FRUIT & VEGETABLE SUMMIT

May 27-30, 2008

Unesco, Paris

NUTRITION MARKETING ECONOMY

Co-presidents:
Elio Riboli and Serge Hercberg

Scientific committee:
E. Bere, A. Drewnowski, M. Chauvet, L. Dube, P. Galan, D. Herman, K. Lock , A. Martin, T. Norat, B. Rolls, E. Valceschini, D. Veschambre

Scientific coordinator:
S. Barnat

Presented by **EGEA – IFAVA**

Co-sponsored by the **World Health Organization (WHO)**,

WHO

With the participation of the **European Commission**,
With the support of the **French Ministry of Agriculture** and the technical cooperation of **FAO**

IFAVA International Fruit and Vegetable Alliance
aprifel agence fruits et légumes frais
Ministère de l'Agriculture et de la Pêche
Viniflhor

GENERAL COORDINATION

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PREFACE
BY MARIANN FISCHER-BOEL

The European Commissioner for Agriculture and Rural Development

It's a great honour for me to contribute to this very important publication following this year's Fruit and Vegetable Summit.

Events like this play a crucial role in our ongoing efforts to encourage greater consumption of fruit and vegetables, as part of our strategy to address chronic diseases and the growing problem of obesity.

Last June, European Union agriculture ministers unanimously backed wide-ranging reforms to the Common Market Organisation for fruit and vegetables.

My hope is that the reforms, which came into force on 1st January, will play a major role in promoting consumption and thus make a significant contribution to improved public health.

Despite plentiful production and great need for the product, the truth is that many people simply don't buy and eat as much fruit and vegetables as they should - as their waistlines and medical bills bear witness.

Besides the need to overhaul an old-fashioned support system, one of the main purposes of the reform is to encourage consumers to eat more of these healthy products.

With this is mind, Producer Organisations will be able to include promotion of F&V consumption in their operational programmes. There will be an additional €6 million under our general promotion regulation for the promotion of F&V targeted at children in schools.

And there will be an €8 million budget for free distribution of F&V to schools, hospitals and charitable bodies, which will be 100 percent financed by the EU.

The Commission is also currently carrying out a feasibility study and a public consultation into the creation of a school fruit and vegetable scheme, which would be part-financed by the EU budget and would hopefully encourage children to eat more fruit and vegetables from an early age – a habit they would then carry into their adult lives.

We hope to complete this work by July and I would welcome all contributions to the debate.

The battle against disease and obesity requires action on many fronts.

We in the European Commission are determined to play our part and what better way than to promote the consumption of our top quality European fruit and vegetables.

I salute the work you are doing at the Fruit and Vegetable Summit. I think it fits very well with what we are doing in Brussels.

Good nutrition isn't rocket science, but it will take a concerted effort to teach the younger generation a few good habits.

In striving to achieve this, your efforts and our policy reforms go hand in hand.

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*: F&V= Fruit and vegetables

PROGRAMME

TUESDAY, MAY 27, 2008 WEDNESDAY, MAY 28, 2008 THURSDAY, MAY 29, 2008 FRIDAY, MAY 30, 2008

17:00/19:00

SESSION 1 (PLENARY)

OFFICIAL OPENING

KEYNOTE LECTURES :

- The role of fruits and vegetables in the genesis of cancer and other noncommunicable diseases. **A. Schatzkin**
- Lessons learned from tobacco promotion. **G. Hastings**

19:00/21:00

Cocktail at "The 7th floor of the Unesco Building"

TUESDAY, MAY 27, 2008 **WEDNESDAY, MAY 28, 2008** THURSDAY, MAY 29, 2008 FRIDAY, MAY 30, 2008

NUTRITION	**MARKETING**	**ECONOMY**
From Scientific Knowledge to Intervention Studies: *How to enhance F&V consumption?*	From Environmental Changes to Social Marketing and Communication: *How to change consumer's behaviour?*	From Agricultural Economy to Food Policies and Strategies: *How to promote F&V supply?*

8:45/10:30

SESSION 2 (PLENARY)

F&V CONSUMPTION TO REDUCE OBESITY: GLOBAL PROSPECTIVE · Chairs: **Ph. James and B. Rolls**

- Introduction. **Ph. James**
- The impact of F&V on public health. **C. van Rossum**
- Diet quality/lifestyle and low energy density. **H. Schroder**
- Strategies to enhance satiety with F&V: implications for weight management. **B. Rolls**

10:30/11:00

Fruit and coffee break, *today's fruit break is provided by AREFLH* – **Poster exhibition**

11:00/13:00

SESSION 3 (PARALLEL)

F&V INTERVENTIONS TO REDUCE CARDIOVASCULAR DISEASES

Chair: **K.T. Khaw**

- The importance of F&V in the prevention of cardiovascular disease. **F.J. He**
- Are supplements equivalent to dietary micronutrient consumption? **J.V. Woodside**
- Effects of F&V consumption on plasma blood pressure: intervention study. **L. Dauchet**
- F&V and cardiovascular disease risk: what should we do? **K.T. Khaw**

SESSION 4 (PARALLEL)

EMPOWERING THE LOCAL AND GLOBAL F&V VALUE CHAINS: POLICY AND PRACTICE

Chairs: **L. Dube – R. Lemaire**

- Highlights from the 2007 Think Tanks. **L. Dubé**
- The challenge for the local and global F&V industry. **R. Lemaire**
- Value-chain perspective. **C. Hawkes**
- Innovation perspective. **R.J. Brummer**
- Social norms and culture perspective. **C. Fischler**

SESSION 5 (PARALLEL)

CULTURAL DIVERSITY, BIODIVERSITY AND TERRITORIAL MANAGEMENT

Chair: **B. Chevassus-au-Louis**

- Introduction. **B. Chevassus-au-Louis**
- The role of genetic diversity in fruit species for the creation of new varieties. **Y. Lespinasse**
- The diversity of French F&V: ethnic market development and the emergence of ancient and new species. **M. Chauvet**
- Cultural and biological diversities: the need for a joined approach. **D. Veschambre**

13:00/14:15

Buffet lunch

14:30/16:30

SESSION 6 (PARALLEL)

F&V CONSUMPTION TO REDUCE CANCER RISK

Chair: **A. Schatzkin**

- Changing dietary habits after a cancer: a systematic review of the literature. **T. Norat**
- Biomarkers of F&V intake and cancer risk. **M. Jenab**
- Vegetables and genetics: feeding studies in cancer prevention. **J. Lampe**
- What about mechanisms? **J. Milner**

SESSION 7 (PARALLEL)

FROM POLICY TO ACTION: WHAT TO DO NOW?

Chair: **T. Lobstein**

- Introduction: Moving from policies to action. **T. Lobstein**
- Food, marketing and young people. **G. Hastings**
- Parents Jury - a grassroots advocacy program to improve nutrition environments. **K. Chapman**
- Controlling the market using legislation. The UK experience for TV and non-TV regulation. **J. Landon**

SESSION 8 (PARALLEL)

LOCAL F&V SUPPORT LOCAL IDENTITY OF FOOD PRODUCTION AND CULINARY CULTURE

Chair: **M. Chauvet**

- Does building of food identity favour local production? The Mediterranean cas. **B. Hervieu**
- Cultural geography of the F&V. Some Mediterranean, African and Asian examples. **M. Chauvet**
- Combining traditional culture and modernity in the F&V sector: lessons from Japan. **T. Nishizawa**

16:30/17:00

Fruit and coffee break, *today's fruit break is provided by AREFLH* – **Poster exhibition**

17:00/18:15

SESSION 9 (PLENARY)

Chair: **G. Hastings**

- **REPORTS FROM THE PARALLEL SESSIONS OF THE DAY**
- **ORAL PRESENTATION OF SELECTED POSTERS**

19:00/21:00

Cocktail at "La Mairie de Paris" : Salon "Les Arcades"

	NUTRITION	MARKETING	ECONOMY
8:45/10:30		**SESSION 10 (PLENARY)** **In presence of MICHEL BARNIER, French Minister of Agriculture and Fischeries** (tbc) **F&V SCHOOL SCHEME** · Chair: **D. Barling** · The School F&V scheme: A priority measure for different countries. **D. Barling** · How is this possible within the EU? **L. Hoelgaard** · How to evaluate the impact of a School F&V scheme? **E. Riboli**	
10:30/11:00	Fruit and coffee break, *today's fruit break is provided by CSO* – **Poster exhibition**		
11:00/13:00	**SESSION 11 (PARALLEL)** **EFFECTIVE INTERVENTION STUDIES TARGETING CHILDREN** Chairs: **C. Perez-Rodrigo - Ch. Rowley** · Determinants of F&V consumption. **C. Perez-Rodrigo** · Are school-based F&V schemes effective at improving the diet and health of children? **K. Lock** · Public/private partnership in action: New Zealand's Fruit in Schools programme. **P. Dudley** · The Pro-Children study. **S. te Velde** · Free school fruit might give long term effects - results from the Norwegian intervention. **E. Bere**	**SESSION 12 (PARALLEL)** **LOCAL INITIATIVES TO PROMOTE F&V CONSUMPTION AT SCHOOL** Chair: **J. Remiller** · Importance of the valorization of the local dimension of the project. **J. Denez** · Beyond the school, how to involve parents and inhabitants in the project ? **F. Liber/P. Martin** · Pooling the competences and federating the projects of all local actors. **P. Berger** · Appraising each action in order to secure its perennity. **E. Feur**	**SESSION 13 (PARALLEL)** **PESTICIDE MANAGEMENT : F&V CONSUMPTION** Chair: **M. Dunier-Thomann** · Evaluation of consumer exposure to pesticides. **B. Declercq** · Evaluation of consumer exposure to pesticides: A French study. **A. Periquet** · EU monitoring and alert system. **L. Martin-Plaza** · Risk management in France. **F. Gérault**
13:00/14:15	Buffet lunch *sponsored by La ligue Contre le Cancer*		
14:30/16:30		**SESSION 14 (PLENARY)** **F&V AT WORKSITE** · Chairs: **J. Milner et B. Sahler** · Preventing chronic diseases at the workplace through diet and physical activity. **V. Candeias** · Worksite-based research and initiatives to increase F&V consumption. **G. Sorensen** · Successful strategies for sustaining increased F&V consumption in worksite canteens. **A.V. Thorsen** · Improving health at the workplace: where can F&V fit into the equation? **B. Sahler**	
16:30/17:00	Fruit and coffee break, *today's fruit break is provided by La Région Ile de France* – **Poster exhibition**		
17:00/19:00	**SESSION 15 (PARALLEL)** **F&V NUTRIENT PROFILING: WHAT ARE WE GOING TO BE ABLE TO SAY IN THE FUTURE?** Chair: **A. Martin** · Nutrient profiling of foods: a systematic approach. **M. Rayner** · Validating nutrient profile models. **J.L.Volatier** · Nutrient profiles, pleasure, and cost. **A. Drewnowski** · How to communicate nutrient profiles to the consumer ? **Panel** · AFSSA point of view. **A. Martin** · EFSA Representative. **L. Heng** · Consumer's Association Representative. **Ch. Pernin**	**SESSION 16 (PARALLEL)** **FROM INTERVENTIONS TO NATIONAL PROGRAMS - WHAT WORKS?** Chair: **K. Glanz** · Introduction: from interventions to national implementation: **K. Glanz** · Canteen Takeaway - worksite provision of healthy meals in the home. **G.L. Hansen** · More Matters - targeting F&V consumption at sporting events. **G. Rebnes** · Successful national expansion of the Danish Worksite Fruit Program - Utilizing partnerships and multiple motives. **R.M. Pederson**	**SESSION 17 (PARALLEL)** **VALUE AND ORGANISATION IN AGROFOOD CHAIN** Chair: **E. Valceschini** · Quality strategies as value sources. **E. Valceschini** · F&V value: the consumer's approach. **P. Gurviez** · Brand alliances and value creation: a network approach. **M. Coulibaly** · Brand Equity and Co-branding in the F&V sector. **M. Gonzalez- Diaz**
19:00/19:30		**SESSION 18 (PLENARY): REPORTS FROM THE PARALLEL SESSIONS OF THE DAY** · Chair: **A. Schatzkin** ***CANCELLED - This session will take place tomorrow morning, Friday, during session 19***	

	NUTRITION	MARKETING	ECONOMY
8:45/10:45		**SESSION 18 (PLENARY): REPORTS FROM THE PARALLEL SESSIONS OF THE PREVIOUS DAY** · Chair: **A. Schatzkin** **SESSION 19 (PLENARY): F&V CONSUMPTION IN DISADVANTAGED POPULATION** · Chair: **E. Brunner** · Obesity and social class in developed nations. **A. Drewnowski** · Social determinants of health inequalities. **E. Brunner** · How to lower inequalities? **Ph. James**	
10:45/11:15	Fruit and coffee break, *today's fruit break is provided by Dole* – **Poster exhibition**		
11:15/13:15	**SESSION 20 (PARALLEL)** **INTERVENTION STUDIES TO INCREASE F&V CONSUMPTION IN DISADVANTAGED POPULATION IN DEVELOPED COUNTRIES** Chair: **S. Hercberg** · Nutrition interventions in low-income groups: Dearth of research on effective interventions. **AS. Anderson** · Providing an economic supplement for fresh F&V purchase. **H. Bihan** · Effect of a Targeted Subsidy on Intake of Fruits and Vegetables among Low-income Women in the Special Supplemental Nutrition Program for Women, Infants and Children. **D. Herman**	**SESSION 21 (PARALLEL)** **TOOL KIT: ADAPTATION AND IMPLEMENTATION OF INTERVENTION PROGRAMMES** Chair: **R. Lemaire** · Introduction : Overview of tool kit components. **R. Lemaire** · Brand development. **E. Pivonka** · Resource development within a developing country framework. **J. Badham** · Overall partnership development. **Ch. Rowley**	**SESSION 22 (PARALLEL)** **PROMOTION OF F&V CONSUMPTION TARGETING DISADVANTAGED POPULATION IN DEVELOPING COUNTRIES (WHO/FAO)** Chair: **F. Branca** · The new policy framework on diet and physical activities in schools in the context of WHO-FAO Initiative on F&V for Health. **G. Xuereb** · Food-based dietary guidelines as an entry point for F&V promotion: regional perspective on promotion of F&V in Caribbean the context of food-based dietary guidelines. **P. Samuda** · The WHO-FAO Initiative in the context of regional and country interventions linked to various initiatives like PROFEL, GLOBALHORT and Urban and Peri-urban Agriculture. **A. Hodder / J. Ganry / R. Kahane** · Promoting fruits and vegetables in schools: FAO's approach to promoting lifelong healthy eating habits. **E Muehlhoff** · ISHS a bridge between horticulture and health sciences. **Y. Desjardins**
13:15/14:30	Buffet lunch *sponsored by Le Crédit Agricole*		
14:30/17:30		**SESSION 23 (PLENARY)** **REPORTS FROM PARALLEL SESSIONS** ROUND TABLE: **INCREASING F&V CONSUMPTION IN DISADVANTAGED POPULATIONS: WHAT SHOULD DECISION MAKERS DO?** Animated by **A. Drewnowski and E. Riboli** 1. Diet quality, poverty, inequality, and food policy. **E. Brunner** 2. Regional Advisor for Nutrition and Food Security - WHO (Europe). **F. Branca** 3. French General Director of Foods. **J.M. Bournigal** 4. French General Director of Health. **D. Houssin** 5. High commissioner for active solidarity against poverty representative. **E. Grass** 6. Vice President of the French Assembly. **J.M. Le Guen** 7. President of the Anti-Cancer League. **A. Hirsch**	

F&V= Fruit and vegetables

Session 1 (Plenary)

1. Official welcome opening

Saida Barnat
Coordinator of the Fruit and Vegetable Summit
Head of the Scientific Department of Aprifel
Chair of the Scientific Committee of Ifava

Ron Lemaire
Chairman, IFAVA
Executive Vice President, Canadian Produce Marketing Association

Elio Riboli
Professor of Cancer Epidemiology
Head of Division of Epidemiology, Public Health and Primary Care

Serge Hercberg
Director of the Research Center on Human Nutrition
Chairman of the Steering Comittee of the Nutritional and Health National Program

2. Keynote lectures

- The role of F&V in the genesis of cancer and other noncommunicable diseases.
A. Schatzkin

- Lessons from tobacco promotion.
G. Hastings

KEYNOTE LECTURES

Arthur Schatzkin
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- Dr. Schatzkin received his B.A. degree from Yale University in 1969, his M.D. degree from S.U.N.Y. Downstate in 1976, and an M.P.H. (1976) and Dr.P.H. (1982) from Columbia University School of Public Health. He completed residency training in internal medicine at Montefiore Hospital, Bronx, N.Y. (1976-9) and preventive medicine at Mount Sinai Medical Center, New York, N.Y. (1979-81).

- He joined the National Cancer Institute in 1984 where he is currently Chief of the Nutritional Epidemiology Branch, Division of Cancer Epidemiology and Genetics (DCEG).

- Dr. Schatzkin's primary areas of research are the nutritional epidemiology of intestinal cancer and neoplasia, prospective cohort studies of nutrition and cancer, methodologic problems in nutritional epidemiology, and the integration of biomarkers in observational and intervention studies.

- He is a Principal Investigator for the NIH-AARP Diet and Health Study, a prospective cohort study of diet and cancer among over a half million men and women in the U.S, the Polyp Prevention Trial, an intervention study of the effect of a low-fat, high-fiber, fruit- and vegetable-enriched diet on colorectal adenoma recurrence, and the Observing Protein and Energy Nutrition (OPEN) study, a biomarker-based investigation of the measurement error structure of dietary assessment instruments.

The role of F&V in the genesis of cancer and other noncommunicable diseases

Although it has long been common wisdom that consumption of fruits and vegetables promotes health and longevity, only in the last few decades has this view been put to scientific test. A starting point for evaluating the scientific evidence is defining the dietary exposure of interest, which can range from the totality of 'fruits and vegetables', 'fruits' and 'vegetables' considered separately, specific food groups such as cruciferous vegetables or citrus fruits, single foods (garlic or broccoli), or even specific signature nutrients such as beta-carotene or vitamin C. Pathophysiologic processes ('mechanisms') suggested to explain how fruits and vegetables can protect against cancer include actions of several potential anti-oxidants, carcinogen dilution, formation of short-chain fatty acids, modulation of metabolizing enzymes, direct effects on cell proliferation and apoptosis, immune system stimulation, lowered insulin resistance, other hormonal influences, and reduced adiposity.

A number of animal studies have shown that fruit and vegetable interventions can lower tumor burden, even in genetically engineered models; generalization to humans, of course, is problematic. Human population studies—observational and interventional epidemiologic investigations with disease end points—are a key source of evidence but face considerable methodologic obstacles. Measurement error in the commonly used food frequency questionnaire—which tends to attenuate observed relative risks—has been of increasing concern. Other methodologic obstacles include inadequate range of intake and confounding by smoking and other lifestyle factors. An earlier generation of case-control epidemiologic studies tended to show fruit and vegetable protection for several malignancies, but recall bias may have been at work in these retrospective investigations. With the advent of a number of prospective cohort studies, the evidence for protection against colorectal and other cancers has diminished. A recent consensus report, based on systematic literature reviews, from the World Cancer Research Fund, found no 'convincing' evidence that fruits and vegetables protect against cancer; the evidence was deemed 'probable' that non-starchy vegetables lowered the risk of upper aero-digestive and gastric cancers and fruits reduced risk for upper-aerodigestive, gastric, and lung cancer. Randomized controlled trials of fruits and vegetables are sparse but in general have not supported a protective role for these foods with regard to colorectal neoplasia or breast cancer survival; these trial findings, however, do not definitively rule out a role for fruits and vegetables in the incidence of colorectal and breast cancer.

