



# The

# Scientific Newsletter

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## Editorial

It gives me great pleasure and excitement to welcome you to the first issue of the International Fruit and Vegetable Alliance (IFAVA) newsletter.

In 2004, representatives from over 10 countries met in New Zealand and began informal discussions to form a new international organization which will be in a leading position to encourage and foster efforts on both national and global levels to increase the consumption of fruit and vegetables for the better health of all citizens.

The hope is that this new international body will support national initiatives, promote efficiencies on a global level, share communication tools and resources, facilitate co-operation on shared aims, act as a clearing house for scientific findings and provide global leadership through the provision of sound evidence-based science. That vision has been achieved and the incorporation of the International Fruit and Vegetable Alliance occurred in Canada in September 2005.

IFAVA is organized on two levels: the IFAVA Board of Directors will manage the overall operations of the organization while two international committees have been formed to focus on science and communications and will support the core tactics of the IFAVA strategic plan.

The creation of this newsletter will enable this not-for-profit organization to provide the global scientific community with access to credible, sound scientific evidence specific to vegetables and fruit. It will also support the overall mission of the organization, namely, to encourage and foster efforts to increase the consumption of fruit and vegetables globally for better health by supporting national initiatives, promoting efficiencies, facilitating collaboration on shared aims and providing global leadership, all of which is based on sound science.

An undertaking of this kind cannot be accomplished without the generous support of many who have contributed to the development and review of the content. As the first Chair of IFAVA, I would like to personally thank all those who have been active in the development of the organization, and now the launch of this new tool, to spread the valuable message of eating vegetables and fruit. I would specifically like to thank the scientific committee and editorial board for their vision and commitment on this program.

Ron Lemaire • Chairman, IFAVA

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# Global Dynamics of the Nutrition Transition

— Barry M. Popkin —

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Global energy imbalance and related obesity levels are rapidly increasing. The world is rapidly shifting from a dietary period in which the higher-income countries were dominated by patterns of degenerative diseases (while the lower and middle income countries were dominated by receding famine) to one in which the world is increasingly being dominated by degenerative diseases. Globally very high levels of overweight are found equally in high and lower income countries, in urban and rural areas. Dietary changes appear to be shifting universally toward a more energy-dense and sweeter diet with reduced complex carbohydrate intake. Large-scale declines in food prices (e.g., beef prices) increased access to supermarkets, and urbanization of urban and rural areas are key underlying factors. The challenge to global health is clear.

## What is the nutrition transition ?

The concept of the nutrition transition focuses on large shifts in diet and activity patterns, especially their structure and overall composition. These changes are reflected in nutritional outcomes, such as changes in average stature and body composition. Further, dietary and activity pattern changes are paralleled by major changes in health status, as well as by major demographic and socioeconomic changes.

## Why the concern ?

The rates of change in non-communicable diseases are great.

*Obesity prevalence and trends.* Rates and levels of change in obesity across the globe are very high. Over 60% of the populations of Mexico, Egypt, the United States and South Africa (black women) are overweight and obese. What is potentially far more important are the rates of change in the prevalence of overweight and obesity across the globe. Changes of 0.5 to 1.5% of the adult population in these countries becoming overweight is common.

*Obesity is universally found in urban and rural areas !* Universally obesity levels are higher in urban areas but studies conducted across the globe shows that except in a few countries, among adult women more overweight exists than underweight in most urban and rural areas in all but 4-5 countries.

## What are the key dietary dimensions ?

Globally, our diet is becoming increasingly energy-dense and sweeter. At the same time, higher fiber foods are being replaced by processed versions. There is enormous variability in eating patterns globally but the broad themes seem to be retained in most countries. Edible oil intake is increasing, particularly among lower income countries. Animal source food changes are equally dramatic, particularly in selected countries. Concurrent shifts are occurring in the use of caloric sweeteners. Fiber intake as well as that of coarse grains is down significantly. Similarly, studies on fruit and vegetable intake indicate declines in many countries and regions of the world, but again have not been systematically studied. There are also selected countries where fruit and vegetable intake remain very high (e.g., Spain, Greece and South Korea).

## What are the major underlying global forces ?

Globalization, with its focus on freer movement of capital, technology, goods, and services has had profound effects on lifestyles that are linked with diet, activity, and subsequent imbalances that have led to the obesity epidemic. While many researchers have placed the global food production, marketing, and distribution sectors (including soft drink, fast food, and other multinational food companies) at the center of blame for these changes, there are other profound and equally responsible factors that must be

understood to enact effective public policy to address them. These other factors include: (a) the worldwide shifts in trade of technology innovations that affect energy expenditures during leisure, transportation, and work; (b) globalization of modern food processing, marketing, and distribution techniques (most frequently linked with westernization of the world's diet); (c) vast expansion of the global mass media; and (d) other changes that constitute the rubric of impacts resulting from an increased opening of our world economy.

