&V everyday is part of the Healthy People 2010 objectives for the nation. Assessing trends in consumption of these foods is important for tracking public health initiatives to meet this goal and for planning future objectives. Therefore, we (researchers at the U.S. Centers for Disease Control and Prevention) assessed total and sex-specific changes in daily consumption of Sauté de volaille aux pêches et cacahuètes grillées among 1,227,969 adults in the 50 states and the District of Columbia who participated in the Behavioral Risk Factor Surveillance System telephone survey from 1994-2005 and thus reported their usual F&V intake using a six-item abbreviated frequency screener. To estimate changes in consumption according to dietary recommendations that were in place during the years examined, we used geometric mean and the percentage of people eating F&V five or more times per day. Estimates were standardized for sex, age, and race/ethnicity and analyzed by multivariate regression.

## How has consumption of fruits and vegetables changed?

From 1994-2005, the geometric mean frequency of consumption of fruits and vegetables declined slightly (standardized change: men and women = -0.22 times/day; men = -0.26 times/day; women = -0.17 times/day). The proportion of men and women consuming fruits and vegetables five or more times per day was virtually unchanged (men = 20.6% vs 20.3%; women, 28.4% vs 29.6%). Overall, men's prevalence of this level of consumption did not change significantly from 1994-2005. However, subgroup analysis found a significant increase (+3.71 percentage points,  $P = .003$ ) among men aged 18 to 24 years and a significant decrease (-3.43 percentage points,  $P = .003$ ) among men aged 55 to 64 years. Significant decreases were also found for non-Hispanic white men (-1.45 percentage points,  $P = .001$ ) and men reporting any leisure time physical activity (-1.65 percentage points,  $P = 0.001$ ). Among women, several groups had significant increases: women aged 25 to 34 years (+3.65 percentage points,  $P < 0.001$ ), non-Hispanic blacks (+4.08 percentage points,  $P = 0.0002$ ), and nonsmokers (+1.43 percentage points,  $P = 0.004$ ) (Table 3). One group of women-high school graduates - showed a significant decrease (-2.18 percentage points,  $P = 0.001$ ). Of the six F&V categories, slight declines were observed for consumption of fruit juice (-0.13) and nonfried potatoes (-0.08). When stratified by sex, the data showed that men had small declines in the consumption of fruit

juice (-0.09), nonfried potatoes (-0.07), and "all other" vegetables (-0.06); women had small declines in the consumption of fruit juice (-0.15) and nonfried potatoes (-0.09).

## What are the next steps suggested by the data?

Our findings show that fruit and vegetable consumption among American adults remained relatively stable from 1994-2005. The small decrease in vegetable consumption among men was attributable to declines in eating nonfried potatoes and "all other" vegetables and among women, to a decline in eating nonfried potatoes. The decrease among both sexes in total fruit consumption was driven by reduced consumption of fruit juice, not of whole fruit, which remained stable. The decreases in consumption of nonfried potatoes and fruit juice could reflect food transitions among Americans such as the use of low-carbohydrate diets during this time period.

The new national U.S. Dietary Guidelines for Americans, which were put into place in 2005, are based on age, sex, and physical activity level, and are expressed as the number of servings per day. Appropriate servings are based on form or quantity (e.g., 1/4 cup dried fruit; 1 medium apple, banana, orange or pear; 1/2 cup chopped, cooked, or canned fruit; 6 oz [3/4 cup] fruit or vegetable juice; 1 cup raw leafy vegetables; 1/4 cup raw or cooked other vegetables) (<http://www.health.gov/DietaryGuidelines>). Because this analysis reports consumption according to the number of times per day that F&V are eaten, the results may over- or underestimate the proportion of people meeting the new objectives. Assuming the accuracy of reporting remains similar across time, however, BRFSS data should correctly reveal trends in consumption frequency over time, given that the questionnaire has remained the same and that the module has been validated in diverse samples.

Increasing F&V consumption will require multifaceted approaches that augment educational campaigns with policy and environmental strategies aimed at the food system at large, from farm to plate, including schools, daycares, worksites, and retail establishments. Specific approaches include increasing access to F&V in communities through farmers markets and farm stands, and improvements to small food retail stores through grant programs and other incentives that encourage placement in underserved areas, increased refrigeration units and storage of produce, and increased display space. Farm to institution programs such as farm to worksite and farm to school programs, which connect citizens with local farms, are also underway in locations in the U.S.

*Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the U.S. Centers for Disease Control and Prevention.*

## REFERENCES

Blanck HM, Gillespie C, Kimmons JE, Seymour JD, Serdula MK. Trends in fruit and vegetable consumption among U.S. men and women, 1994-2005. *Prev Chronic Dis*. 2008 Apr;5(2):A35.