Future advances in our understanding of the etiologic role of fruits and vegetables in malignant disease may come from the development of more accurate assessment instruments for large-scale studies as well as the investigation of fruit and vegetable-gene interactions—relative risks may be enhanced among individuals, for example, with a specific genetically-determined metabolic profile. Although the evidence for cancer is limited at this point, a number of epidemiologic studies show that fruit and vegetable consumption can lower the risk of heart disease, stroke, and diabetes. Thus, even if the evidence for cancer protection should turn out to be modest at best, recommendations to increase fruit and vegetable intake may be reasonable from a broad public health perspective.

KEYNOTE LECTURES

Gerard B Hastings
Professor
Director of the Institute for Social Marketing
Director of the Centre for Tobacco Control Research

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- Gerard Hasting is Professor of Social Marketing, Director of the Institute for Social Marketing, and Director of the Centre for Tobacco Control Research. He was a Special Advisor to the House of Commons Select Committee on Health during its enquiries into the Tobacco (2000), Food (2003/4) and Pharmaceutical industries (2005/6).

- Professor Hastings is also a Member of the UK Government's Advertising and Food Forum, Chair of the EU HELP campaign Advisory Board, a WHO/FCTC Expert on Cross-border advertising, promotion and sponsorship UK, Principal Investigator on the International Tobacco Control Policy Research Programme, Member of the EC ASPECT consortium and the NCI Monograph Group, and an Expert Witness for the UK and Irish Governments in tobacco litigation. He is also the first Andreasen Scholar in Social Marketing, a Member of the Alcohol Education Research Council, Advisor to the World Health Organisation, the National Cancer Research Institute, the Cabinet Office, the Department of Health on critical and social marketing and Visiting Professor at the University of Wollongong.

Lessons from tobacco promotion

The tobacco industry has been remarkably successful in promoting its product, turning into an evocative symbol of freedom, rebellion and maturity. This is a considerable feat considering that tobacco is addictive, expensive and lethal. Yet smokers continue to abound (there are still 12 million in the UK alone) and tobacco shares persistently grow in value. In 2007, for instance, Imperial Tobacco declared profits before tax of £1,237m – up 6% on 2006.

This presentation will explore how the industry achieves such success using marketing, with its capacity to put at the consumer at the heart of the business process. It will also discuss the implications for public health and the fight against obesity, suggesting we too can learn from marketing. Most fundamentally it will conclude that we need to be empathetic to the needs of those who are obese and overweight, and that from this the following key principles flow:

1. we should recognise that the evidence base has revealed a rich variety of opportunities for us all to make their lives safer, longer and (above all) more fulfilled (the benefits of exercise and healthy eating are just one example of this) and avoid presenting it as a collection of disempowering, capricious threats.

2. although this evidence base is important, slavish adherence to it gets in the way of clear and strategic thinking. Intuition and vision have a place at the decision making table, along side data.

3. communications are only a small part of the solution. Glossy advertising campaigns – especially isolated ones - are not the answer.

4. by the same token, ad hoc campaigns of any sort cannot bring about the kind of social change we are seeking.

5. progress will depend on a deep and sustained understanding of people's real needs, recognising that these may be more complex than a disease and accident free long life. This understanding has got to be used to build long-term relationships with our clients and stakeholders.

6. good health and safe communities are the product of many complex factors - including Government policy, commercial marketing, education and wealth - as well as individual lifestyle choices, and progress will depend on action on all these fronts. Stakeholders are a key target group.

7. competitive analysis is a crucial tool: one of the principle reasons we have so many binge drinking, smoking – and overweight - people is that the commercial sector has been better at marketing than we have. This has to change.

8. this is a long and complex game which demands a sustained strategic response. The Marlboro brand has remained largely unchanged for fifty years; Coke is a centenarian – our efforts need similar continuity.

9. we do not know best - indeed sometimes it may be that no one knows best; but this is not a problem provided we level with people, adult to adult. It is more important that our clients trust us than obey us.

10. success will come when people are given - and experience - a measure of genuine control over their own destiny.

In short, we need to start doing some social marketing. We will use the consumer and stakeholder centred strategic approaches that have made the commercial sector so successful. We also will put effective controls on those who put their commercial interests before people's health.

Watch this space: good health is coming to an outlet near you.

Session 2 (Plenary)

Chairs

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F&V consumption to reduce obesity: global prospective

• Introduction.
Ph. James

• The impact of F&V on public health.
C. van Rossum

• Diet quality/lifestyle and low energy density.
H. Schroder

• Strategies to enhance satiety with F&V: implications for weight management.
B. Rolls

Session 2
(Plenary)

Philip James
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- Professor James, a medical physiologist, spent 3 years in paediatrics in Jamaica and a year at Harvard before returning to the London School of Hygiene and Tropical Medicine.

- In 1974 he became Assistant Director, MRC Dunn Nutrition Unit, Cambridge and then Director of the Rowett Research Institute, Aberdeen, a large biological nutrition research institute relating to the whole food chain.

- He chairs the International Obesity TaskForce, responsible for global initiatives relating to food and health with particular emphasis on the pandemic of obesity. He chairs a Presidential Council of 5 WHO related medical NGOs for cardiology, diabetes, paediatrics, nutrition and obesity operating globally to stem the pandemic of adult chronic disease. He chaired and wrote the UN Millennium Commission Report on global issues relating to nutrition up to 2020, wrote Blair's plans for the UK Food Standards Agency and those for a new EU Food and Health Authority.

- He currently operates globally, focusing on creating National Councils to prevent childhood obesity and persuading governments to change their policies.

Introduction

Only at the turn of the Millennium has the significance of adequate fruit and vegetable(F&V) intake been recognised in global, regional and national quantitative terms as contributing to the prevention of a whole range of chronic diseases including high blood pressure, strokes, coronary heart disease and many cancers. The subsequent WHO 916 report assessed the likely contributions of diet to the prevention of obesity and concluded that F&V made important contributions to obesity prevention probably primarily through their effects on the energy density of food. On a global basis it is assumed that low and moderate income countries (the former "developing world") have substantially bigger intakes than in the West but new analyses reveal very deficient diets in many developing countries this being markedly exacerbated by the dramatic changes in diet evident when urbanisation occurs. Furthermore some major culinary habits with long cooking times, probably developed to limit bacterial spoilage of food, mean that many communities with apparent substantial F&V intakes e.g. in India have pandemic deficiencies of those water soluble vitamins found in F&V. The policy, political and practical challenges of combating these problems and contribute to avoiding obesity and its co-morbidities is one of the neglected areas of analysis. Thus this symposium is important in providing the background information needed to formulate new approaches to national policy making and challenging the current perceptions of agricultural priorities.

SESSION 2
(PLENARY)

Caroline van Rossum
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- Caroline van Rossum was born on July 28th, 1968 in Woerden, the Netherlands. From 1986 till 1990 she studied Nutrition and Dietetics at the "Haagse Hogeschool'in The Hague. In 1990, she started the study Human Nutrition at Wageningen University. As part of that study she conducted an epidemiological research project on the socio-economic inequalities, a nutritional research project in Bogor, Indonesia, and a marketing research. In 1993 she received her MSc degree (cum laude). She started working as data manager for clinical research at Solvay Duphar in Weesp. In 1994 she started her PhD project at the Department of Public Health and the Department of Epidemiology of the Erasmus University in Rotterdam. The title of her thesis was socio-economic inequalities in cardiovascular disease in an ageing population. A part of this thesis was performed at the Department of Epidemiology and Public Health of the University College London. As post-doc she worked on genetic variability in diet induced weight gain at the National Institute of Public Health and the Environment (RIVM) in Bilthoven.

- Since 2003 she is working as a scientist and project director at this institute, involved in different projects: the Dutch national food surveys, modelling health effects of nutrition and possible impact of nutritional policies on public health and the Dutch food composition database.

The impact of F&V on public health

Diet and lifestyle are major determinants of chronic diseases such as cancer, cardio-vascular disease and diabetes. Dietary levels of disqualifying ingredients such as sodium, trans fatty acids, saturated fatty acids and energy are too high, whereas dietary intake of qualifying factors such as fiber, fruits and vegetables are too low. In 2003, the WHO has set population consumption goals for fruit and vegetables at >400 g/day, recommendations that are also found in many national dietary guidelines. Fruits and vegetables are generally low energy-dense / high nutrient-dense foods. They provide carbohydrates, fiber and many vitamins and minerals and are low in fat and sodium. In addition to nutrients, fruits and vegetables also contain a wide variety of non-nutritive dietary constituents. In contrast to the well-established health effects of fruits and vegetables in general, the scientific evidence for health effects of the individual constituents is lacking to date: even the most well-studied plant antioxidants such as vitamin C, vitamin E, and ß-carotene fail to prove effective in well-performed human studies.

Model simulations can be used to calculate long-term health effects and health care related costs of policy targets and dietary interventions. Using the RIVM chronic Disease model, we have shown that with an elevated consumption of fruit, vegetable in the Netherlands large health gains can be achieved. This health gain was larger than that due to improvements of the fatty acid composition. If the Dutch population complies with all dietary recommendations related to fruit, vegetable, fish and fat consumption, about 140,000 fewer deaths and about 3% savings in health care costs can be seen over 20 years, although increased life expectancy also means a rise in health costs in later life.

This model was also used to simulate the effects of two dietary interventions on fruit and vegetables, 'SchoolGruiten' and 'Fruit at the workplace'. Primary school children participating in 'SchoolGruiten', (getting fruit and vegetables in the classroom), will see an increase in their life expectancy by ca. 0.37 years, assuming long-term effects of the intervention. They will also, on average, stay healthy for longer. In this way, medical costs for these children will be less at a younger age; however, most of these costs are postponed. Introducing 'Fruit at the workplace' in the Netherlands for 1 in every 10 employees, will increase the life expectancy of an 20-year old by an estimated 0.08 year and decrease the health-related costs of the whole population by 0.2 per cent. All these kind of model simulations are a good method to underpin nutritional policies.

In conclusion, there is sufficient evidence for the positive effects of consumption of fruits and vegetables on public health. The public health effects encompass many thousands lives spared and several billions of euros saved in The Netherlands only. It remains a policy and consumer issue to translate the health effects of fruits and vegetables into daily practice.

SESSION 2
(PLENARY)

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- Helmut Schröder holds a diploma in nutritional sciences from the University of Giessen and a Ph.D. in Human Biology from the Phillips University of Marburg.

- He currently holds two Senior Research Scientist appointments in Spain, at the Lipids and Cardiovascular Epidemiology Research Unit, Barcelona, and in physiopathology of obesity and nutrion within CIBER (Centros de Investigación Biomédical en Red), a network of biomedical research centres based at Madrid's Carlos III Health Institute, Spain.

- His basic research interest is the analysis of lifestyle-disease relationships. This includes studies of the effects of nutrition on obesity and other cardiovascular risk factors. He is involved in several large epidemiological and clinical intervention studies.

- Dr. Schröder is a member of the editorial board of Journal of Nutritional Biochemistry, the Spanish Society for the Study of Obesity (SEEDO), and the Spanish Society of Community Nutrition.

Diet quality/lifestyle and low energy density

Identifying properties of foods or dietary patterns related to the deregulation of energy balance, a major factor in weight gain, is essential to the development of new strategies in the fight against obesity. Preventing excessive energy intake is a key factor in this battle. The energy density of a diet, defined as the amount of available dietary energy per unit of weight, seems to play a role in regulating food intake.

Due to the amorphous nature of energy density, freely selected low energy density diets might differ considerably in food and nutrient composition across among populations. The average energy density of the diet of Mediterranean populations is remarkably lower than that reported for the United States and Great Britain, reflecting substantial differences in dietary patterns. Similarly, the choice of foods in a low energy density diet varies by cultural background. In this sense it is interesting to note that following the traditional Mediterranean diet means following a low energy density diet.

Ingestion of most nutrients increases with increasing energy consumption, and energy density increases with energy intake. Theoretically, then, low energy density diets should be more prone to nutrient inadequacy than are high energy density diets. However, several recent reports have suggested that low energy density diets are associated with higher diet quality and lower risk of obesity and diabetes in the general population. Whether these findings hold for more vulnerable segments of the society, such as the elderly, is unknown.

Aging is accompanied by physiological changes, such as loss of appetite and taste sensitivity that can influence nutrition status. Therefore, it is not surprising that older adults are generally at greater risk for nutritional deficiencies than younger adults. Promoting diets for the older adult that provide appetizing food with adequate nutrient intake is of paramount importance. Lower energy consumption in the elderly can be accompanied by a general decrease in nutrient intake or by an increase in nutrient density, such as a selective decrease in consumption of the "nutrient-empty calories" in sugar-sweetened beverages.

To better understand how low energy density diets relate to diet adequacy, it is important to examine the underlying food intake patterns that explain low energy density diets in various food cultures. Whether or not a diet can be recommended to the public depends mainly on its nutrient adequacy. However, if the recommendation of healthful food choices implies higher monetary costs, it is important to recognize that the effort runs the risk of being futile, particularly in low income groups.

Session 2 (Plenary)

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- Dr. Barbara Rolls obtained a B.A. in biology from the University of Pennsylvania and a Ph.D. in physiology from the University of Cambridge, England.

- Dr. Rolls held a number of research fellowships at the University of Oxford. In 1984, she joined the Johns Hopkins University School of Medicine faculty as a Professor of Psychiatry. In 1992, she became Professor of Nutritional Sciences and Guthrie Chair in Nutrition at The Pennsylvania State University. Dr. Rolls has served as Past-President of both the Society for the Study of Ingestive Behavior and the North American Association for the Study of Obesity.

- Dr. Rolls has been the recipient of a number of awards including: the American Society of Nutritional Sciences Award in Human Nutrition, a MERIT award from the National Institute of Diabetes and Digestive and Kidney Diseases, the International Award for Modern Nutrition, and Honorary Membership in the American Dietetic Association. In 2006 she was elected a fellow of the American Association of the Advancement of Science and was selected as the 2007 W.O. Atwater Lecturer at Experimental Biology. In April of 2008, Dr. Rolls will receive the Centrum Center for Nutrition Science Award at the Experimental Biology Annual Meeting.

- Dr Rolls' research interests include the controls of food and fluid intake, especially as they relate to obesity.

Strategies to enhance satiety with fruits and vegetables: implications for weight management

Because fruits and vegetables are high in water and fiber, incorporating them in the diet can reduce energy density (kcal/g), promote satiety, and decrease energy intake. Recent research suggests specific strategies that will influence the impact of fruits and vegetables on satiety and energy intake. For example, adding a first course of vegetables or fruit to a meal affects total energy intake in the meal, and this effect depends upon the portion size and energy density of the first course. Eating a large, low-energy-density first course of a mixed salad enhanced satiety and reduced meal energy intake. Starting a meal with low-energy-density vegetable soup in a variety of forms (chunky, pureed, etc) reduced meal energy intake by 20%. Fruit consumption (apple) as a first course also affected energy intake, but the effect varied with the form of the fruit, such that whole fruit enhanced satiety more than pureed fruit or juice. Thus, starting a meal with low-energy-density vegetables or fruits shows promise as a strategy for weight management, but the long-term effectiveness of this approach should be tested.

A number of studies show that incorporating vegetables into the main course of a meal reduces energy density, and this leads to reduced energy intake since people tend to eat a consistent weight of food. This approach shows promise for the prevention of overweight in that we found that adding extra vegetables to a pasta sauce to lower the energy density reduced energy intake in 3- to 5-year-old children. Another strategy that is promoted to increase vegetable intake is to increase the proportion of vegetables served during a meal, for example, by filling half the plate with vegetables. New data will be presented on the effects of changing the portion size of vegetables during a meal.

While data examining the relationship between dietary energy density and body weight are still limited, analysis of data from the multi-center PREMIER trial indicates that changes in body weight were related to changes in dietary energy density. This trial included over 600 participants divided into 3 treatment groups that received different amounts and types of dietary advice. Because changes in energy density were reported by participants in each treatment group, analyses were conducted by stratifying them by change in energy density (ED) tertile over the 6 months of treatment. Participants in the highest tertile (ie, largest ED reduction) lost more weight (5.9 kg) than those in the middle (4.0 kg) or lowest (2.4 kg) tertile. Participants in the highest and middle tertiles increased the weight of food consumed (300 and 80 g/day respectively) but decreased their energy intake (500 and 250 kcal/day). The highest and middle tertiles had favorable changes in fruit, vegetable, vitamin, and mineral intakes. Taken together these data suggest that lowering the energy density of the diet by consuming more fruits and vegetables enhances satiety, facilitates weight loss, and improves diet quality.

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Session 3 (Parallel)

F&V interventions to reduce cardiovascular diseases

Chair

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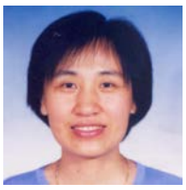
- The importance of F&V in the prevention of cardiovascular disease.
FJ. He

- Are supplements equivalent to dietary micronutrient consumption?
JV. Woodside

- Effects of F&V consumption on plasma blood pressure: intervention study.
L. Dauchet

- F&V and cardiovascular disease risk: what should we do?
KT. Khaw

SESSION 3
(PARALLEL)



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-Dr. Feng He received her medical training and a Bachelor degree of Medicine in 1984 at HeBei Medical University, China. After 2-years' working as a physician, she went on for further training at Beijing Heart, Lung and Blood Vessel Medical Centre and obtained a Master degree in Cardiovascular Epidemiology. She was involved in a number of national and international cooperative research projects on the prevention of cardiovascular disease in China.

- In 1996, she went to the UK to broaden her experience in cardiovascular research and obtained a PhD at St. George's University of London in 2002. Since then she has focused her research on the role of dietary salt and potassium intake in the prevention of hypertension and cardiovascular disease.

- During the past 10 years, Dr. He has published over 30 papers in peer-reviewed journals. Her publications on salt and fruit and vegetables have received worldwide media coverage. Currently she is working on a number of large scale randomised trials on the effects of salt reduction and potassium supplementation on blood pressure and surrogate markers of target organ damage in cardiovascular disease.

The importance of F&V in the prevention of cardiovascular disease

Cardiovascular disease is the leading cause of death and disability worldwide. A low consumption of fruit and vegetables has been shown to be an important contributory factor for cardiovascular disease. The evidence for this comes from different sources including case-control studies, prospective cohort studies, and secondary prevention trials.

A number of case-control studies have shown an inverse association between fruit and vegetable consumption and cardiovascular disease. The largest case-control study is the INTERHEART study [Yusuf et al. Lancet 2004;364:937-952] which enrolled 15152 cases of first acute myocardial infarction and 14820 controls from 262 centres in 52 countries, using standardised methods for data collection. The results showed that individuals who ate fruit and vegetables daily compared with those who did not, had a 30% lower risk of myocardial infarction after adjusting for potential confounding factors.

There have been over 20 prospective cohort studies that have looked at fruit and vegetable intake and risk of cardiovascular disease. Recently we performed a meta-analysis of these studies. We included studies that reported relative risks and corresponding 95% confidence interval of stroke or coronary heart disease (CHD) with respect to frequency of fruit and vegetable intake. For stroke, 8 studies consisting of 9 independent cohorts met the inclusion criteria. There were 257551 participants with an average follow-up of 13 yrs. A total of 4917 strokes occurred. For CHD, 12 studies consisting of 13 independent cohorts met the inclusion criteria. There were 278459 participants (9143 CHD events) with an average follow-up of 11 yrs. The pooled analyses showed that increased consumption of fruit and vegetables was related to a reduced risk of both stroke and CHD. Compared with those who had less than 3 serving/day of fruit and vegetables, individuals with 3-5 serving/day had an 11% (P=0.005) lower risk of stroke and 7% (P=0.06) lower risk of CHD. Individuals who had more than 5 serving/day of fruit and vegetables had a 26% (P<0.0001) lower risk of stroke and 17% (P<0.0001) lower risk of CHD.

Although there is no outcome trial evidence looking at fruit and vegetables alone on the primary prevention of cardiovascular disease, randomised trials in individuals who had survived coronary heart disease, showed that increasing fruit and vegetable intake in combination with other diet and lifestyle changes significantly reduced the recurrence of CHD events. These results lend further support to the important role of fruit and vegetables in CHD prevention though the beneficial effects are not solely attributable to fruit and vegetable consumption.