One of the central shifts has occurred in the global food system related to the marketing and sales of food. The fresh (wet or open public) market is disappearing as the major source of supply for food in the developing world. These markets are being replaced by multinational, regional, and local large supermarkets which are usually part of larger chains or in other countries such as South African and China by local domestic chains patterned to function and look like these global chains. Increasingly, we are finding hypermarkets (very large megastores) as the major force driving shifts in food expenditures in a country or region. For example, in Latin America, supermarkets' share of all retail food sales increased from 15% in 1990 to 60% by 2000. This same process is also occurring at varying rates and different stages in Asia, Eastern Europe, and Africa.

**Global agricultural policies** Global agricultural policies have a built-in long-term focus on creating cheaper grains and animal source foods. One clear outcome has been a dramatic decline in the real price of beef and related products.

**Global mass media** Global mass media access has shifted in an equally impressive manner.

## The economic costs of this transition are huge

In the United States and other higher-income countries, there have been a large number of analyses of the health costs and other effects of this shift toward higher obesity. There has been a controversy in the United States about the impact of obesity on mortality. Essentially, Flegal and colleagues have shown that earlier work—done by the Center for Disease Control and Prevention (CDC) that showed a very high mortality linked with obesity—was in error and smoking killed more persons than obesity. More recently, following a more behavioral approach, there is a study that shows that the health care costs of obesity far outweigh those of smoking, particularly for those with a BMI greater than 30.

In developing countries, far less has been done to study this issue. In one set of studies on the economic costs in India and China it has been shown that these costs are rapidly increasing and represent a serious component of their GNP. In fact, it is quite possible that these economic effects of the shift toward the degenerative disease stage of the nutrition transition will overwhelm the health system of China and slow its economic growth.

## Do we have any positive models at the national or regional level ?

See my website ([www.nutrans.org](http://www.nutrans.org)) for examples from Brazil, Finland, and South Korea.

## So where do we go from here ?

The challenge for us is to devise ways to improve the lives of our citizens to (a) give people the more varied and tasteful diets they want; (b) give people less burdensome work; (c) prevent obesity, type 2 diabetes, all other aspects of the metabolic syndrome, and (d) prevent a vast array of cancers linked with these dietary, activity and obesity patterns. The fruit and vegetable sector, a relatively untapped and neglected component of the agricultural sector, is one area that deserves major attention.

References are omitted but pdf files of key references on all elements in the paper are found at [www.nutrans.org](http://www.nutrans.org)

# The European Prospective Investigation into Cancer and Nutrition (EPIC)

— Dr Teresa Norat —

International Agency for Research on Cancer

In spite of several decades of research, few nutrition-related factors, other than obesity and alcohol consumption, have been unequivocally established as playing a causal role in human cancer <sup>(1)</sup>. Several methodological problems faced by epidemiological studies may explain this situation: dietary habits are difficult to assess accurately; biologically relevant dietary exposures may have occurred over many years and their role may be modified by other lifestyle factors. Case-control studies may be flawed by recall bias, and biological markers of diet or metabolism might be altered by the tumour presence. Prospective studies are not subject to these biases, but they may lack statistical power to study less common cancers and genetic interactions. Prospective studies have often been conducted within populations with relatively homogeneous lifestyles and dietary patterns. This homogeneity, combined with diet measurement errors, makes it difficult to demonstrate moderate associations.

## What is EPIC ?

The European Prospective Investigation into Cancer and Nutrition (EPIC) – a multi-centre prospective cohort study - was devised in an attempt to overcome these limitations. Initiated in 1992, the study is a collaborative endeavour of 23 centres in ten European countries: Denmark, Germany, Greece, Italy, France, The Netherlands, Norway, Spain, Sweden and United Kingdom, including over 500,000 volunteer participants mostly aged from 35 to 70 years. Information of usual diet and anthropometric measurements were collected at enrolment. Blood samples were taken from most participants. EPIC represents the largest single resource available for prospective investigations in the aetiology of cancers that can integrate questionnaires on lifestyle and diet, biomarkers of diet, metabolism and genetic polymorphisms, with the additional advantage of the contrast in cancer rates and dietary habits between centres <sup>(2)</sup>.

## Testing the effect of fruit and vegetables against cancer

One of the hypotheses tested in the EPIC study is the potential protective effect of fruit and vegetable consumption against

certain cancers. We briefly summarize the results here.

Between the first results of EPIC, the finding of the association between fibre intake and reduced colorectal cancer risk is of great scientific importance, since other cohorts questioned the potential protective effect of fibre <sup>(3)</sup>. Two other results that support the potential beneficial effect of plant foods against colorectal cancer are the protective effect of fruit and vegetables observed in preliminary analyses <sup>(4)</sup> and the significant inverse association between nut and seed intake observed for colon cancer in women <sup>(5)</sup>.

It is well established that the main risk factor of lung cancer is smoking. EPIC has confirmed previous findings of a potential protective effect of fruit intake against lung cancer in an analysis of 860 incident cases, while no association with vegetables was observed <sup>(6)</sup>.