The average fruit and vegetable intake in most developed countries is approximately 3 serving/day, and it is even less in developing countries. The current recommendations are to increase the intake to 5 or more serving/day. Greater efforts should be made to implement these recommendations. If these were achieved, the benefits would be very large in terms of reducing the appalling burden of cardiovascular disease worldwide.

SESSION 3
(PARALLEL)

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-Dr Jayne Woodside is a Senior Lecturer in Clinical Biochemistry at Queen's University Belfast. Her major research interest is in the effect of micronutrients and micronutrient-rich foods on disease-related endpoints particularly vascular disease.

- She has attracted significant research funding and published extensively in this area.

- Dr Woodside is part of a research group which is currently running or has recently completed five fruit and vegetable intervention studies with a variety of clinically relevant endpoints.

Are supplements equivalent to dietary micronutrient consumption?

Whilst clinical deficiency of micronutrients is uncommon in the developed world, a sub-optimal intake of certain micronutrients has been linked with an increased risk of chronic diseases such as cardiovascular disease, cancer, osteoporosis and age-related macular degeneration. Observational cohort studies have consistently demonstrated an association between high intakes of micronutrients such as vitamin E, vitamin C, folic acid and ?-carotene, and lower risk of coronary heart disease, stroke, and cancer at various sites. Attention has therefore focused on increasing micronutrient status in order to theoretically reduce chronic disease risk. Increasing micronutrient status can involve a number of approaches: increasing dietary intake of micronutrient-rich foods, food fortification, or use of supplements. However, randomised intervention trials of micronutrient supplements have, to date, largely failed to show an improvement in clinical endpoints and, in fact, high-dose ?-carotene supplementation has been shown to increase the incidence of lung cancer and the incidence of all-cause mortality in smokers. The discordance between data from cohort studies and the results so far available from clinical trials remains to be explained. Various aspects of the trial design need to be considered. It may be that the duration of clinical trials is too short to show a benefit, and that micronutrient intake over many years is required to prevent disease. Careful thought needs to be given to the design of clinical trials, with dose, duration of treatment and follow-up period, the population's initial dietary micronutrient intake and status, and extent and distribution of existing disease being taken into consideration. For example, positive results with animal models have nearly always tested the effects of antioxidants on the early stages of coronary heart disease. Whether or not antioxidants have inhibitory effects on the later stages of CHD, which is what has actually been tested in human randomised controlled trials, remains to be seen. In addition to trial design issues, the biological plausibility of the trials also requires consideration. The significant results linking micronutrient intake with disease risk observed in cohort studies may be due to confounding with other diet and lifestyle behaviours. Another reason may be that the complex mixture of micronutrients found, for example, in a diet high in fruit and vegetable intake may be more effective than large doses of a small number of micronutrients, and therefore that intervention studies which use single micronutrient supplements are unlikely to produce a lowering of disease risk. Studies concentrating on whole foods (e.g. fruit and vegetables) or diet pattern (e.g. Mediterranean diet pattern) may therefore be more effective in demonstrating an effect on clinical endpoints. This presentation will consider the clinical trial evidence for a beneficial effect of micronutrient supplements on health, and review the alternative approaches to the study of dietary intake of micronutrients.

SESSION 3
(PARALLEL)

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- Doctorate in Medicine (Rouen University, 2005)
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- Assistant Professor in public Health- Rouen University CHRU Rouen , France (2005-2007)
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Effects of F&V consumption on plasma blood pressure: interventions studies

Several randomized clinical trials have measured the effect of increasing the consumption of fruit and vegetable on blood pressure levels. In the DASH study three diet were randomly assigned to 459 subjects with moderate hypertension: a diet rich in fruit and vegetables, a diet combining low fat, low fat dairy products and high fruit and vegetable consumption. All meals were provided to participants by the investigators and the intakes were strictly controlled over a period of 8 weeks. The systolic blood pressure (SBP) of participants who were randomly assigned to the diet rich in fruit and vegetables decreased by 2.8 mm HG ($p<0.001$) compared to the control group. This decrease was more pronounced in the combination diet (-5.5 mm Hg $p<0.001$). Other randomized studies conducted in free-living men and women assessed the effect of recommendations to eat more fruits and vegetable one blood pressure over longer periods of time. In a study conduct in Oxford, John et al observed, after 6 months of follow-up, a decrease of 3.4 mm HG in subjects who were encouraged to increase their fruit and vegetable consumption to at least five servings per day. The PREMIER study confirmed the effect of the combination DASH diet after 18 month of follow up (-1.9 mm HG compared to the control group). In the later study, blood pressure lowering were not greater than in the control group witch had usual diet recommendation. In contrast, post-hoc analyses of interventions trials on cancer prevention (Minnesota CPRU diet intervention and Women's Health initiative) didn't show any effect, or a very limited effect of intervention comprising an increase of fruit and vegetable on blood pressure. In summary, experimental studies have shown significant effects of fruit and vegetable consumption on blood pressure. Several components of fruit and vegetables have been proposed to be responsible of blood pressure lowering. The role of fibers, potassium, calcium and magnesium has been confirmed in experimental studies. Results from intervention trials on vitamin or antioxidant supplementation effects are less conclusive. Finally, in addition to there own effects, fruits and vegetables might substitute less healthy food. In general, the effect of fruits and vegetable on blood pressure is small. However, since high blood pressure is a major cardiovascular risk factor, a small reduction of blood pressure could produce appreciable results at population scale. Furthermore, published cohort studies suggest that fruit and vegetables could slowdown age-related progression of high blood pressure.

SESSION 3
(PARALLEL)

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- Kay-Tee Khaw is Professor of Clinical Gerontology at the University of Cambridge School of Clinical Medicine. She trained in medicine at Girton College, University of Cambridge and St. Mary's Hospital, London and in epidemiology at the London School of Tropical Medicine and Hygiene, with subsequent clinical and academic posts in the University of London and University of California San Diego.

- Her research interests are the maintenance of health in later life and the causes and prevention of chronic diseases including cardiovascular disease, cancer and osteoporosis with a particular focus on nutrition and hormones. She is principal investigator in EPIC-Norfolk, a prospective population study of determinants of health in 30,000 men and women and part of a ten country European collaboration

F&V and cardiovascular disease risk: what should we do?

Many prospective population studies have reported that higher consumption of fruit and vegetables is associated with substantially lower risks of cardiovascular disease. Intervention trials have also reported that increasing fruit and vegetable consumption may also lower cardiovascular disease risk factors such as blood pressure or inflammatory markers. However, there is still a paucity of intervention trials with cardiovascular disease endpoints. Most longer term dietary intervention trials which have increased fruit and vegetable intake have also involved changes in other components in the diet including amount and type of fats and carbohydrates so it is difficult to distinguish specific effects of fruit and vegetables. The Lyon Diet-Heart study of secondary prevention reported 70% reduction in cardiovascular events; the intervention was primary targeted at changes in dietary fats though fruit and vegetables also increased in the intervention arm. The Women's Health Initiative, in contrast, with an intervention aimed at lowering total fat intake and increasing fruit and vegetable intake, reported no differences in cardiovascular outcomes between the intervention and control arm.

There is a paucity of evidence therefore from intervention studies of fruit and vegetable intake and cardiovascular disease events. This may be because high fruit and vegetable intake in observational studies may simply be an indicator of some other factors, lifestyle or otherwise, which are more directly related to cardiovascular risk; or lack of power in the trials as the fruit and vegetable intake in the Women's Health Initiative only increased slightly, interactions with other lifestyle factors, or because we do not yet understand which components or types of fruit and vegetables are related to cardiovascular risk. Further research needs to address these issues. Nevertheless, given the many demonstrated biological effects of components of fruit and vegetables which may influence cardiovascular disease risk factors, with the substantial body of epidemiologic evidence, it would seem prudent to continue with public health recommendations for high fruit and vegetable intake (e.g five servings daily) to reduce cardiovascular risk.

Session 4
(Parallel)

Empowering the local and global F&V value chains: Policy and Practice

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This session is anchored in the 2007 McGill Health Challenge Think Tank: Ways Forward Blueprints to Shift the Drivers of Food Supply and Demand in a Health-Friendly Direction. The McGill Health Challenge Think Tank is a platform that assembles the world's most innovative thinkers and leading organizations in health, education, media, agriculture and business to serve as a springboard for changes that address the pressing challenges posed by obesity and other chronic diseases, in a manner that simultaneously promotes economically sustainable social and business innovations. In the Fall 2007, adopting the perspectives of global value chains and complex systems, participants articulated an agenda with a set of lever points for changes to transform the food chain in a "health-friendly" direction. They built into its strategic development and everyday activities better convergence between health, economics and culture. The aim was to create an agenda that would mobilize all sectors and all levels just as "environmentally-friendly" actions have done. The FV industry was at the core of many of the lever points for change identified in shifting these drivers of food supply and demand. This session will build on this material to empower the local and global FV value chains to scale up their contribution to a healthy diet for all around the world, while contributing to the economic performance of all levels of the industry.

• Highlights from the 2007 Think Thanks.
L. Dubé

• The challenge for the local and global F & V industry.
R. Lemaire

• Value-chain perspective.
C. Hawkes

• Innovation perspective.
RJ. Brummer

• Social norms and culture perspective.
C. Fischler

References

- Highlights from the 2007 Think Thanks. L. Dubé
- The challenge for the local and global F & V industry. R. Lemaire
- Value-chain perspective. C. Hawkes
- Innovation perspective. R. J. Brummer
- Social norms and culture perspective. C. Fischler

SESSION 4
(PARALLEL)

Laurette Dubé

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- Laurette Dubé (MBA, PhD) is a Professor and holds the James McGill Chair of consumer and lifestyle psychology and marketing at the Desautels Faculty of Management of McGill University, which she joined in 1995. Dr. Dubé received her Ph.D. from Cornell University in 1990, specializing in consumer and lifestyle psychology and marketing. She has received prior to her doctoral degree a MPS in Marketing and Management (Cornell University), a MBA in Finances (HEC), and a BSc in Nutrition (Laval).

- Dr. Dubé's lifetime research interest bears on the study of affective processes underlying consumption and lifestyle behavior and how such knowledge can inspire more effective product and service design and management, as well as health and marketing communications. Her academic achievements are solidly anchored in both marketing and health management. She examines affective processes from their neurobiolo-gical manifestations to their conscious experience, to develop more effective communications and service manage-ment strategies. She is the founding scientific director of the McGill Integrative Health Challenge Think Tank, created to foster partnerships among scientists and decision-makers from all sectors of society to encourage a more ambitious notion of what can be done for more effective health management.

Highlights from the 2007 Think Tanks

Co-Chair Laurette Dubé will focus on two of the system-level lever points for change having emerged from the 2007 Think Tank that can empower the FV industry to serve as catalyst for policy and practice changes. The first lever point for change she will consider is a shift in the drivers of supply and demand in the primary production sector. This shift would move the sector away from a "commodity" mindset to one of "value-creation", i.e., away from a vision of itself as feeding everybody at a low cost to feeding everybody with respect to his/her needs and requirements. A second lever point for change is the simultaneous development of both healthy agriculture, business, trade and economic public policies, and, of economically, socially and culturally sustainable health policies on the government agenda. These would emphasize not only health, nutrition and equal access to health foods, but would take into account, the sensory, social and cultural values attached to food and eating. Challenges for policy lie in striking the appropriate balance between regulatory and policy controls – necessary for the prevention of threats to the health of individuals – and a flexible and innovative approach to food and food service operations. Such an approach would entice economic actors to market foods that are low-caloric, flavourful, satisfying and available at an accessible cost, regardless of the socio-economic, geographical or ethnic background of the consumer. Areas where such a balance is demanded include food labelling, health claims related to food products, new ingredients and product approval processes, advertising, and, in particular, advertising targeting children. This new and more complex vision of governmental action perceives governments not only as providers of public funds, but as capable of engaging other social and economic actors. This requires lowering the barriers that restrain action by these actors and reinforcing cooperation, fairness, trust and reciprocity among actors involved.

SESSION 4
(PARALLEL)

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- Ron is Chairman of the International Fruit and Vegetable Alliance, and was instrumental in the development and incorporation of this entity. IFAVA is an international organization incorporate in Canada 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. Member Countries include: Canada, USA, France, Denmark, New Zealand, Australia,

South Africa, Peru, Japan, China, Argentina, and Chile.

- Ron has been with the Canadian Produce Marketing Association (CPMA) since 1998. CPMA is a not-for-profit association committed to increasing the market for fresh fruit and vegetables in Canada. The CPMA represents over 650 members, including approximately 220 foreign firms and organizations representing over $8 billion dollars in produce sales in Canada. As Executive Vice President and Director of Marketing for the CPMA, Ron is responsible for the development, strategic alliances and the implementation and management of sound and strategic programs which will support the goals and objectives of the Canadian based international Association..

The challenge for the local and global F&V industry

Co-Chair Ron Lemaire will review the challenges faced by the FV industry. Indeed, in spite of the increasing scientific evidence that low fruit and vegetable intake is a key risk factor for several non-communicable diseases, in spite of the growing popularity and consumer awareness of promotion programs such as the 5 a Day Program, less than a third of individuals in many countries eat the recommended amount of fruits and vegetables. In fact, the impact of promotional programs such as the 5 a Day Program on behavioural change is not clear, nor is its impact on the agri-food sector. Lemaire will review the many barriers that the FV industry has to overcome in order to increase their share of individuals' stomach, mind and wallet. These challenges relate to high production, transportation and distribution costs and high relative consumer prices. Barriers are also tied to lack of convenience in terms of storage, transportation, consumption, and cooking; to biology, as as human beings have developed a taste for high-caloric foods; to social norms that constrain the number of consumption occasions; and to advertising and media, where FV are less present than their high-caloric competitors.

SESSION 4
(PARALLEL)

Corinna Hawkes

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Corinna Hawkes is a freelance consultant specializing in policies to address the global shift towards unhealthy diets, overweight/obesity, and diet-related chronic diseases. She is a Visiting Research Fellow at the Centre for Food Policy, City University, London. Until March 2008, Corinna was Research Fellow at the International Food Policy Research Institute (IFPRI), Washington DC, where she led their research program on global dietary change. Prior to joining IFPRI, she worked and consulted for the World Health Organization, where her research supported the development of the WHO's Global Strategy on Diet, Physical Activity and Health. A British citizen, Corinna received her PhD in geography from the University of London in 1998. She began her work on food policy at Sustain, a London-based non-governmental organization, where she focused on food poverty issues. After moving to the United States in 1999, she worked with a range of community food groups on promoting a healthy food supply. She also taught a Masters course on Environmental Nutrition at the Department of Nutrition and Food Studies at New York University. Corinna has published over 50 articles and reports on food issues..

Value-chain perspective

Corinna Hawkes, will specify the value-chain lever points for changes – in terms of policy and business and civil society organizational practices – at both the local and global level. These include policy and practice changes: (1) in farming, and the subsequent points along the chain, to create value by diversifying production and moving toward more niche- and value-added horticultural crops and varieties; (2) in the better integration of small farms to the social and health fabric of the society in which it operates as well as to the industrial segments of the food chains; (3) in the policy changes for better coherence between health, trade, agriculture and business to ensure the price and functional accessibility of FV that are safe and tasty, and that contribute to the diversified nutritional needs of individuals and populations worldwide.

SESSION 4
(PARALLEL)

Robert-Jan Brumer
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- Robert-Jan Brummer is Professor of Gastroenterology and Clinical Nutrition at Örebro University, Sweden, and Honorary Professor in Medical Nutrition and Clinical Dietetics at Maastricht University, the Netherlands. He studied medicine at the Catholic University of Nijmegen in the Netherlands. He was a Research Fellow at the Department of Clinical Nutrition at Sahlgrenska University Hospital, where he obtained a degree as a clinical nutritionist and a PhD for his thesis 'Body composition in acromegaly: A clinical and methodological study'.

- His main field of interest in research is the metabolic interface between gastrointestinal disease / 'brain-gut axis' and nutrition as well as nutrient-gut interaction. Since 2004 Professor Brummer is working as Program Director of 'Nutrition and Health' at Top Institute Food and Nutrition (formerly Wageningen Centre for Food Sciences), a public/private partnership that generates vision on scientific breakthroughs in food and nutrition. He serves a number of national and international board functions within the domain of agro-food and nutritional innovation, and as such has been one of the architects of the EU Technology Platform Food4Life program.

Innovation perspective

Robert-Jan Brummer, will map the invention and innovation processes that are necessary to articulate a vision of the scientific breakthroughs by which the FV industry can better contribute to nutrition and health worldwide. Innovative products and technologies that respond to consumer demands for economically and functionally accessible, safe, tasty and healthy FV include: innovations that extend shelf life and that improve the quality of the product by investing in cooling equipment; new technologies for controlled atmospheric storage; the expanded use of irrigation to increase product consistency; innovation that also extends the marketing season through investments in proper pre-storage cooling, storage and varieties, etc.

SESSION 4
(PARALLEL)

Claude Fischler
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- Dr. Claude Fischler earned his PhD in sociology from the Ecole des Hautes Etudes en Sciences Sociales (EHESS) in Paris. His early research on beliefs and social representations in contemporary Western societies was pursued under the auspices of his mentor Edgar Morin. It led him to work on topics such as rumors, contemporary use and consumption of astrology, or the structures of media narratives. After subsequent long term fieldwork studies on urban planning and policies, their genesis and their local consequences, Fischler became interested in the interfaces between biology and culture. He took on food and eating as his main object of research in the mid seventies. Working in a deliberately interdisciplinary perspective, he explored the structure and function of cuisines, taste and preferences, body image and their evolution and change over time and space (L'Homnivore, Paris: Odile Jacob, 1990, 2001; to be published in english by University of California Press). Subsequently, his work came to focus on perception of risk, "scares" and crises, on comparative approaches of attitudes toward food and health across cultures (in relation to, among other things, prevalence of obesity), on the reception and perception of sensitive technologies and on assessment and measurement of well being and quality of life in a comparative perspective.

- Dr. Fischler is a Research Director ("Directeur de recherche") at CNRS, the national research agency of France, a co-director of Institut Interdisciplinaire d'Anthropologie du Contemporain (IIAC), a research and graduate studies unit of CNRS and Ecole des Hautes Etudes en Sciences Sociales in Paris, within which he is the head of the Center for Transdiscliplinary Studies - Sociology, Anthropology, History (CETSAH). He served on the Scientific Committee and the Expert Committee on Human Nutrition of AFSSA, the French Agency for Food Safety and on its board of directors. He is a member of the steering committee of the French National Program on Nutrition and Health and serves on the Expert Advisory Group on Risk Communication at EFSA, the European Food Safety Authority.

Social norms and culture perspective

Claude Fischler, will help actors along the FV local and global value chains acquire a more sophisticated understanding of the many cultural, social and psychological sources of influence that determine individual food preference and choice, including FV. Cultures vary in the values they attach to food, some rationally emphasizing health and nutrition or symbolically favoring natural and/or organic foods, others focusing on hedonism or guilt, and a large number viewing food as a core social engine. Groups of individuals presenting such range of cultural values attached to FV and other foods can also be found within cultures. This will empower actors along the FV chains to develop a more differentiated and segmented approach to their actions targeted to increase consumer demand as well as improve the response to promotional interventions such as the 5 a Day Program. Nutrition is not the only benefit that consumers value in FV and important health and economic returns may await.

Session 5
(Parallel)

Cultural diversity, biodiversity and territorial management

Chairs

Bernard Chevassus-au-Louis
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- Introduction.
B. Chevassus-au-Louis

- The role of genetic diversity in fruit species for the creation of new varieties.
Y. Lespinasse

- The diversity of French F&V: ethnic market development and the emergence of ancient and new species.
M. Chauvet

- Cultural and biological diversities: the need for a joined approach.
D. Veschambre

SESSION 5
(PARALLEL)

Bernard Chevassus-au-Louis
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- Bernard Chevassus-au-Louis, 59, geneticist, PhD, is presently Inspector General ("Inspecteur général") at the French ministry of agriculture and was from 2002 to 2006 President of the National Natural History Museum in Paris. He studied at the "Ecole Normale Supérieure" of Paris during which time he became specifically interested in marine biology and genetics. In this field, he developed new methods for the genetic improvement of aquaculture species.

- As research managers, he had several responsibilities in the agriculture and food sector: From 1992 to 1996, Bernard Chevassus-au-Louis was Directeur General of the National Institute for Agricultural Research (INRA). During this period, he stimulated international relationships between INRA and the different A.R.O.s.(Agricultural Research Organization). He was the Chairman of EURAGRI (Association of European A.R.O.s) from 1995 to 1996 and has been member of several advisory or review Panels of International research Centers in the area of agriculture and fisheries. He was also the Head of the Department of Hydrobiology and Wildlife of INRA (1984-1989), chairman of AFSSA (French Food Safety Agency) from 1998 to 2002 and Vice-chairman of CGB (French Commission for GMO assessment) during the same period.

- He is associated to many debates and prospective studies on risk analysis and innovation.

Introduction

As an introduction to the workshop, we will:

- present the various dimensions of the notion of biological and cultural diversity;

- explain why the issue of a sustainable territorial management can not be treated today by policies based only on the concept of protected areas;

- raise the issue of a contribution of F & V productions to a sustainable management of territories, with a focus on the notion of "positive externalities" of these productions.

SESSION 5
(PARALLEL)

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- Senior scientist, specialist in apple genetics and breeding; he is the former head of the Fruit and Ornamental Plant Breeding Unit at INRA Angers and currently coordinator of all the fruit breeding activities in France; he has a longstanding experience on apple genetics and breeding, especially as regards pest and disease resistance and fruit quality. He was the coordinator of the European project DARE (Durable Resistance in Europe) – 1998-2002.

- He is particularly concerned by selection of new apple and pear resistant cultivars with improved fruit quality, by organizing fruit experimentation all over France and by involving private partners as nursery SMEs for promoting the new varieties to the growers and finally to the consumers.

- He is one of the coordinators of the European Integrated Project ISAFRUIT (2006-2010) for increasing fruit consumption through a trans-disciplinary approach. He is an active member of several International Scientific Societies and has served as Secretary of EUCARPIA Fruit Breeding Section.

The role of genetic diversity in fruit species for the creation of new varieties

A well documented inventory of the French fruit patrimony has been carried out by the "Danone association for fruit" in November 2001. This inventory confirms the wealth of fruit tree genetic resources and highlights the extensive human effort behind this work, including approximately 350 individuals, 250 fruit gene banks, representing nearly 40 000 accessions present in about 20 fruit species. In spite of this impressive effort, the documentation of fruit varieties remains incomplete. This is also true for the description of the collected data, its precise identification, the detection of duplicates and so forth. The persons involved in this endeavour have carried out admirable work. Nevertheless the lack of official recognition of this effort to uphold the fruit patrimony weakens these collections. It is important to note someassistance from regional collectivities to relevant groups including the "Conservatoire Végétal Régional d'Aquitaine" [plant repositoryof the Aquitaine Region], the "Centre des Ressources Génétiques du Nord Pas de Calais" [Centre for genetic resources of Nord Pas de Calais], the "Conservatoire Régional d'Espèces Fruitières Anciennes et de Vigne (CREFAV du Tarn)" [Regional repository of ancient fruit species and vines], and the "Centre de Ressources Génétiques du Berry" [Centre for genetic resources of Berry]. These efforts should promote a territorial strategy of conservation of regional fruit varieties and avoid their dispersion outside their respective regions. The study of the fruit patrimony has been progressively carried out thanks to the establishment of a network with the support of the BRG (Bureau des Ressources Génétiques) [Office for genetic resources], the INRA and several associations including the "Union Pomologique de l'AFCEV (Association Française pour la Conservation des Espèces Végétales)" [Pomological union of the French association for the conservation of plantspecies]. The characterisation of this patrimony will lead to a more precise description of the genetic diversity for factors related to the quality of fruit, resistance to bio-aggressors, the architecture of trees and so forth. This knowledge base is essential in order for the genetic diversity to participate in the development of new fruit varieties which are adapted to regions, less sensitive to bio-aggressors and appreciated by consumers. This knowledge base must contribute to the work of public institutions such as the INRA for the creation of varieties relevant to national and international demand, as well as to regional repositoriesfor the development of new regional varieties. These new varieties will be more resistant to the main bio-aggressors and should respond to new energy, fertilizer, water-, and pesticide-efficient technologies. Thus it is important to promote new varieties grown in orchards or family gardens using innovative methods in terms of plantation techniques, variety mixes, tree management to modify the microclimate, management of the orchard or garden environment (with grasses and hedges), to preserve the resistance to bio-aggressors and enhance the interest of these fruit variety innovations. Finally methods for the dissemination of these new fruit innovations must also be promoted, including certain current processes for releasing new apple varieties which will be described.

SESSION 5
(PARALLEL)

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- Michel Chauvet trained as an agronomist, specialized in economy and ethnobotany. He was for ten years at the French Centre for Foreign Trade encharged of advising French exporters of fruit and vegetables. He participated later to the creation of the French Bureau for Genetic Resources, organizing the conservation of genetic resources, and negociating the Convention on Biological Diversity and the Treaty for Plant Genetic Resources.

- He works now at Agropolis (Montpellier), which is a major centre for agricultural, food and environmental sciences. He has written an encyclopaedia on food plants (to be published), and has a broad knowledge of the diversity and history of food plants and their products.

The diversity of French F&V: ethnic market development and the emergence of ancient and new species

Within some decades, the F&V market has known tremendous changes. Globalization has allowed products from all over the world to be transported, and immigrant communities can now buy and cook the food that belong to their culinary heritage. We can now find in Paris shops offering products from the Carribean, the Arab countries, the Indian subcontinent, tropical Africa and above all, China and South Asia. The development of such "ethnic" markets has remained largely ignored by the mainstream industry and public authorities. Now, Chinese supermarkets have become an important activity, and consumers of other origins (including French) are getting used to many exotic products. Some of those products are grown in France by individual growers, such as vietnamese vegetables in Sainte-Livrade.

The interest of consumers for exotic F&V extends to old, "forgotten" and curious F&V. They are more and more perceived as "produits de terroir", and promoted as such. It has become a fashion to eat them and to invest some time in searching about their biology and history.

Such evolutions are good news for the F&V industry, and have to be documented and monitored. They offer new opportunities for innovation.

SESSION 5
(PARALLEL)

Daniel Veschambre
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- 1970 : Engineer ENSH Versailles
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- 1992 – 1996 : Assistant to the Head of the Department for Vegetables and Technology
- Since 1997 : Head of the Department for Vegetables and Technology

Cultural and biological diversities: the need for a joined approach

One of the characteristics of the recent change in human population concerns the increased intermixing of cultures over the past couple of centuries. This intermixing now affects more or less whole populations that migrate and no longer just a few isolated individuals. These populations not only seek to preserve their eating habits once they have moved, thus preserving a link with their ancestors, but also to continually enrich them. Food consumption patterns are thus preserved but are modified depending on the new environment in which the food is produced: biological diversity may therefore rapidly change in a given geographical area. This provides the opportunity to enrich our heritage as well as the natural environment. As far as fruit and vegetables are concerned, biological diversity is apparent in the production of new crops, considered as mainly Mediterranean, that are produced farther and farther north, and in the increasing number of different fruit and vegetables for sale originating from increasingly diverse sources

SESSION 6 (PARALLEL)

F&V CONSUMPTION TO REDUCE CANCER RISK

Chair

Arthur Schatzkin
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- Dr. Schatzkin received his B.A. degree from Yale University in 1969, his M.D. degree from S.U.N.Y. Downstate in 1976, and an M.P.H. (1976) and Dr.P.H. (1982) from Columbia University School of Public Health. He completed residency training in internal medicine at Montefiore Hospital, Bronx, N.Y. (1976-9) and preventive medicine at Mount Sinai Medical Center, New York, N.Y. (1979-81).
- He joined the National Cancer Institute in 1984 where he is currently Chief of the Nutritional Epidemiology Branch, Division of Cancer Epidemiology and Genetics (DCEG).
- Dr. Schatzkin's primary areas of research are the nutritional epidemiology of intestinal cancer and neoplasia, prospective cohort studies of nutrition and cancer, methodologic problems in nutritional epidemiology, and the integration of biomarkers in observational and intervention studies.
- He is a Principal Investigator for the NIH-AARP Diet and Health Study, a prospective cohort study of diet and cancer among over a half million men and women in the U.S, the Polyp Prevention Trial, an intervention study of the effect of a low-fat, high-fiber, fruit- and vegetable-enriched diet on colorectal adenoma recurrence, and the Observing Protein and Energy Nutrition (OPEN) study, a biomarker-based investigation of the measurement error structure of dietary assessment instruments.

- Changing dietary habits after a cancer: a systematic review of the literature.

T. Norat

- Biomarkers of F&V intake and cancer risk.

M. Jenab

- Vegetables and genetics: feeding studies in cancer prevention.

J. Lampe

- What about mechanisms?

J. Milner

SESSION 6
(PARALLEL)

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- 1988-1991: Research in Epidemiology, Diabetes Epidemiology Unit, National Institute of Endocrinology, Havana, Cuba.

- 1991-1998: Chief of the Clinic Research Unit, National Institute of Cancerology and Radiology, Havana, Cuba.

- 1998-2006: Research in Epidemiology in the Nutrition Unit, IARC, Lyon, France.

- 2006- : Epidemiologist, Department at the Faculty of Epidemiology and Public Health, Imperial College, UK.

Changing dietary habits after a cancer: a systematic review of the literature

The number of cancer survivors –people who are living with a diagnosis of cancer, including those who have recovered from the disease- has greatly increased in recent decades. In 2002, the total number of recorded cancer survivors in the world was estimated to be just under 25 million (1). The need for informed lifestyle choices for cancer survivors becomes particularly important as they look forward for the best strategies to successfully complete therapy, recover from treatment and improve their long-term outcomes. However, the available evidence on the role of nutrition and diet in preventing recurrence, relapse and improving survival in cancer survivors is sparse. In the absence of more definitive information, survivors of cancer should strive to follow the guidelines for the prevention of cancer.

Increased body weight has been associated with increased risk of several cancer sites. Stronger associations have been observed for cancers of the breast (pot-menopausal), colon, oesophagus (adenocarcinoma), thyroid, endometrium, gall baldder and renal cancers (2) . Accumulating data in survivors of breast and colorectal cancer suggest that overweight and obesity at the time of diagnosis adversely influence not only cancer-specific outcomes, but also overall health and quality of life (3).

Higher intake of vegetables and fruits have been associated with lower incidence of cancers at several sites, including the colorectum, stomach, lung, oral cavity, and esophagus, although the results are not entirely consistent. Whether a diet rich in vegetables and fruits may influence recurrence or survival of cancer is not known. In the observational studies that examined the relationship between intakes of fruits and vegetables and risk of recurrence of several cancers, the results have been mixed. Evidence form randomized clinical trials is sparse and inconclusive. In The Women's Healthy Eating and Living (WHEL) randomized trial, adoption of a diet that was very high in vegetables, fruit, and fiber and low in fat did not reduce additional breast cancer events or mortality during a 7.3-year follow-up period among survivors of early stage breast cancer (4). In another randomized clinical trial, The Women's Intervention Nutrition Study, reported that low-fat dietary interventions can influence body weight and decrease breast cancer recurrence, but the results showed a differential effect of diet on hormone-receptor-positive and -negative disease (5).

Dietary recommendations to reduce the risk for heart disease are especially important for cancer survivors. In particular, diets high in fruit and vegetables, and low in saturated fats has been found to be associated with reduced risk of heart disease. Several observational prospective studies in North-American and European populations have reported beneficial effects of diets rich in vegetables, legumes, fruits, nuts, whole grains, fish and low in meat and alcohol consumption ("Mediterranean dietary pattern") on risk of death from all causes including deaths due to cardiovascular disease and cancer (6,7,8).

The evidence from randomized controlled trials into the effects of food, nutrition and physical activity in cancer survivors was evaluated as inconclusive by the Panel of Experts convened by the AICR-WCRF in 2007 (6). The Panel recommended that, if able to do so, and unless otherwise advised, cancer survivors should follow the recommendations for cancer prevention, which include: be as lean as possible within the normal range of body weight, be physically active as part of everyday life, limit consumption of energy-dense food and avoid sugary drinks, eat mostly foods of plant origin, limit intake of red meat and avoid processed meat, and limit alcoholic drinks. The Panel recommended cancer survivors to receive nutritional care from an appropriately trained specialist.

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SESSION 6
(PARALLEL)

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Education and Training

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- 1995-2000: Doctor of Philosophy. Department of Nutritional Sciences, Faculty of Medicine, University of Toronto, Toronto, Canada.

- 1992-1995: Master of Science. Department of Nutritional Sciences, Faculty of Medicine, University of Toronto, Toronto, Canada.

Research Positions

- 2007-present: Scientist, Lifestyle, Environment and Cancer Group, International Agency for Research on Cancer, Lyon, France.

- 2004-2007: Scientist, Nutrition and Hormones.

Biomarkers of F&V intake and cancer risk

The fruits and vegetables food groups have a diverse variety of sub-group classifications and can be defined very broadly as edible plant foods. The consumption patterns of fruits and vegetables vary considerably worldwide and the types of fruits and vegetables consumed are often culturally defined.

Earlier results from observational studies suggested that higher consumption of fruits and vegetables were associated with reduced risk of some cancers. However, more recent evidence, particularly from larger cohort studies, do not suggest a strong etiological role for fruits and vegetables. To some extent, this may be due to large differences in study design, population homogeneity, statistical methodology, consideration of confounding variables, and, perhaps most importantly, inherent measurement errors in dietary questionnaires used to assess the intake of these diverse food groups.

Compared to some other food groups, fruits and vegetables have a lower energy density and are rich sources of macronutrients as well as vitamins, minerals and a multitude of phytochemicals, such as carotenoids, flavanoids, phytoestrogens, sterols, phenolic acids etc. Indeed, the potential cancer protective effects of various fruits and vegetables are generally attributed their high content of these various compounds. For example, carotenoids have been hypothesized to decrease cancer risk because of their antioxidant properties. In addition, some carotenoids can also be converted endogenously into retinol, which can inhibit cell proliferation and induce cell differentiation and apoptosis. Furthermore, vitamins C and E are also important components of the antioxidant defense system and protect against cellular and DNA damage from free radicals.

However, similar to the measurement of the food groups themselves, dietary assessment of micronutrients derived from fruits and vegetables is also prone to numerous errors particularly from food composition tables which are used to assess nutrient contents of specific foods. This is compounded by the fact that measures of dietary intake of these compounds may not accurately reflect their bioavailability from various foods, their level of absorption from the digestive tract, or individual differences in metabolism. Thus, in studies that are based uniquely on assessment of dietary intake, relatively small effects of these compounds on cancer risk may be easily obscured.

As a result, many studies attempt to measure blood levels of these compounds as biomarkers of fruit and vegetable consumption and as a measure of their true biological exposure. Nevertheless, utilization of biomarkers of fruit and vegetable intake also presents some technical and analytical challenges.

The aim of this presentation is to critically review the utilization of biomarkers of fruit and vegetable intake to assess cancer risk.

SESSION 6
(PARALLEL)

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Current positions

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Previous positions: Research Associate Professor, University of Washington; 1999-2004, Associate Member, Fred Hutchinson Cancer Research Center; Research Assistant Professor, University of Washington; Assistant Member, Fred Hutchinson Cancer Research Center

Research interests: phytochemical metabolism; biotransformation enzymes; gut bacteria; cancer prevention.

Vegetables and genetics: Feeding studies in cancer prevention

Genetic differences in taste preference, food tolerance, nutrient absorption and metabolism and response of target tissues all potentially influence the effect of diet on cancer risk. Thus, cancer prevention at the individual and population level should be considered in the context of the genetic background and exposures to both causative agents and chemopreventive compounds. Diet is a mixture of carcinogens, mutagens, and protective agents many of which are metabolized by biotransformation enzymes. Genetic polymorphisms that alter protein expression and/or enzyme function can modify risk. Genotypes associated with more favorable handling of carcinogens may be associated with less favorable handling of phytochemicals from vegetables and fruits. Often the phenotype associated with a genetic variant is not well characterized. Controlled experimental dietary studies in humans are useful for testing the capacity of vegetables and fruit and their constituents to modulate the biology underpinning potential chemoprotective mechanisms and to determine the contribution of specific genetic variants to the response. For example, glutathione S-transferases (GST) conjugate isothiocyanates, the chemopreventive compounds found in cruciferous vegetables. Isothiocyanates also induce expression of several types of conjugating enzymes important in carcinogen handling, including GSTs, UDP-glucuronosyltransferases (UGT), and sulfotransferases (SULT). One polymorphism in the GSTM1 gene results in lack of GSTM1-1 protein. Controlled feeding studies suggest that increased expression of certain genes with cruciferous vegetable feeding may be greater in the individuals who are GSTM1-null possibly due to poorer metabolism of isothiocyanates. Interestingly, pharmacokinetic studies in controlled feeding studies show that lack of the GSTM1 enzyme actually is associated with more rapid excretion of the isothiocyanate sulforaphane, suggesting that GSTM1-genotype differences in downstream responses are not the result of higher circulating isothiocyanate concentrations among GSTM1-null people. Genetic variation in the promoter region of the UGT1A1 gene may also influence response to cruciferous vegetables. Isothiocyanates and indoles in cruciferous vegetables induce UGT1A1 expression. Individuals with an additional TA repeat (7 vs 6) in the promoter are more likely to have increased UGT1A1 activity in response to cruciferous vegetable feeding than those who only have 6 TA repeats. Genetic polymorphisms in biotransformation enzymes and their impact on response to plant-based diets may account in part for individual variation in cancer risk but have to be considered in the context of other aspects of human genetics, gut bacterial genetics, and environmental exposures. Rigorously conducted experimental dietary studies in humans are an important link between population- and laboratory-based research and help to clarify genotype-diet relationships.

SESSION 6
(PARALLEL)

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- Dr John Milner, Ph.D., is chief of the Nutritional Science Research Group, Division of Cancer Prevention, National Cancer Institute. From 1989 to 2000, he was Head of and a Professor in the Department of Nutrition at The Pennsylvania State University, where he also served as Director of the Graduate Program in Nutrition. Before joining Penn State, he was a faculty member for 13 years in the Food Science Department and in the Division of Nutritional Sciences at the University of Illinois-Urbana-Champaign. While at the University of Illinois he served as the Director of the Division of Nutritional Sciences and as an Assistant Director of the Agricultural Experiment Station.

- Dr. Milner is a member of several professional organizations, including the American Society for Nutrition, American Association of Cancer Research, American Chemical Society's Food and Chemistry Division, the Institute of Food Technology and the International Society of Nutrigenetics/Nutrigenomics. He is a fellow in the American Association for the Advancement of Science and an Honorary Member of the American Dietetic Association.

- Dr. Milner has published more than 350 abstracts, book chapters, and journal articles. He serves on the editorial boards for Food and Nutrition Research, Nutrition and Cancer, Nutrfood, Journal of Nutritional Biochemistry, Journal of Alternative and Complementary Medicine and The Journal of Medical Foods. In his current position he promotes research that deals with the physiological importance of dietary bioactive compounds as modifiers of cancer risk and tumor behavior. Much of his own current research focuses on the anticancer properties of garlic and associated allyl sulfur compounds. In addition to presentations about garlic and health he has been an invited to speak about nutrition and genomics, selenium nutriture, antioxidants and health, functional foods and health promotion, and nutrition for cancer prevention.

What about mechanisms?

The contribution that dietary fruits and vegetables make to health remains an area of immense interest and debate. Much of the controversy stems from inconsistencies in the literature. Variation in the content of multiple bioactive food constituents and how they response depends on genetics of the consumer and on environmental modifiers contribute to the controversy.