Although no association between total fruit and vegetable consumption and risk of renal cell carcinoma (306 incident cases) was demonstrated, the data do not exclude the possibility that very low consumption may be related to a higher risk, since an inverse association with root vegetables was observed <sup>(7)</sup>. Gastric cancer (GC, 330 cases) and adenocarcinoma of oesophagus (ACO, 65 cases) were not related with fruit and vegetable in EPIC, although a potential beneficial effect of vegetables and of onion and garlic for the intestinal type of GC, and of citrus fruit against cardia GC and ACO, for which inverse associations were observed, cannot be discarded <sup>(8)</sup>.

Finally, the data from 3659 invasive incident breast cancer cases in EPIC support previous evidence that vegetable and fruit intake is not associated with risk for breast cancer <sup>(9)</sup> and that prostate cancer is not associated with total fruit and vegetables consumption <sup>(10)</sup>. Fruit and vegetables do not seem to protect from ovarian cancer (581 verified cases of epithelial cancer) <sup>(11)</sup>.

Overall, these results indicate that the potential beneficial effect of fruit and vegetables against certain cancers deserve further investigation, and that studies on specific types of vegetables and fruits, as well as studies using biological markers of diet are warranted. This research is actually ongoing in EPIC.

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# Can we change the way we eat ? What are the barriers ?



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Food consumption is a target end-point for many interventions designed to lead to a healthy life-style. Particular aspects of food consumption that are widely agreed to be healthy choices include increased eating of fruits and vegetables. However in many dietary modification trials, which may include intensive interventions including behavioural modification, tailored targets and motivational interviewing, the outcome has in general been poor with a reported advantage over several years of one serving of fruit and vegetables per day compared with the target of five per day. Why is it so difficult to change eating behaviour in a direction that everyone agrees would be beneficial to health ? Why do people appear to be unwilling or unable to make healthy choices in their diet?

## Eating: attitudes, intentions and behaviours

One problem is that making a choice between different foods appears to be an act of self-will, or a purely conscious decision. However, this decision process contains three major elements: an attitude, an intention and the behaviour. It should be remembered that eating itself is 100% behaviour; it is an action we ultimately carry out with our own hands. The issue is that it is relatively easy to hold an attitude (for example, 'I want to be healthy'), and also quite easy to have an intention (for example, 'I intend to eat more fruits and vegetables') but it is rather difficult to convert the intention into a behavioural action. This is called the 'intention-behaviour gap'. We may all have good intentions but fail to implement them whilst congratulating ourselves on possessing sensible aims.

One reason for this is that eating is not such a simple act as it seems. Indeed, eating comprises integrated behaviour sequences which together form our eating habits. These habitual patterns are extremely resistant to change.

## What supports our eating habits ?

Psychologists are well aware that the best predictor of future behaviour is past behaviour. One important aspect of eating is that it confers pleasure. For some people, the sensory pleasure of eating is the most important form of pleasure in their lives. This pleasure sensation constitutes the 'reward' that helps to hold behavioural habits in place. One other feature of habits is that, although they are personal and individual, they are supported and maintained by the environment. Some features of the environment in which our current habits are

expressed include the idea of a competitive market, aggressive marketing by the food industry and advertising targeted at the consumer. The habits are also supported by existing cultural values which make different food choices more or less prized. Although we may lament the introduction of a 'fast food' mentality, it is not a crime to eat in McDonalds, nor is it a sin. Indeed, a certain part of the economic system is specifically designed to promote cultural acceptability of fast foods.

## What are the opportunities to eat more fruit and vegetables?

Within this economic and cultural climate, what are the opportunities to break-up unhealthy eating habits and insert more fruits and vegetable onto our platters of food choice ? It is unlikely that expecting individuals to 'go it alone' will be very effective. The culture has to change to place a high cultural value on eating fruits and vegetables. Such cultural values must be incorporated into economic strategies so that the values can exert pressure on market forces. That is, fruits and vegetable must be advertised and marketed with the same financial intensity as their competitors bring to bear. Government agencies could help to balance the market through the introduction of favourable pricing strategies. Some people have remarked that the degree of social engineering involved makes this an unlikely scenario. However, even partial changes could lead to significant health benefits. From a theoretical, and practical, perspective we have to work on liking and wanting. Together these will form enduring habits. There are some encouraging signs; recently in the UK one major food group reported a 10% decrease in sales of savoury pies, cakes and snacks – mostly containing high levels of fats, sugars and salt.

An increase in the strength of collaboration between producers and the market would help individuals to convert their intentions into active behavioural choices. The intention is present; it simply needs to be liberated. Given that some improvement can be achieved in helping people to express their desired intention, do fruits and vegetables have the

necessary sensory appeal (the 'pleasure factor') to compete with synthetically manipulated artificial assaults on our taste buds ? The answer is yes;

fruits and vegetables have distinctive rewarding tastes that can lead to the establishment of healthy habits. The key is to start early in life to expose children to a diversity of healthy tastes. Changing food habits in adults is difficult. It is much better to start off in life with the desirable healthy habits.