Compounds ranging from carotenoids, flavonoids, isothiocyanates, and allyl sulfurs can influence one or more key cancer processes. Evidence exists that combining quercetin and genistein is more effective in retarding tumors because of their unique molecular targets. Likewise soy may increase the response to vitamin D by inhibiting degradation via CYP24 activity. Strategies for use combinations or blends of foods with distinct molecular targets offer exciting opportunity for maximizing health.

Knowledge about the sites of action of bioactive constituents is needed to maximize the response. Information is needed about the response to physiologically relevant concentrations as modifiers of foreign compound metabolism, immunocompetence, cell proliferation, apoptosis, differentiation, and angiogenesis. Evidence already exist that many compounds modify the transition of normal to neoplastic cells by modifying carcinogen bioactivation and elimination. Many of these compounds can also influence cancer promotion. While allyl sulfur causes autocatalysis of CYP 450 E1, the mechanism by which other components influence phase I and II enzymes remains unknown. Evidence is immerging that while flavonoids and allyl sulfurs function as antioxidants their ability to inhibit neoplasms may be by influencing proliferative and apoptotic processes. Evidence already exist that the response in normal cells is different than neoplastic cells, but why remains to be resolved.

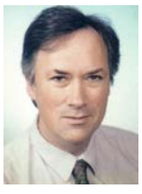
It is critical that the minimum exposure (threshold) needed to bring about a change in a biological process is known. Evidence exists that combining dietary components may not only increase overall effective it may also reduce the exposure needed to bring about a response. Timing, in terms of when during life and for what duration, must be considered when developing strategies to increase synergy while minimizing antagonistic interactions

Undeniably not all individuals will respond identically to bioactive food components. Expanding knowledge about the physiological consequences of nutrigenomics-which includes nutrigenetic (genetic profiles that modulate the response to food components), nutritional transcriptomics (influence of food components on gene expression profiles), and nutritional epigenomics (influence of food components on DNA methylation and other epigenetic events and visa versa)-should help identify those who will and will not respond to dietary interventions. Unquestionably genetic and epigenetic expressions can influence the quantity or activity of a target and thus the response to a food component. Studies are identifying subpopulations most responsive to food components suggesting the importance of using single nucleotide polymorphisms/ haplotypes for intervention planning and for the use of transcriptomics, proteomics and metabolism for developing predictive models. Personalized nutrition that builds on the "omics" of nutrition is fundament to future advances in nutrition science and to optimizing fruits and vegetables for global health.

Session 7
(Parallel)

From policy to action: what to do now?

Chair



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- Introduction: Moving from policies to action.

T. Lobstein

- Food, marketing and young people.

G. Hastings

- Parents Jury - a grassroots advocacy program to improve nutrition environments.

K. Chapman

- Controlling the market using legislation. The UK experience for TV and non-TV regulation.

J. Landon

SESSION 7
(PARALLEL)

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- Dr Tim Lobstein is Director of the Childhood Obesity Programme at the International Obesity TaskForce, London. The TaskForce is a component of the International Association for the Study of Obesity, which has over 50 national and regional member organisations representing over 10,000 researchers and health professionals concerned with obesity.

- Dr Lobstein is also European Coordinator of the International Association of Consumer Food Organizations. He has helped to compile reports on food policy for the World Health Organization, the European Commission and several consumer and health NGOs. He has recently been appointed a Research Fellow at the Science Policy Research Unit at the University of Sussex, UK.

Introduction: Moving from policies to action

European policy-makers have understood the message. They know about rising obesity and concurrent heart disease, diabetes and a host of other diet-related diseases afflicting the region's population. They know these epidemics will bear heavily on the regions economic health: not only the costs of treating these diseases but also the losses to economic production, the social costs to individuals and families, and the political costs to governments if nothing is done.

Policy-makers are also well aware of the need to encourage healthier behaviour among the citizens of the region, to encourage a change of dietary intakes and a change in routine physical activity levels, in order to improve the prospects for health. And one by one, national governments and regional bodies such as the European Commission and the European office of the World Health Organization, are piecing together their proposals for making a change.

For those of us in the public health world, the progress seems immoderately slow, with several years of a Platform on diet and physical activity already come and gone, a five-year regional action plan on food and nutrition already past and a second one already launched. Indeed we can trace the origins of these policy documents to the health promotion and health education programmes of the 1980s and 1970s.

But some things have begun to change. We are seeing the recognition by several governments and international agencies that we can no longer rely on personal choice and individual lifestyle change to resolve the issue – education and exhortation to individuals has not created sufficient demand in the marketplace for the sorts of food products and health-promoting environments needed to ensure improvements in population health. Indeed, individual education and exhortation has been shown to increase the problems of social inequalities: telling someone to improve their lifestyle has no meaning if the message cannot be easily acted upon – those who have the capacity, resources and motivation may make the changes, but those without capacity, motivation or resources will not.

And so governments and agencies are starting to accept the need to intervene more actively and to consider where legitimately they can act to change the marketplace so that healthy choices are the easiest ones to make. This means stepping beyond the old health education approach and looking at the influences on markets and how they can be harnessed to promote health policies in healthier environments. Governments are reluctant to legislate in the marketplace but in many circumstances legislation is the only way of securing public benefits, and ensuring they remain secured.

Governments tend to be reactive, however, and to get them to make policies for the public good they have to be pushed. This pushing is often done by non-governmental advocacy organisations, backed up sympathetic scientists and public-spirited lawyers. These groups make use of the media and increasingly can assist each other through the internet and through sharing experiences of their successful campaigns – e.g. drawing on the experience of tackling the tobacco lobby, the baby formula manufacturers, the alcohol industry.

In this session we shall consider three aspects of these processes: the move from health education to social marketing that has occurred in the last two decades, the increasing strength of NGO action in promoting and advocating change, and the value of making sure that the gains we make are enshrined in a non-reversible legal code.

SESSION 7
(PARALLEL)

Gerard B Hastings

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Gerard Hasting is Professor of Social Marketing, Director of the Institute for Social Marketing, and Director of the Centre for Tobacco Control Research. He was a Special Advisor to the House of Commons Select Committee on Health during its enquiries into the Tobacco (2000), Food (2003/4) and Pharmaceutical industries (2005/6). Professor Hastings is also a Member of the UK Government's Advertising and Food Forum, Chair of the EU HELP campaign Advisory Board, a WHO/FCTC Expert on Cross-border advertising, promotion and sponsorship UK, Principal Investigator on the International Tobacco Control Policy Research Programme, Member of the EC ASPECT consortium and the NCI Monograph Group, and an Expert Witness for the UK and Irish Governments in tobacco litigation. He is also the first Andreasen Scholar in Social Marketing, a Member of the Alcohol Education Research Council, Advisor to the World Health Organisation, the National Cancer Research Institute, the Cabinet Office, the Department of Health on critical and social marketing and Visiting Professor at the University of Wollongong.

Food, marketing and young people

This presentation will discuss the findings from our recently completed review of the literature on food promotion to children. The review was commissioned by the World Health Organisation and is an update of our 2003 review conducted for the UK Food Standards Agency. It examines to two key questions:

- the extent and nature of food promotion to children
- the effect, if any, that this promotion has on their food knowledge, preferences and behaviour

It uses the same extremely rigorous 'systematic' procedures used in the original review. These are borrowed from medical science, where great care is needed to ensure that particular treatments are really safe and effective, and ensure that every possible source of evidence is identified and carefully evaluated. The precise methods of this search and evaluation process are laid down in a detailed protocol, so that other researchers can replicate the review and check the conclusions it reaches. In short, systematic reviews are both robust and transparent.

This review confirms that in both developed and developing countries: (i) there is a great deal of food promotion to children, particularly in the form of television advertising; (ii) this is typically for highly processed, energy dense, unhealthy products with evocative branding; and (iii) that children recall, enjoy and engage with this advertising. More complex research from developed countries shows that it is having an effect, especially on their food preferences, purchase behaviour and consumption.

The presentation will go on to discuss the implications that these findings have for policy makers. It will also discuss the implications for 'social marketing', arguing that the health sector can learn important lessons from commercial marketing about how to influence behaviour. In particular, concepts such as strategic planning, consumer orientation, segmentation and branding can all be invaluable aids in the response to obesity.

SESSION 7
(PARALLEL)

Kathy Chapman

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- Kathy Chapman is the Nutrition Program Manager for The Cancer Council in Sydney, Australia. She is responsible for developing policies, position statements and programs related to nutrition and physical activity with regard to cancer control. Kathy is an accredited practising dietitian.

- She is also the Chair of the Coalition on Food Advertising to Children, which is a coalition of public health groups in Australia who collectively advocate for a reduction in food marketing to children. Kathy is a member of the Steering Committee for the Parents Jury.

- Kathy's research interests include food marketing and she has coordinated the largest study of TV advertising in Australia, as well as other studies describing the extent of food marketing to children in other forms of media.

Parents Jury - a grassroots advocacy program to improve nutrition environments

Purpose

The Parents Jury (www.parentsjury.org.au), launched in August 2004, is an online advocacy network of parents who wish to improve the food and physical activity environments for children in Australia. The Parents Jury focuses on "upstream" issues to influence policy and environmental issues which impact on the increasingly predominant obesogenic environment in Australia. Parents Jury conducts its advocacy campaigns through a number of channels:

• Media advocacy

• Direct delegations and submissions to key decision makers (e.g. government bureaucrats, politicians, and the food industry) on behalf of its parent members

• Advocacy tools and resource kits for parents themselves to become grassroot advocates

Focus issues

The Parents Jury provides a forum for parents to voice their views on children's food and physical activity issues, and to collectively advocate for the improvement of children's food and physical activity environments. The current issues of focus for The Parents Jury are:

• A reduction in the amount of food marketing to children including TV advertising, sponsorship and internet sites that promote unhealthy foods and beverages.

• A reduction in the number of supermarket checkout counters displaying confectionery, snack foods and sweet drinks.

• Healthy school food environments, including canteens, vending machines and fundraising.

• Improved physical activity environments for children including active transport to school, physical activity within school and access to after school sports.

Achievements of the Parents Jury

• Since August 2004 more than 3000 parents across Australia have registered as members.

• Extensive media coverage, including print, radio, TV news and current affairs.

• Development of the Parents Jury website that includes latest news updates and advocacy tool kits for parents.

• The Parents Jury website has a moderated discussion forum for parents, whereby parents are able to voice their concerns or positive feedback on children's food products, food advertising, and physical activity opportunities.

• Annual TV Food Advertising Awards - Parents nominate awards for food advertisements under the following categories: "pester power" award; "smoke and mirrors" award (a food that doesn't tell the full story e.g. coco pops with its claims about its high vitamin content and no mention of its high sugar content); and the parents choice award for healthy TV food advertisements.

• Trial By Jury panel verdicts to highlight food marketing campaigns across a broad range of mediums such as TV, in-store promotions, internet sites, advergames and viral marketing.

• Regular online polls of members e.g. views on sponsorship by food companies.

• Media training for parents to act as spokesperson in media activity.

• Consumer advocacy training to give parents a better understanding of how to influence decisions.

• Submissions and delegations to key stakeholders, such as the Australian Competition and Consumers Commission about misleading food advertisements and supermarket retailers about confectionery checkouts.

• Published research on the high availability of confectionery at supermarket checkouts.

SESSION 7
(PARALLEL)

Jane Landon

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- Jane Landon is deputy chief executive of the National Heart Forum – a charitable alliance dedicated to the prevention of avoidable chronic diseases, including coronary heart disease, through scientific review and public health policy development. Her special interest is food and health, and children's nutrition in particular.

- Jane also chairs the board of trustees for the Food Commission – an independent watchdog organisation campaigning for safer, healthier food.

- She is on a number of advisory groups for the Department of Health, the Food Standards Agency and the European Commission, and is a regular participant in public debates and conferences on obesity, school meals, advertising to children and food labelling issues.

Controlling the market using legislation: The UK experience for TV and non-TV regulation

We can distinguish several different forms of controls on the marketing of foods. There are statutory regulations, laid down in law. Examples include bans on advertising alcohol at certain times or in certain forms, and labelling and claims regulations.

Self-regulations or co-regulations, agreed by industry and government, include the British Code of Advertising, written and monitored by industry and applied to all advertisers. Selective co-regulations or self-regulations such as the Spanish PAOS code of marketing to children, apply only to those members of the industry that sign the agreement.

Some individual companies or trade associations make statements about what they will do, such as not marketing in primary schools or to children under 12. It is voluntary and there are no penalties if the companies change their policies.

Self-regulatory codes are usually weak and easily broken. They do not normally control the amount or frequency of advertising, or the types of products advertised.

For over 20 years, consumer organisations have been concerned about intense promotion of fatty and sugary foods to children. The quantity of advertising – with children seeing an estimated 17,000 TV food advertisements before they are 16 and watching television for more hours per year than they spend in a school classroom – has triggered pressure for government action. A committee of parliamentarians challenged industry practices and recommended stronger action on advertising to children. Under increasing pressure, the government announced a review of statutory controls on TV advertising.

The broadcast regulator, the Office of Communications (Ofcom), consulted on several models for limiting children's exposure to advertising of unhealthy foods. Ofcom was challenged legally by the National Heart Forum, for not consulting on the single option supported by parents and public interest organisations – a restriction on advertising foods high in fat, sugar or salt before 9pm. Before the case reached court, Ofcom agreed to analyse and consult on the 9pm option.

Ofcom did not propose the 9pm watershed but did include significant measures - fixing 16 as the age limit for advertising to children, and using nutrient profiling to define which foods can and cannot be advertised. By placing restrictions only on programmes with high child-to-adult audience ratios, the rules are only half as effective as a watershed restriction because they do not cover popular programmes where the actual numbers of children watching are high, but the proportion of children to adults is low.

In the UK there is continuing pressure for a 9pm watershed and regulations for non-broadcast advertising. There is increasing call for an international code – such as the draft by Consumers International and the International Obesity Taskforce – which would help to control cross-border advertising including the internet.

In conclusion: voluntary measures are unlikely to limit children's exposure to the promotion of fatty and sugary foods and lack force. Statutory measures - covering broadcast and non-broadcast promotions - are needed to ensure real public heath gains. The UK has made a valuable start and we must build on this progress. The gains have been achieved largely through the alliance of consumer and health organisations acting on policy-makers.

Session 8
(Parallel)

Local F&V support local identity of food production and culinary culture

Chair

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- Does building of food identity favour local production?
The Mediterranean case.

B. Hervieu

- Cultural geography of the F&V.

M. Chauvet

- Combining traditional culture and modernity in the F&V sector:

lessons from Japan.

T. Nishizawa

SESSION 8
(PARALLEL)

Bertrand Hervieu
Secretary General

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-Bertrand Hervieu, President of the National Institute for Agronomic Research (INRA) from 1999 to 2003, former Head of research for the CNRS at the Centre for Studies of French Social Policy (Cevipof), Professor (on secondment) for particular class at the National Graduate Institute for Rural, Water and Forestry Engineering (Engref), he is at present Secretary General of the International Centre for Advanced Mediterranean Agronomic Studies (Ciheam). From 2002, he has been a member of the International and European Prospective Council for Agriculture and Food chaired by Mr de Montbrial. He is Chevalier of the national order of the Legion of Honour, Agricultural officer of Merit, Doctor Honoris Causa from the University of Laval (Canada) and the University of Cluj (Roumania).

- He gave lectures at the Universities of Paris X – Nanterre and Paris I – Panthéon-Sorbonne, at Sciences Po, and at the French National School of Administration (Ena), he was the prime mover (from 1995 to 2003) in the Group of Bruges (European Group of Reflection on the Agricultural Policies), member (from 1992 to 1995) of the Group of Seillac (Group of Reflection on Agricultural Policies chaired by Edgar Pisani), and President of the Association of the French Ruralists.

Does building of food identity favour local production? The Mediterranean case

The Mediterranean Region is a unique agro-ecological zone, in which a great variety of agricultural crops go hand in hand with a wide range of different foods. It is one of the world's foremost eco-regions in terms of its biodiversity (10% of its plant varieties on 1.7% of its land- mass) and its ecosystems, considered to be among the most important worldwide. Its biological richness is mainly due to the ease with which many animal and plant species, including fruit and vegetables, are able to adapt to its climate (mild in winter and very warm in summer). The Mediterranean Region produces 16% of the world's fruit and 13% of its vegetables.

The Mediterranean Region has a very distinct food identity based on a specific combination of vegetable products, which is the key asset in the drive to promote health in many southern countries (forming the basis of the food pyramid). This identity is also derived from particular flavours, culinary skills and social customs. The Mediterranean diet is currently being inscribed on UNESCO's World Heritage List.

But does a collective effort to promote a food identity really encourage local production? Nothing can be less certain, for even with increased consumption of Mediterranean food internationally, there would still be no guarantee that the market for Mediterranean products would grow. Given that the market will depend on what consumers understand by "Mediterranean food", a number of scenarios might be envisaged:

- If consumer appeal depends mainly on the area of production and there is a demand for products of Mediterranean origin, a tremendous market will open up. However producers would be sorely tempted to keep on intensifying output in order to create wealth at the cost of exhausting local land and water resources. Moreover it is well known that the intrinsic quality of goods is altered by over-intensive production and unthinking exploitation of craftsmanship on an industrial scale.

- If consumers are attracted by the structure of the Mediterranean diet, the great variety of foodstuffs and the ways in which they are combined, the origin of the products is of little importance. Other parts of the world will be quick to offer serious competition to the region, embracing new products in order to satisfy demand. Olive growing for example has prospered in the United States, Australia and Latin America. Arboriculture of the Mediterranean kind can be developed wherever climate conditions permit, as can pulse or vegetable production, even if the crops have to be grown in greenhouses. The number of fish farming facilities is on the increase.

- If consumers are concerned with the authenticity of products and their links with specific localities, it will be possible to promote the Mediterranean Region's food and agriculture heritage. Mediterranean industrialists and craftsmen will then have to work together to protect specific products, expertise and recipes with patents and labels.

SESSION 8
(PARALLEL)

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- Michel Chauvet trained as an agronomist, specialized in economy and ethnobotany. He was for ten years at the French Centre for Foreign Trade encharged of advising French exporters of fruit and vegetables. He participated later to the creation of the French Bureau for Genetic Resources, organizing the conservation of genetic resources, and negociating the Convention on Biological Diversity and the Treaty for Plant Genetic Resources.

- He works now at Agropolis (Montpellier), which is a major centre for agricultural, food and environmental sciences. He has written an encyclopaedia on food plants (to be published), and has a broad knowledge of the diversity and history of food plants and their products.

Cultural geography of the F&V

In spite of the mainstream production and trade in F&V and the fears of uniformity, cultural and culinary traits remain quite important, and consumers tend to be proud of maintaining culinary practices as cultural markers. Italy for example is known for exhibiting an astonishing diversity. According to towns, cauliflowers can be white, green, yellow or violet. Some vegetable types are quite endemic to Italy, such as 'puntarelle', a kind of chicory eaten for its stem as a salad. In the Near-Eeat, meloukhia (Corchorus olitorius) is a popular vegetable, whereas it is ignored in Europe. In Africa, vegetables are usually eaten in sauce, and preference goes to mucilaginous textures (such as in okra) or bitter tastes (African aubergine, leafy vegetables). In Asia, the taste for sugar is not so developped as in Europe and the Arab world ; one consequence is that several fruits are preferred immature as vegetables, such as papaya, guava.

One of the challenges we have to face is that this culinary diversity can be maintained only if research and development help those products to evolve from home-grown and home-processed items to market items, allowing them to be available in towns and reach minimum market requirements.

SESSION 8
(PARALLEL)

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Educational Background

- **Ph.D.: Doctor of Agronomy (Horticulture). Tohoku University, Japan. 1986.**
- **Master: Tohoku University, 1982.**
- **Bachelor: Kanazawa University, Japan. 1980.**

Work Experiences

- **Professor: Faculty of Agriculture, Yamagata University, 2004 – present.**
- **Associate Professor: Faculty of Agriculture, Yamagata University, 1994-2004.**
- **Assistant Professor: Faculty of Agriculture, Tokyo University, 1987-1994.**
- **Japan International Cooperation Agency: 1986-1987.**

Combining traditional culture and modernity in the F&V sector: lessons from Japan

Although Japan has a long history of cultivating many fruits and vegetables, there are few native crops on the islands of Japan. Indigenous crops which are still utilized in Japan and eastern Asia are i) Wasabi (Wasabia japonica (Miq.) Matsum., Eutrema japonicum (Miq.) Koidz., or E. wasabi Maxim., Brassicaceae), which is used as a spice for 'sushi', ii) Udo (Aralia cordata Thunb., Araliaceae), blanched shoots of the perennial woody plant are enjoyed as 'tempura', iii) Fuki (Petasites japonicus (Siebold & Zucc.) Maxim., Asteraceae), young flower stalks are also enjoyed as 'tempura', iv) Seri (water dropwort; Oenanthe javanica (Blume) DC., Umbelliferae), aquatic green leaves including the petioles are used as a potherb, v) Miyoga (Zingiber mioga (Thumb.) Roscoe, Zingiberaceae), young flower buds are used as a garnish for 'miso' soup, vi) Akebi (Akebia quinata (Houtt.) Decne., Lardizabalaceae), a herbaceous perennial plant which is enjoyed as a fresh fruit, vii) Ginkgo nut ("Ginnan"; Ginkgo biloba L., Ginkgoaceae), seeds of the ginkgo tree are used as a ingredient in steamed egg hotchpotch and so on. These crops have been utilized since pre-history in Japan, and even today, they are widely used as important ingredients in traditional Japanese cuisine. Most indigenous crops in Japan have been recognized as wild crops for a long time; however, recently, cultivation of these crops has increased because their consumption is rapidly increasing as the health benefits of traditional Japanese cuisine are re-evaluated. Among the commonly utilized fruits and vegetables in the world, Japanese pear, walnut, orange, grape, persimmon, Welsh onion, garlic, Japanese radish, cucumber, eggplant etc. were primarily introduced into Japan probably before the Nara era (12th century) mainly through China and Korea. During the Edo era (1603?1866), a period of national isolation, these crops were cultivated as commercial crops and many unique local varieties were raised because the feudal lord in each area protected these crops as regional specialties and strictly prohibited their export to other regions. After the opening up of the country in the Meiji era (after 1867), apple, pear, strawberry, tomato, potato, onion etc. were newly introduced but production did not increase because many Japanese people maintained their traditional eating habits. After World War II, many new varieties of fruits and vegetables were introduced through U.S. and Europe, and the production of those varieties rapidly expanded, concurrent with the change to a Westernized lifestyle. As a result, many local crops ceased production; however, mainly after the 1970?80, traditional Japanese eating habits were reevaluated and many Japanese people gradually began to slip back into their old eating habits. After the 1980?90, the production of many local crops restarted because of their special taste, nutrients, anti-oxidative functions and so on in accordance with the movements of slow-food and local production for local consumption, but many local varieties had already been lost. Universities, local governments, horticultural experimental stations, and private companies are currently working aggressively on the regeneration of such local varieties, sometimes independently, sometimes cooperatively. As an example of the results of such work, local vegetables which were traditionally grown in Kyoto for a long time were named "Kyo-yasai" and are sold now in Japanese markets as value-added crops. The Faculty of Agriculture, Yamagata University organized the Collegium of Local Crops in Yamagata in 2003 to conduct activities such as research, collection, preservation, and production of such local crops.

Session 9 (Plenary)

Chair

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1. Reports from the parallel sessions of the day

The chair of each parallel session will present the main ideas of the session

KT. Kaw

L. Dube

B. Chevassus-au-Louis

A. Schatzkin

T. Lobstein

M. Chauvet

2. Oral presentations of the selected poster abstracts

SESSION 10 (PLENARY)

Chair

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F&V SCHOOL SCHEME

*In presence of **Michel Barnier**, French Minister of Agriculture and Fisheries (tbc)*

- European School Meals, policy contexts and supply chain challenges to increased production and consumption of F&V
D. Barling

- The School F&V scheme: How is this possible within the EU?
L. Hoelgaard

- How to evaluate the impact of a School F&V scheme?
E. Riboli

SESSION 10
(PLENARY)

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- Dr Barling's main areas of research are around: the governing of the agri-food sector and the national UK food supply in relation to sustainability, and the politics of food standards setting, at global, EU and national (primarily UK) levels. • Dr Barling's recent work has looked at: the international politics of the regulation of agri-food traceability; ethical traceability and food supply chains (part of an EU 6th framework project); European retailing trends and food systems (ESF/COST project); private governance and public regulatory interactions; policy boundaries and means of policy integration in relation to food policy (at UK and EU levels); and, the conceptualisation of an ecological public health approach to food policy.• His current funded research (with Tim Lang) includes an investigation of policy debates around national food security in the UK in relation to sustainability and land use.

- Dr Barling's external memberships are : expert advisory panel to the UK Prime Minister's Strategy Unit project on Food Policy 2007-8, UK Government Department for the Environment Food and Rural Affairs' (DEFRA) Organic Action Plan team for England ; British Standards Institute committee AW/90 Quality Systems for the Food Industry (co-opted member) ; Council member of Sustain (UK food and farming alliance of c.100 NGOs) ; Chair of Sustain's Good Food on a Public Plate Project (public procurement of sustainable local food) ; Editorial board of the international journal Agriculture and Human Values

European School Meals, policy contexts and supply chain challenges to increased production and consumption of F&V

The European School Meals initiative is discussed in relation to the existing and potential policies available to the EU for promoting and integrating the consumption with the production of fruit and vegetables (F&V). The opportunities and potential policy pathways for integrating consumption with production of fruit and vegetables in Europe are identified and examined. The reform of the Common Market Organisation for F&V has ended the traditional market management of supply in relation to demand which had maintained price levels for producers. In turn agricultural policy makers have sought to find compensatory and new ways of stimulating demand for F&V, as in the case of the European School Meals initiative. This initiative provides a welcome connection between agricultural production and dietary health goals, and between food production and consumption.

The question is how to take this connection further? Two further policy areas are explored. Firstly, under the CAP reform agricultural support has switched from production to reward the public goods provided by multi-functional agriculture. Yet public health gain is not included amongst these public goods and supports are de-coupled from production and moved to rural development. This raises the possibility of rural development funding as a potential lever for the promotion of fruit and vegetables. Secondly, the EU's Sustainable Development Strategy includes public health and social exclusion within its priority areas well as environmental protection (including biodiversity). Sustainable production and consumption is another priority, and within this the role of greening public procurement is a key focus.

The role of the public procurement of sustainable food is a key lever in relation to school meals also. The presentation draws, briefly on the recent experience of school meal provision in relation to local and sustainable food in the UK to explore the supply chain challenges (including skills training) that exist and the need for clear standards for school meals provision.

This orchestra of different players and instruments is playing from several different sheets of music within the EU's overall policy symphony. This talk will introduce these players and policy areas and ask where they could be better integrated and what are the challenges that can be identified? It will seek to set the scene for the more detailed presentations to follow in this session.

SESSION 10
(PLENARY)

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- Lars Hoelgaard is Deputy Director General at the Directorate General for Agriculture and Rural Development. He is responsible for Directorate C "Economics of agricultural markets and common market organisations (CMO)", including the CMO for fruit and vegetables, and Directorate D "Direct support, market measures and promotion", which includes promotion of fruit and vegetables.

- Prior thereto, he was Director for markets in livestock products, specialised crops and wine and headed up the task force for the implementation of CAP reform decided in Luxembourg in June 2003.

Before joining the European Commission in 1989 as Director responsible for veterinary, phytosanitary, feed stuff, seeds and pesticide legislation, Lars Hoelgaard was Assistant Secretary in the Danish Ministry of Agriculture.

The School F&V scheme: How is this possible within the EU?

SESSION 10
(PLENARY)

Elio Riboli

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- Prof. Riboli has an M.D. degree (1977, Milan), a Master of Public Health (1980, Milan) and a Master of Science in Epidemiology (1982, Harvard, Boston, USA).

- In 1983 he moved to IARC-WHO in Lyon, where he undertook the task of developing new research projects in the area of nutrition, nutritional status and cancer. In 1989 he initiated the European Prospective Investigation into Cancer and Nutrition (EPIC), which eventually included 26 centres in 10 European countries. Questionnaire data on diet and lifestyle have been obtained from about 500,000 study subjects, and blood samples from most of them.

- He was Head of the Nutrition and Hormones Group of IARC from 2004 to 2005.

- In 2005 Prof Riboli joined Imperial College London, where he is Professor of Cancer Epidemiology and the Divisional Head of Epidemiology, Public Health and Primary Care.

How to evaluate the impact of a School F&V scheme?

Chairs

Session 11 (Parallel)

Effective intervention studies targeting children

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- Carmen Pérez Rodrigo is Doctor in Medicine, Specialist in Preventive Medicine and Public Health. Postgraduate Diploma in Nutrition, Postgraduate Diploma in Education, special postgraduate training in the field of Nutrition and Public Health, nutritional epidemiology, nutrition education and community health.

She has coordinated population nutrition surveys at the local, regional and national levels. Has been involved in the design, implementation and evaluation of intervention and nutrition education programmes, particularly in the school setting. Has been or is currently involved in European projects, such as Eurobese (Ethics and the obestity and overweight epidemic: image, culture, technologies and interventions), Pro Children (Promoting and sustaining health through increased vegetable and fruit consumption among European schoolchildren) or Eurodiet, among other.

- Coordinator of the PERSEO Project (2006-), promotion of healthy eating and physical activity in Primary Schools (Ministry of Health (AESAN) – Ministry of Education (CIDE).

Chris Rowley
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- Chris is a communications and public relations consultant specializing in rural industry.

For the past four years he has worked with the Western Australian Department of Health to develop a national framework for the Australian Go for 2&5® fruit and vegetable campaign. The licensing approach has allowed industry and private sector interests to work with government under a uniform national approach to the promotion of fruit and vegetables.

- As Health Initiative Coordinator his role is to promote and manage the widest possible involvement in the Go for 2&5® campaign by Horticulture Australia member industries; commercial interests and non government health organisations.

- Ongoing evaluation of Go for 2&5® shows high levels of campaign awareness and understanding of the message to eat two serves of fruit and five serves of vegetables. Western Australian evaluation has shown an increase of nearly one serve per person per day over a three year campaign period.

- Determinants of F&V consumption.
C. Perez-Rodrigo
- Are school-based F&V schemes effective at improving the diet and health of children?
K. Lock
- Public/private partnership in action:
New Zealand's Fruit in Schools programme.
P. Dudley
- The Pro-Children study.
S. te Velde
- Free school fruit might give long term effects - results from the Norwegian intervention.
E. Bere

SESSION 11
(PARALLEL)

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Determinants of F&V consumption

There is solid evidence that adequate consumption of fruits and vegetables has a protective health effect. However, population food consumption studies show that usual intake levels for many people are far from desirable, particularly among children.

The development and implementation of fruit and vegetable promotion strategies require the identification and understanding of determinant factors, particularly those which can be influenced when addressed by effective action plans on a large scale over time.

Evidence shows that the family environment, including parental dietary behaviour and lifestyle, parenting styles, educational level as well as the variety of foods and drinks available and accessible at home are relevant factors influencing children and adolescent eating practices. Evidence related to the school environment highlights the positive influence of increased access to healthy foods and opportinuties to develope healthy eating and physical activity practices.

Studies analyzing determinants of fruit and vegetable consumption in children and adolescents conclude that a combination of personal and environmental factors draw the pattern. A large number of potential determinants have been studied among children and adolescents. However, for many presumed determinants convincing evidence is lacking, mostly because of paucity of studies The determinants of fruit and vegetable consumption among children best supported by evidence are age, gender, socio-economic position, preferences, parental intake, and home availability/accessibility. Girls and younger children tend to have a higher or more frequent intake than boys and older children Preferences and availability have been identified as strong predictors of fruit and vegetable consumption in children in several studies. In other studies habit was the most influential correlate of fruit and vegetable consumption in children and adolescents.

In the ProChildren study, daily fruit intake and daily vegetable intake was mainly associated with knowledge of the national recommendations, positive self-efficacy, positive liking and preference, parental modeling and demand and bringing fruit to school. The strongest correlates of fruit intake were bringing fruit to school, modeling behavior of parents and friends, parents demanding that their child eat fruit, knowledge about recommended intake levels, liking fruit, and self-efficacy to eat fruit. For vegetables, gender, parental demand, parents facilitating the consumption of vegetables by cutting them for their child, modeling behavior of parents and friends, and preferences for vegetables emerged as the strongest correlates. Exposure to TV ads for fruit and vegetables appeared to be associated with fruit and vegetable consumption. However, several studies have identified and inverse association between television viewing and intake of fruit and vegetables among adolescents.

Studies investigating the influence of parenting styles have found a positive association between an authoritative feeding whereas a negative association for an authoritarian feeding with the availability of fruit and vegetables at home.

Research looking into availability and access of fruit and vegetables in neighbourhoods suggest the possible importance of small neighbourhood food stores and their fresh produce availability in affecting fruit and vegetable intake. Good local availability, own vegetable garden, or low food insecurity have been found to have a positive influence on intake. Intervention studies show a positive effect of increased availability and access of fruit and vegetables in schools on intake.

SESSION 11
(PARALLEL)

Karen Lock

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- Dr Karen Lock, is a Lecturer in public health in the European Centre on Health of Societies in Transition, London School of Hygiene and Tropical Medicine. She is also a public health doctor in the UK NHS. She studied clinical medicine at Oxford, and has postgraduate degrees from UCLA and LSHTM.Her ongoing research looks at the health impacts of food and agricultural policy worldwide, and the effects of nutrition and environmental interventions on obesity prevention particularly in the UK. Her previous work includes estimation of the world wide burden of disease due to low consumption of fruit and vegetables (published in the WHO World Health Report 2002: Reducing Risk, Promoting Healthy Life). This work allowed the effects of fruit and vegetable consumption to be compared with other non-communicable disease risk factors using standard methods for the first time. She has also worked with colleagues reviewing the effectiveness of interventions and policies to increase population consumption of fruit and vegetables.

- She has been an expert advisor to the Joint FAO/WHO Initiative promoting Fruit and Vegetables for Health (as part of the WHO Global Strategy on Diet, Physical Activity and Health), and has been part of the Global Design Team for the current World Bank led global research assessment on agriculture to improve nutrition, hunger, health and sustainable livelihoods.

- She also works with colleagues across Europe assessing the health impacts of the EU Common Agricultural Policy, and is currently working on EU Commission agricultural proposals for school fruit and vegetable schemes which is under consideration in 2008.

Are school-based F&V schemes effective at improving the diet and health of children?

This will report on a systematic review of the effectiveness of interventions to promote fruit and/or vegetable consumption in children in schools worldwide. The results show that school-based schemes are effective at increasing both intake of, and positive knowledge and attitudes to fruit and vegetable intake. Of the 35 studies included, 65% of studies in both younger and older age groups showed statistically significant increases in fruit and vegetable intake at follow, with none decreasing intake. 25 studies had follow up periods greater than 1 year and this review provides evidence that both large (national) and smaller (local) scale FV schemes can have long term impacts on consumption. One national study showed that free school fruit and vegetable schemes can also help to reduce inequalities in diet. Only one study showed an effect on both increasing fruit and vegetable intake and decreasing overweight in the same scheme. It was unsurprising that other studies showed no impact on overweight or obesity, as changes to weight would be expected to occur at longer time scales that changes in intake.

This review concludes that school fruit and vegetable schemes work. Effective school programmes have used a range of approaches and been organised in ways which vary nationally depending on differences in the food supply chain and education system.

The talk will also discuss the implications of these findings for the new EU agricultural policy measure for school fruit and vegetable schemes which will be launched in 2008.

SESSION 11
(PARALLEL)

Paula Dudley

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- After starting her working career as a nurse in Auckland Paula travelled to the UK and moved into the field of advertising and marketing.

Paula is now responsible for the strategic management of the national 5+ A Day programme in New Zealand and the day to day management of United Fresh as a non profit organisation set up to promote fruit and vegetables for health.

- In addition, she is the United Fresh representative on a number of industry and government working groups including the Ministry of Health's Healthy Eating Healthy Action Advisory Group, the National Fruit and Vegetable Alliance (FAVA) and Vice Chair of the International Fruit and Vegetable Alliance (IFAVA).

Public/private partnership in action: New Zealand's Fruit in Schools programme

United Fresh (NZ) Inc. was first incorporated in 1991 and launched the 5+ A Day programme in 1994. In 2007 The 5+ A Day Charitable Trust was formed with the children of New Zealand as its beneficiaries.

United Fresh is New Zealand's only pan-produce industry organization with representation from all sectors of the fresh produce value chain, including growers, retailers and wholesalers. It is a credible link into the food, education and health sectors for the fruit and vegetable industry.

The objective of United Fresh's 5+ A Day programme is to encourage all New Zealanders to eat and enjoy eating five or more servings of fruit and vegetables every day for health taste and variety. This is in line with the Ministry of Health's guidelines that recommend we eat five or more servings of fruit and vegetables every day.

One of United Fresh's initiatives is the Fruit in Schools (FIS) programme. United Fresh first proposed FIS to the government in 2003. After conducting a successful pilot, the Ministry of Health agreed to fund FIS. The programme was rolled out nationally from 2005 to all Decile 1 schools (most deprived schools). Currently United Fresh supplies 60,000 children with fresh fruit or vegetables every school day.

The aim of the New Zealand FIS programme is to enhance student learning through promoting the well being of the school community with particular focus on: Healthy Eating, Physical Activity, Being Sunsmart, Being Smokefree.

United Fresh supports the Healthy Eating component of FIS by providing all schools and health professionals involved in the programme with 5+ A Day teaching resources. These curriculum-linked resources are produced each year and provided to approximately 14,000 educators on request.

United Fresh has developed the 5+ A Day programme into a widely recognized and respected brand. It continues to grow as New Zealand's produce industry, health and education sectors find value in its messages.

SESSION 11
(PARALLEL)

Saskia te Velde

PhD

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- Saskia te Velde received a master in human movement sciences from University of Groningen, the Netherlands in 1998. After that she worked as a PhD-student at the EMGO institute and participated in several courses on epidemiology and data analysis. In 2004 she received her PhD degree at the faculty of Medicine from the VU University, Amsterdam. In 2005 she started working as a post-doctoral researcher at the Erasmus University Medical Center, Rotterdam, where she was involved in the evaluation of interventions promoting fruit and vegetable consumption among schoolchildren.

- She is currently continuing her work as a post-doctoral researcher at the EMGO institute at the VU University Medical Center, Amsterdam. She is involved in several studies examining determinants of nutrition behavior and physical activity or evaluating the effect of intervention programs. Her main interest is in the evaluation of intervention studies promoting healthy nutrition behavior and physical activity, determinants of health behavior, and data analysis in general.

The Pro Children Study

In order to promote fruit and vegetable intake among European schoolchildren, the school based Pro Children Intervention has been developed. The school setting has great preventive potential, since all children can be reached.

The Pro Children project consisted of two phases: 1) a cross sectional survey in nine European countries and 2) the design, implementation and evaluation of a school-based intervention to increase F&V consumption in schoolchildren. Information from the first phase was used to develop the intervention according the intervention mapping approach. To reach the goals, the Pro Children intervention consisted of different components: the classroom component, a school component, a family component and one optional component, which differed by intervention site. The school component consisted of the provision of fruit and vegetables. The intervention package was implemented in schools in Norway, The Netherlands and Spain during one school year.

The intervention was evaluated using a cluster randomised controlled trial. Children completed questionnaires assessing their FV intake and a broad range of potential determinants of FV intake during the measurements; a baseline measurement prior the start of the intervention, a follow-up measurement after the first year of the intervention and again one year later. Results after one year follow-up showed that in the total sample, significant positive intervention effects were found for all intake measures. The intervention group reported a 56.9 gram/day higher intake of fruit and vegetables than the control group. However, at second follow-up, the intervention effect for total fruit and vegetable intake and vegetable intake differed by country. At second follow-up the intervention effect was significant only in Norway: the intervention group reported a 91.5 gram/day higher intake of fruit and vegetables than the control group. During the second year, when the intervention activities were less intense, only the intervention schools in Norway further increased their intake levels, while the intervention schools in the Netherlands stabilised their intake levels and children from the intervention schools in Spain decreased their intake levels. A process evaluation showed that the intervention was better implemented in Norway, which may explain the findings. In addition, children's appreciation of the program influenced the outcomes. Another major issue is the parental involvement. We found that parental involvement in the special organised activities was rather low. Future studies need to make the parental involvement activities more attractive in order to promote parental participation in these activities.

Although we could not separately assess the effects of the different components of the Pro Children study, results suggest that making fruit and vegetables more available at school, is a very important environmental component influencing FV intake. Providing free fruit at schools seems a promising strategy improving children's FV intake. In addition, also social-environmental determinants of FV intake should be addressed, since parents can importantly influence the home environment and make FV better available and accessible.

SESSION 11
(PARALLEL)

Elling Bere

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- Elling Bere is currently an Associate Professor in Public Health Nutrition at the University of Agder, Kristiansand, Norway. He has a PhD from the University of Oslo in Public Health Nutrition (2004), where he also spent three years as a post doc researcher (including one year as a guest researcher at the Department of Public Health, Erasmus Medical Centre Rotterdam, the Netherlands). He has a Masters degree in Nutritional Biology (2000) from the University of Bergen, Norway.

- His academic interest is mainly in determinants of eating and activity behaviors and intervention research, as well as in sustainable food production. He is the main researcher of the Norwegian intervention project "Fruits and Vegetables Make the Marks".

Free school fruit might give long term effects - results from the Norwegian intervention

Objectives: A paid school fruit and vegetable (FV) programme (parents pay NOK 2.50 per day ~ € 0.30) is offered all Norwegian schools (grade 1-10)*. The programme is subsidised by the Norwegian Government with NOK 1.00 per pupil per day. The aim of this study was to evaluate the effect of this programme and to compare it to a free pilot version.

Material and Methods: Data from four questionnaire surveys (conducted between Sept. 2001 and May 2005) of 1950 pupils from 38 schools are used. All pupils at nine of the schools participated in this programme for free in the school-year of 2001/2002. The remaining 29 schools had to decide to participate in the paid programme or not.

Results: The paid programme showed low participation by schools (30%) and low subscription by pupils (40% at participating schools), and therefore it's effect in increasing FV intake was limited. In addition, the pupils subscribing reported to behave healthier (i.e. higher FV intake) than the non-subscribers - also before the programme started. The free version of the programme increased all pupils' FV intake (i.e. boys and girls, low and high SES), and it tended to reduce the inequality present in FV intake. An effect of the free programme was also observed three years after the fruit was provided for free.

Conclusions: The paid programme had limited effect and it increased the social inequality present in FV intake. The free programme had much higher effect, it tended to reduce the inequality present and it showed long-term effects.

* From fall semester 2007 all Norwegian pupils in grades 8-10 are offered a piece of FV every school day for free.

Session 12
(Parallel)

Local initiatives to promote F&V consumption at school

Chair

Jacques Remiller

Secretary of the Foreign Affairs Commission

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- Jacques Remiller started his political career as mayor of Jardin (Isère) from 1977 to 2001.

- He was elected to Isère county council from 1985 to 2001, and was vice-president from 1992 to 1998. He was also member of Rhône-Alpes regional council from 1998 to 2001.

- In 2001, he became mayor of Vienne and Member of Parliament for the 8th constituency of Isère in June 2002. As a UMP group activist during the twelfth legislation, he was president of an industrial chemicals study group, and of the France-Chad Friendship Committee. Member of the Foreign Affairs Commission, member of the French delegation to the NATO assembly (re-elected in 2007), and of the French section of the Parliamentary Group for French-speaking communities (re-elected in 2007), he was a Deputy Judge in the High Court of Justice. He also sat on numerous information and enquiry committees (GM, pastoral issues, sects, the Outreau Paedophilia Enquiry,..). In May 2003, he proposed a law requiring fresh fruit to be distributed in the playground of every school.

The proposition was supported by the government in September 2007.

- Re-elected to parliament 2007, he is secretary of the Foreign Affairs Commission and President of the Fruit and Vegetable Studies Group, and President of International Vatican Relations Committee. In Autumn 2007, he proposed a resolution regarding the high bee mortality rate in France, as well as a proposition to reduce VAT on fruit, vegetables, meat, fish and unsweetened dairy products to 2%.

- Importance of the valorization of the local dimension of the project.
J. Penez

- Beyond the school, how to involve parents and inhabitants in the project?
F. Liber / P. Martin

- Pooling the competences and federating the projects of all local actors.
P. Berger

- Appraising each action in order to secure its perennity.
E. Feur

SESSION 12
(PARALLEL)

Jacqueline Penez
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Importance of the valorization of the local dimension of the project

Obesity has become an increasing problem over the last few years. This presents a real threat to public health.

One third of the Paris region population are obese.

(Source: Insee – 10-year Health Survey, 2002-2003; ORS Ile-de-France quota)

The statutory recommendations of CERVIA - Centre Régional de Valorisation et d'Innovation Agricole et Alimentaire (Regional Agriculture and Food Board of Paris Ile-de-France) - include nutrition, quality, innovation and food safety. All of which complements the Paris Region promotion of fruit and vegetables. With this in view, CERVIA has initiated educational groups in high schools. This is a logical follow-up to the signing of the Fruit and Vegetables in Society Charter by Monsieur Jean-Paul HUCHON, President of the Regional Council, and by the professional fruit and vegetable growers association, September 2006. The CERVIA has worked with Interprofession Fruits et Légumes (INTERFEL) to produce a Fruit and Vegetable Nutrition, educational programme in Ile de France. This involves a 90-minute session with a teacher present, and is aimed at private and public high schools in the Paris region, whether general subject or specialist technical schools. The aim is to carry out 100 sessions in 2008. During the sessions, a wide range of local products is presented in original fashion, at the same time as nutritional values. The Ile de France region is effectively one of two test regions in France, which have initiated schools programmes. The long-term objective is for each class in the programme to be in direct contact with school authorities (and therefore with kitchen staff and educational health advisors) in order to promote fresh, local produce.

Session 12 (Parallel)

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- **Deputy Mayor of Dunkirk (North of France)**
- **Surgeon**

Philippe Martin

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- **Director of the Office for Promotion of Good Health, Dunkirk (North of France)**
- **Project Coordinator for "Dunkirk, Healthy town associated with the World Health Organisation".**
- **Professor at University of Littoral Master 2 Staps - "Sport and Health"**
- **Took part in PNNS study into the implication of communes in the national system**

Beyond the school, how to involve parents and inhabitants in the project?

In the region of Nord-Pas-de-Calais, public health is a priority. Since 1989, Dunkirk has worked for a Public Health Policy on the coast. Between 1991 and 1994, measures for prevention were put in place and the partnership agreement between the town, CPAM and the 'Union des Mutuelles de Dunkirk', instigated the Office for Promotion of Good Health (MPS), a permanent showcase for prevention and action. Since 2004, Dunkirk has also been part of the 'French Towns for World Health Organisation (OMS)' and in November 2007 became member of the European network.

Dunkirk : pilot city for fruit and vegetables

The municipal authorities are very committed to the 'Dunkirk the Active Town' charter as part of the National Programme for Nutrition and Health (P.N.N.S). This charter recommends eating 5 portions of fruit and vegetables every day. This message is clear but putting it into practice throughout the population, especially amongst poorer sections of the population, is difficult. In fact, due to economic reasons, way of life, and availability, fruit and vegetables are not necessarily the top priority for every family. As a Pilot City, we involve the grower networks and distributors in our projects. In this way, economic and social considerations are treated together.

Local production in Dunkirk

MPS missions involve promoting individual and collective eating habits, working with consumers at all levels to understand their expectations. Therefore, numerous initiatives are targeted at children in schools, although parents play an equally important role in this kind of education. As well as the local authorities, community centres and parent groups are instrumental in setting up regular events, which promote healthy eating 'to grow up and grow old in the city'.

12 healthy eating workshops or projects take place in the local communities, with most participants being parents of local schoolchildren. These projects give priority to examining 'slices of life' and address health problems in the community, such as the amount of fruit and vegetables in daily diets. The town of Dunkirk thinks that "fruit and veg" are important, and is trying to overcome the money issue, which can be an obstacle to certain sections of the population.

SESSION 12
(PARALLEL)

Patrick Berger

Environment Director

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- Patrick Berger is Environment Director for the city of Perpignan, and in charge of piloting the technical project entitled Perpignan, Pilot City – Fruit and vegetables, Health and Society.

- Trained as a Landscape Engineer, he graduated in 1992 from the National Institute of Horticulture (INH) in Angers after further education in Agriculture. For 8 years at the start of his career, he was in charge of the parks in the city of Lyon; there he instigated a Vegetation Plan and began to re-classify the public parks.

- In 2000, he took over as Environment Director for the city of Perpignan. He has developed a working partnership with farmers and growers of the area. Perpignan is the most important farming area in the Pyrénées Orientales region, and, by the nature of their activity, these farmers and growers make an essential contribution to his green space programme. He also chairs an agricultural consultation committee, set up 2001. He uses different elements to create strong links between urban and agricultural needs, with particular regards to the development of short distribution chains.

- Further to his official role, since 2005 he has been voluntary chairman of the Work Group for Green Spaces, attached to the Association of French Territorial Engineers (AITF). On one occasion, he organised a European conference on 'The sustainable city and natural territories: green policies and assessment'. He is also co-founder of the Centre for Scientific and technical Studies, « Plants and Estates » with INH, which addresses the issues of inner city agriculture.

Pooling the competences and federating the projects of all local actors

Obesity is a real and growing problem for public health in France. Currently, 3 million people suffer from obesity and 14.4m people are overweight.

Scientists consider obesity to be a genuine disease and the alarming increase of cases signifies an epidemic. Prevention is a key strategy in the battle against obesity. That is why, since 2006, the city of Perpignan has been committed to prevention, by bringing together skilled professionals and special projects in a new, united approach.

Agriculture in Perpignan part of the local culture; the inhabitants are proud of their farming heritage. The city's initiatives have several priorities: environment, economy, tourism and health. In fact, Perpignan is France's most important hub for fruit and vegetables.

SESSION 12
(PARALLEL)

Elisabeth Feur

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- Doctor in Public Health Sector

- Since 1994: Head of Research and Evaluation Department, 'Direction PMI-Promotion Santé' (promoting public health) of CG94

- Since 2001: Head of 'Programme Nutrition Santé Adolescences' (Youth health programme).

Contributions to the development of professional recommendations:

- Obesity: Review and assessment of prevention and care programmes; INSERM expert forum (2005): experts hearing.

- Recommendations for systematic testing in 7 to18 year-olds, HAS/ANAES 2005

- Advice for school meals, updating the former CNA advice (Avis n°47/2004)

- Nutrition Guide for the public, for parents: PNNS(2003)

- The importance of nutrition in school catering. Ambroise Martin, PNNS (2003).

Appraising each action in order to secure its perennity

Since 2001, the County Council of Val-de-Marne (1.2m inhabitants) has been promoting healthy nutrition among teenagers:

- Financial aid for payment of school meals
- Promotion for consumption of fruits, dietary education,
- Care of overweight children.

The Teenage Nutrition Programme (www.cg94.fr/node/14224), in compliance with the National Nutrition and Health, has been developed in close collaboration with educational and medical establishments, local committees and representatives of the fruit and vegetable industry, such as: 'Interprofession des Fruits et Légumes' (INTERFEL), 'SEMMARIS of MIN of Rungis', 'Agence pour la Recherche et l'Information des Fruits et Légumes Frais' (APRIFEL).

In 2007-2008, 20,000 guests were invited to the promotion for the consumption of fruit: 3 weeks of promotional activity, tasty seasonal fruit, educational activity, 10 tonnes of fruit.

Assessment programme: particular attention paid to fruit in daily diet

In 2005, two studies were made of pupils and schools.

One concentrated on the quality of dishes served to secondary and high school pupils. It concerned all 153 secondary and high schools in the county. The aim was to describe the following:

1- The catering system

2- The fruit, dairy products and drinks on offer.

The data was gathered using a questionnaire put to management regarding the school canteen, the daily menus, and records of fruit, dairy products and drinks purchased in 2005 (calendar year). The results allowed a comparison between schools, according to whether they had participated in the fruit consumption promotion (schools programme) since 2001, or not.

A total of 125 out of 153 schools completed the questionnaire, and 85 of these included their purchase records for 2005.

An average daily ration of 100g of fruit - significantly higher for those schools in the Schools Programme.

- In 2005, the average daily ration of fruit offered to a pupil was as much as 102 g (gross weight). Most of that offered was fresh fruit (90%). In schools in poorer areas, the daily ration on offer was only 50g.

- Nearly 86 % of schools proposed at least 12 different fruits over the year. However this variety is relative due to the fact that 60% of the fresh fruit was 'popular' fruit e.g. apples, bananas, oranges...

The fruit on offer in the Schools Programme was significantly great in volume and variety, although the budget was no higher: 128g (as opposed to 81g), 12 different fruits during the year in 90% of schools (as opposed to 83%).

The 'Schools Programme effect' was helped by the management and chefs, who managed their purchasing better over the year. It was not due to aid for fruit purchasing from the county council, or the amount of extra fruit on offer during the promotional activities.

This results show the importance of the contributions of management, and chefs, and the value accorded to them, in Val de Marne. Without increasing spending on food, they can effectively increase the ration of fresh fruit on offer to the pupils, and that of the raw vegetables, although to a lesser degree. The disparity between schools is detrimental to children form poorer backgrounds. More attention will be paid to them in future.

SESSION 13
(PARALLEL)

PESTICIDE MANAGEMENT: F&V CONSUMPTION

Chair

Muriel Dunier-Thomann

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Education

- 1980 Graduated in agricultural engineering from the National Agronomic Institute Paris-Grignon
- 1983 PhD at the University VI Paris
- 1991 Accredited to direct Research (HDR)

Career

- 1980 Researcher in Institut de la Recherche Agronomique (INRA-currently at grade Director of Research in secondment in European Institutions since 2000)
- 1985-1994 Head of the Immunotoxicology laboratory (INRA) located in the National Veterinary School of Lyon, expert for FAO
- 1994-1997 Head of Division, OEDC, Agriculture and Fisheries Directorate
- 2000-2002: Detached National Expert (DNE) in European Commission DG Environment C3 (Chemicals Unit) in charge of the pesticides policy (Directive 91/414/EEC)
- Since 2003: Head of Unit, in charge of the Scientific Panel "Plant Protection Products and their residues" at the European Food Safety Authority (EFSA) in Parma (Italy)

- Evaluation of consumer exposure to pesticides.
B. Declercq

- Evaluation of consumer exposure to pesticides: A French study.
A. Periquet

- Eu monitoring and alert system.
L. M. Martin-Plaza

- Risk management in France.
F. Gerault

SESSION 13
(PARALLEL)

Bernard Declercq

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- **Honorary director of the DGCCRF Massy Laboratory**
- **Honorary consultant FAO specifications and JMPR**
- **ex French representative at the CCPR (codex)**
- **French representative in community 'residue' meetings**
- **missions in Africa for the organisation of agricultural protection services**
- **audits**

Evaluation of consumer exposure to pesticides

When a pesticide is authorised and used it must ensure a high level of protection:

- o Efficacy
- o Risk for operators
- o Risk for bystanders
- o Risk for consumers
- o Risk for birds terrestrial mammals and aquatic organisms
- o Fate and distribution in the environment
- o Impact on non-target species

The evaluation of the risk request often the same way. On one hand we have the risk assessment for pesticide based on hazard identification from toxicological studies and on another hand the intake taking into account the diet and the contamination of crops. In Europe for water, the concentration was set at 0.1µg/l by the law and the evaluation was restricted only with the respect of this level.

We choose only one topic regarding the time of speaking which can be related to the subject of the symposium: The Risk for consumers.

The « credit » was evaluated starting on long and short-term toxicological studies on animals and the consumption by the intake based on the diet and the residues of pesticide in crops (chronic intake)

New approaches are taken into account the acute exposure. The aggregate exposure is also on going but not finalised.

All pesticides in the market must be safe for all topics described above.

SESSION 13
(PARALLEL)

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- Alain Periquet is Professor of University (Biology, Physiology, Nutrition, Pharmacology, Toxicology and Food safety).

- He is Director of the Department of Toxicology and Food Security and of the 'Institut Universitaire Professionalisé' (Bioengineering).

- Professor Alain Periquet is member of the French Food Safety Agency, and of the High French Council of Public Hygiene. He is also technical advisor to the EEC and to the FAO/WHO. His main areas of research are on the subject of nutrition and toxicology and include studies of the hepatic metabolism of the xenobiotics, the organic response to oxidative stress and the influence of nutritional factors.

Evaluation of consumer exposure to pesticides: A French study

Introduction: The increase of fresh fruit and vegetable (FFV) intake represents a major public health goal in industrial countries. Such a change could contribute to the prevention of obesity, and major pathologies such as diabetes, cardiovascular diseases, osteoporosis and cancer. Nutritional recommendations call for the increased consumption of daily servings of FFV. But, theorically, a high intake of FFV could be associated with a high amount of pesticide residues.

In this study, we have evaluated dietary intake of pesticides residues by heavy consumers of growing intakes FFV. Theoretical exposure to pesticide residues under increasing amounts of FFV was assessed.

Method: Five daily balanced menus with increasing amounts of fruits and vegetables (200 – 400 – 600 and 800g/j) over a period of four weeks were established. The quantities of active substances brought by every fruit and/or vegetable vector, at the maximum residue level (MRL) were summed up to determine the intake for each active substance. This value was then compared to the Acceptable Daily Intake (ADI) to point out any potential overexposure which may be associated with increased risk.

We intentionally have adopted a maximalistic approach by:

1) considering that residue level of all active substance was equal to the MRL,

2) hypothesizing that each of the 165 authorized substances mostly used on fruit and vegetable culture could be found in the fruits and vegetables present in the various menus,

3) assuming that contribution to other food items to dietary intake of pesticides was negligible,

3) ignoring any reducing factors i.e. washing, peeling, or cooking,

4) estimating that the whole menu is consumed each time.

Results: Under the conditions of minimally recommended daily consumption of fruit and vegetables (400 g/d), the intake of all active substances was lower than the ADI. 21 active substances were over 10 % of the ADI vs 144 active substances below 10 % of the ADI.

Assuming a consumption of fruit and vegetables 2 times higher than minimally recommended consumption (800 g/day vs 400 g/day) the intake for 127 active substances remain lower than 10 % of the ADI.

Conclusion: This study shows that substantial increase of fruits and vegetables ration to meet nutritional recommendations minimally affects consumer's exposure to pesticides for most of the active substances currently used. Considering that this theoretical study overestimates the actual intake, heavy consumers of fruit and vegetables are not likely exposed to pesticide doses reaching or exceeding the ADI.

Thus, public health community should strive to place fruits and vegetables consumption high on the political agenda.

SESSION 13
(PARALLEL)

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Studies background: **DEA (Diplôme d'études approfondies) in Food Pesticide Residues Control. PhD in veterinary sciences. Experience in control and research laboratories, veterinary inspection and food safety legislation, in particular on pesticide residues in food.**

- Current obligations at European Commission are developing policy and legislation, as well as manage the existing legislation, in the area of pesticides residues; such as the yearly monitoring Recommendation setting out a co-ordinated Community monitoring programme or management of the fourth Community Reference Laboratories (CRLs) on pesticide residues.

The EU co-ordinated monitoring program for cereals, fruit and vegetables and EU Rapid alert system

Pesticide residues in foodstuffs of plant origin are monitored throughout the European Union. Besides national programmes, which have different layouts regarding commodities and pesticides, all Member States and Norway also participate in a co-ordinated Community programme. The aim of this programme is to work progressively towards a system, which would permit to estimate actual dietary pesticide intake for the population of the European Union.

The co-ordinated programme is planned on a 3-year basis as rolling programme. Each year a Commission Recommendation defines the pesticide/commodity combinations and the number of samples to be taken by each Member State.

Some of the results of the 1996 to 2005 monitoring exercises are shown in this presentation.

In line with the aim of the Commission to assess the actual dietary pesticide intake, the Rapid Alert System for Food and Feed (RASFF) is a system which has been in place since 1979. The legal basis of the RASFF is Regulation EC/178/2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. In Articles 50, 51 and 52 scope and procedures of the RASFF are defined.

The purpose of the RASFF is to provide the control authorities with an effective tool for exchange of information on measures taken to ensure food safety

The RASFF has three levels of information: Alert and information notification and News, each of them with specific conditions for launching. In the case of pesticides, the range of notification goes from 5% for alerts to 8% for information. When and how to decide the launching of a notification is very important, in order to avoid false alerts and to prevent overloading the system.

SESSION 13
(PARALLEL)

Florence Gérault

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- Florence GERAULT is Chief Engineer for Rural Areas, Water and Forests. Since October 2003 she has held the post of national expert on residues for the Ministry of Agriculture unit which deals with plant quality and protection (the SDQPV).

- Dr Gerault has expertise in the field of pesticide residues and is a member of the expert committee on phytosanitary products at the AFSSA and at the community level (the Standing Committy on Food Chain and Animal Health).

- Dr Gerault contributes to the development of the French position on Community MRLs. In collaboration with experts in production sectors she assists the SDQPV in making safe agricultural practices in terms of residues (MRLs, norms and standards of practices...).

- She has developed and piloted with the SDQPV, regional services, experts and the DGCCRF, plans for surveillance and control of pesticides and other plant contaminants.

- Drawing from her experience at the GIRPA laboratory (inter-regional unti for research in agro-pharmaceutical products) and as adjunct director of GIRPA from 1999 to 2003, she is contributing to the implementation of an observatory for residues analysis alongside the National Laboratory for Plant Protection.

Risk management in France

DGAL (General Direction of ALimentation of the french agriculture ministry) is involved in pesticide risk managment.

Since 2006, risk evaluation is separated from managment and in charge of AFSSA (French Agency for Sanitary Security of Alimentation).

Since this year, pesticides Maximum Residues Limits are set at european level. These EU MRLs will enter in force in september. DGAL is involved in this process upstream through the Standing COmmity on Food Chain and Animal Health and downstream through the alignment of french agricultural uses to these new MRLs. Exemples of these both aspects will be developped in the oral presentation.

Implementation of pesticides residues monitoring programmes is an important tool of pesticides risk managment. Since 1990, survey programmes have been conducted on many crops for 3 years each. The aim was to generate data base on pesticides residues in relation with agricultural practices. The last one concerned protected vegetables and pesticides specific application methods.

These programmes are evolving to take into account the needs of AFSSA to estimate dietary pesticides intake for French population and to be complementary to control plans implemented since 2004.

The aim of pesticides control plans is to verify that phytopharmaceutical products are used according to conditions and restrictions defined in their authorizations.

They are conducted in the farms on the basis of a regional risk analysis and they are part of the reform of the Common Agricultural Policy (conditionality of financial aid). They operate in accordance with the requirements of Article 3 of Directive 91/414/EEC.They are also complementary to the monitoring programme of the DGCCRF (General Directorate for Competition Policy, Consummer Affairs and Fraud Control) wich verify the conformity to MRLs of agricultural products on the market.

Finally, at national level, according to the conclusions of the « Grenelle de l'environnement », pesticides risk managment is manifested by the withdrawal of 53 most dangerous molecules, including 30 by the end of 2008 and the objective of 50% reduction of pesticide use to the extent possible within less than 10 years.

To this end, an operational committee of experts has been formed. It is responsible for formulating concrete proposals for action. This « Ecophyto 2018 » plan will be presented.

SESSION 14 (PLENARY)

Chairs

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For Biographical Sketch, see Session 7

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F&V AT WORKSITE

- Preventing chronic diseases at the workplace through diet and physical activity.
V. Candeias

- Worksite-based research and initiatives to increase F&V consumption.
G. Sorensen

- Successful strategies for sustaining increased fruit and vegetable consumption in worksite canteens.
AV. Thorsen

- Improving health at the workplace: where can F&V fit into the equation?
B. Sahler

SESSION 14
(PLENARY)

Vanessa Candeias

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- Since October 2005 works as Technical Officer at the World Health Organization, Headquarters-Geneva, in the implementation of the WHO Global Strategy on Diet, Physical Activity and Health.

- From September 2004 to September 2005, worked as public health nutritionist at the Portuguese Directorate General for Health (Ministry of Health) in the Health Promotion and Education Division, and at the Institute of Preventive Medicine.

- Faculty of Medicine, Lisbon University.

- Before that she worked as research assistant at the Faculty of Nutrition and Food Science of Porto University, and as professional trainer of nutrition/dietetics, physiology and chemistry at the Employment and Professional Education Centre of Porto (2002/2004). Graduated as nutritionist from the Faculty of Nutrition and Food Science of Porto University in October 2003 and is currently doing her masters in public health with the London School of Hygiene and Tropical Medicine.

Preventing NCD in the workplace through diet and physical activity

In 2005, an estimated 35 million people died of noncommunicable diseases (NCDs) such as heart disease, stroke, cancer and diabetes. An estimated 80% of these deaths occur in low- and middle-income countries that also have to deal with the burden of infectious diseases, maternal and perinatal conditions and nutritional deficiencies. Unhealthy diets, physical inactivity and tobacco use are major risk factors for NCDs.

Data on rates of economically active populations indicate that, globally, approximately 65% of the population aged over 15 years is part of the workforce. Therefore policies and programmes that target main risk factors for NCDs at the workplace, will reach significant proportions of the population.

Addressing diet and physical activity in the workplace has the potential to: improve health-related outcomes; contribute to a positive and caring image of the company; improve staff morale; reduce staff turnover and absenteeism; enhance productivity; and reduce sick leave and health plan costs.

As a further step towards the implementation of the WHO Global Strategy on Diet, Physical Activity and Health (DPAS), WHO and the World Economic Forum organized a Joint Event addressing prevention of noncommunicable diseases in the workplace through healthy diets and physical activity. This Joint Event was held in Dalian, China, on 5-6 September 2007.

The participants of the Joint Event (academics, NGOs, private sector and Ministries of Health), discussed the current state of knowledge regarding use of the workplace as a setting for NCDs prevention; key elements of successful workplace health promotion programmes focusing on diet and physical activity, and potential roles for different stakeholders in the development and implementation of these programmes.

A report summarizing the discussions of the Joint Event and the current evidence available in addressing the different dimensions of the workplace as a key setting for preventive interventions through diet and physical activity was produced and can be accessed through the following link:

http://www.who.int/dietphysicalactivity/workplace/en/index.html

SESSION 14
(PLENARY)

Glorian Sorensen

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- Dr. Glorian Sorensen is Professor of Society, Human Development, and Health in the Harvard School of Public Health and Director of the Dana-Farber Cancer Institute's Center for Community-Based Research. The mission of CCBR is to conduct research that promotes the reduction of cancer risk and social disparities in cancer risk. The core of Dr. Sorensen's research is randomized worksite- and community-based studies that test the effectiveness of theory-driven interventions targeting individual and organizational change. These interventions are designed particularly to be effective for low income, multiethnic populations, including blue- and pink-collar workers.

- Dr. Sorensen has articulated a social contextual model for health behavior change, aimed at embedding behavioral interventions in the social context or environment in which people live. She conducted the first randomized controlled worksite intervention trials to integrate messages on occupational health and health behaviors. Her work increasingly includes research on the process of dissemination of evidence-based interventions. Dr. Sorensen is the Principal Investigator for the Harvard School of Public Health Center for Excellence to Promote a Healthier Workforce; for the Massachusetts Cancer Prevention Community Research Network, one of eight networks funded nationally; and for the Harvard Cancer Prevention Training Program.

Worksite-based research and initiatives to increase F&V consumption

An increasing number of worksites are providing health promotion programming, including efforts to increase fruit and vegetable consumption. Worksite research has documented the efficacy of these programs across a wide array of outcomes. In general, results from randomized studies of worksite health promotion have found modest yet promising effects. The purpose of this presentation is to present the evidence from worksite-based research on efforts to increase workers' consumption of fruits and vegetables.

Worksite intervention research has examined both comprehensive programs and environmental and policy approaches that aim to increase workers' consumption of fruits and vegetables. Comprehensive approaches to promote fruit and vegetable consumption often rely on the social ecological framework, and target change at multiple levels of influence, from changes in individual behaviors to organizational and environmental changes. The worksite research testing this approach has shown promising results. Studies have pointed to the importance of the use of participatory strategies designed to assure that programs are responsive to workers' needs and priorities, including through employee advisory boards and peer delivered approaches. Dietary patterns are also influenced by workers' broader social context, including worksite and family norms, social support, and the resources available in local neighborhoods. Recent research has explored the features of the social context most likely to influence improvements in fruit and vegetable consumption. Tailored interventions provide one promising avenue for assuring that interventions are responsive to workers' priorities.

Environmental and policy approaches include changes in the work environment and improved organizational support. Management commitment may be demonstrated by including worker health as part of the organization's mission statement, providing a budget and assigning staff to support the work, and engaging workers in program planning. Management support is important to reinforce norms supportive of healthful eating patterns. Some worksites have linked their efforts to resources in the neighborhood surrounding the workplace, such as access to neighborhood restaurants and grocery stores.

Although some studies have focused exclusively on increasing consumption of fruits and vegetables, recent research has tested interventions aimed at changing multiple risk behaviors. Evidence points to the importance of understanding the ways in which changes in one health behavior may support or contribute to changes in other health behaviors. Other research has indicated the importance of simultaneously addressing other worksite factors contributing to worker health, including exposures to occupational hazards.

Future research is needed to explore further the mechanisms and processes of both organizational and individual behavior change. It will be important to identify effective ways to offer programs in a range of worksite settings – from small to large worksites, across different industries, and in different geographic regions. Research is needed to explore the role of changes in the structure of work, including trends toward downsizing and mergers, privacy protections of health information, increasing use of technological innovations, and part-time and contractual work. Increasing attention is being devoted to understanding effective processes and strategies for disseminating evidence-based workplace interventions. Therefore, research is needed to explore barriers to and facilitators of worksite changes as well as willingness to adopt and implement health promotion programs.

SESSION 14
(PLENARY)

Anne Vibeke Thorsen

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- Since Jan 2004, Anne Vibeke Thorsen is PhD student at the Department of Nutrition, National Food Institute and the Department of Management Engineering at the Technical University of Denmark. The main focus of research is to analyze the long term sustainability of worksite canteen interventions.

- 2000- 2003; Project leader of the Danish "6 a Day" project aiming at increasing the availability and consumption of fruit and vegetables at worksite canteens.

- 1998 – 1999; Evaluation of Health Claims from a nutritional perspective for the Nordic Council of Ministers and Nordic Council.

Successful strategies for sustaining increased fruit and vegetable consumption in worksite canteens

The worksite is recognized as an important setting for the promotion of healthy eating in the 21st century because it provides access to such a large proportion of the adult population, including some that otherwise would be hard to reach1,2,3,. Healthy eating, particularly increasing consumption of fruit and vegetables (F&V), is a good investment for the companies since it may improve employee satisfaction, recruitment and efficiency. Together with high intake of dietary fat, a low intake of fruit and vegetables was among the 10 top selected risk factors for global mortality4. In addition, food served at worksite canteen may serve as a model of an optimal meal, thus influencing a person's food choices in other settings.

In a previous worksite canteen intervention, five worksite canteens increased the F&V lunchtime consumption significantly5. However sustaining the intervention efficacy over time seem to be a challenge6,7,. The objective of this study was to analyze the long term sustainability at the five worksite canteen interventions by means of a five-year follow-up.

The five-year follow-up showed that overall the canteens were able to sustain the intervention by using different strategies. Analyzing the data showed that adding F&V to hot dishes and serving appetising mixed salads were successful strategies, as were peeled F&V snacks. Whereas adding F&V to sandwich seems to be a more difficult strategy for sustaining the F&V intervention.

The method developed during the canteen intervention focused on cooperation between a consultant and the canteen personnel and management in defining, planning and implementing the F&V-intervention. The method also focused on providing ideas for increasing F&V for lunch, making environmental changes in the canteens by giving access to tasteful and healthy food choices and reducing the availability of unhealthy options.

Even though the worksite canteens seem to be a promising setting for promoting healthy eating there is limited knowledge on how healthy eating can be promoted most effectively at the workplace. This study shows that future worksite canteens interventions should be based on a participatory approach, long-term intervention, environmental changes, dialogue with suppliers and networking among worksite canteens.

SESSION 14
(PLENARY)

Benjamin Sahler

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1971 Engineer diploma from Ecole Centrale de Paris

1973-75 Institut des Sciences Sociales et du Travail – Paris-Sorbonne

1976-84 Junguian Psychoanalysis training

- His first job is as organization and management consultant in Paris from 71 until 1974

- Than he becomes an academic teacher in Conservatoire des Arts et Metiers (Paris), for different disciplines: applied mathematics to economics, applied statistics to psychology, labour and industrial psychology until 1984

He also exercises as a private psychoanalyst for 8 years.

- Then he develops consultancy and training skills for companies projects in a holistic approach (i.e. joining psychological, sociological, social partners dialogue, organizational and economical aspects). He also becomes Associate Professor at Rouen University .In 1999 he becomes a ANACT (The French National Agency for improving the working conditions) Regional representative and ARACT Limousin general manager. He also becomes Worplace Health Promotion referent for ANACT national network, especially developing and managing the work-related stress and psychosocial risk prevention project. He also takes part with Aract Limousin in a European EQUAL project focused on ageing and equality topics.

Improving health at the workplace: where can F&V fit into the equation?

We firstly have to understand how Workplace the Individual Health Promotion and the "classical" Workplace Risk Prevention are interlinked, according to different national contexts. Is there any consideration for the healthy individual behaviour beyond the work organization aspects in the companies' Health Programme?

The European Network for Workplace Health Promotion (ENWHP) is leading a campaign named "Move Europe" (including 26 countries) on life-style related Workplace Health Promotion (WHP), focusing on the combination of the following 4 fields: physical activity, healthy diet, mental health and smoking prevention.

That's where the "F&V" issue can "fit into the equation". How can the company players, the occupational practitioners lead concrete programmes about nutrition: having information campaigns, worksite canteens actions, connections with physical activity promotion...?

We'll report the first intermediary results of the ENWHP campaign.

Session 15 (Parallel)

F&V nutrient profiling: what are we going to be able to say in the future?

Chair

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- Prof. A. Martin obtained his MD in 1978, his PhD in 1985. Dr. Martin is university professor of biochemistry and nutrition at the faculty of Medecine in Lyon (France). He also heads the DERNS (Direction de l'Evaluation des Risques Nutritionnels et Sanitaires) between 1999 and 2004, the department in charge of the evaluation and food risks within the new French agency for food health security (AFSSA)

- His research activities as team leader at the INSERM 189 unit of the University of Lyon focused on the regulation, in particular nutritional regulation, of glycoprotein synthesis.

- Member of various scientific organisations, which are now included into Afssa : the French High Council of Public Hygiene (CSHPF), the Commission of products for special dietary purposes (CEDAP), the French National Food Council (CNA). Member of the Scientific Committee on nutrition of Afssa and of the nutrition Panel of the European Food Safety Authority (EFSA). Member of the Pilot Committee of the French Nutrition Health Policy

- Coordinator of the revision of the "Nutritional Recommendations for the French Population" (ANC) and chair of the EFSA working group on Dietary Reference Values.

- Nutrient profiling of foods: a systematic approach.
M. Rayner

- Validating nutrient profile models.
JL.Volatier

- Nutrient profiles, pleasure, and cost.
A. Drewnowski

How to communicate nutrient profiles to the consumer ?
Panel :
- AFSSA point of view. **A. Martin**
- EFSA Representative. **L. Heng**
- Consumer's Association Representative. **Ch. Pernin**

SESSION 15
(PARALLEL)

Mike Rayner

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- Mike Rayner is Director of the British Heart Foundation Health Promotion Research Group which is based within the Department of Public Health of the University of Oxford. The Group is engaged on a range of different projects related to assessing the burden of cardiovascular disease and to obtaining evidence for different ways of preventing it.

- Mike Rayner works closely with voluntary organisations concerned with food and health in the UK and in Europe. He is currently Vice-Chair of Sustain: the alliance for better food and farming and a trustee of the National Heart Forum in the UK. He is Chair of the Nutrition Expert Group of the European Heart Network based in Brussels and he is an ordained minister (Deacon) in the Church of England.

- He recently led the research team that helped the UK Food Standards Agency develop its nutrient profiling model for the purposes of regulating the television advertising of food to children. He and his research group are currently working on new ways of validating nutrient profiling models using dietary and health data.

Nutrient profiling of foods: a systematic approach

Nutrient profiling can be defined as "the science of categorising foods according to their nutritional composition". Nutrient profiling is a useful tool for many purposes related to public health nutrition.

This presentation will firstly indicate the uses to which nutrient profiling can be put: for regulating the marketing of foods (their composition, promotion, price and availability); for informing consumers about foods (both through health education and food labelling) and as a research tool. It will be suggested that a single nutrient profiling model may be appropriate for a range of different purposes but that this model may need adaptations specific for each purpose.

Methods of developing nutrient profiling models will be described and a more systematic and transparent method than generally used will be proposed. This method involves asking and answering seven questions.

For what purpose is the model to be used?

What group or population is the purpose relevant to?

Should the model be 'category-specific' or 'across-the-board'?

Which nutrients and other food components should be involved?

What should be the reference quantity (e.g. 100g, a serving, 100kJ)?

Should the model involve thresholds or scoring?

What should be the precise cut points for thresholds or the points for scoring?

This method has been used for developing a nutrient profiling model for the purposes of regulating the television advertising of food to children in the UK and the development of this model, using this systematic approach, will be described.

It will be suggested that the development of nutrient profiling models using a systematic approach is necessary but not sufficient. Nutrient profiling models also need to be 'valid'. Methods of validating nutrient profiling models will be presented - including testing for content, criterion and construct validity. Finally methods of comparing nutrient profiling models will be discussed.

SESSION 15
(PARALLEL)

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MSc in Statistics graduated of the National School of Statistics and Economic Studies (ENSAE, Paris), Jean-Luc Volatier was :

- Responsible of the National Health Survey ESPS at CREDES-IRDES in 1986-1991, then developed the surveillance of nutrient,

- Food additive and contaminant intakes at Credoc Research Center, Paris since 1992, and at Afssa, Maisons-Alfort since 2000.

- He published more than 40 peer-reviewed papers in the fields of nutritional epidemiology and food safety risk assessment.

Validating nutrient profile models

Nutrient profiles of foods are increasingly used as the scientific basis of nutritional labelling, health claims or nutritional education. Nutrient profiling schemes are based on sets of rules, scores or thresholds applied to the nutritional composition of foods. However, there is a lack of scientific validation of nutritional profiling schemes.

The aim of the study was to develop a reference method using existing dietary surveys, to define a set of indicator foods that are positively or negatively associated with a "healthy diet". Such indicator foods can be used both for establishing relevant nutrient profiles and for the validation of existing or future nutrient profiling schemes. In a second step, these indicator foods were classified according to three existing nutrient profiling schemes: The UK Food Standards Agency (FSA) model, The Dutch Tripartite classification model and the US FDA model used for regulating health claims. It was thus possible to test these three profiling schemes according to a reference method.

The proposed validation method is based on food and nutrient intakes of adults participating in national dietary surveys in five EU countries: Belgium (n=2507), Denmark (n=3151), France (n=1474), Ireland (n=1379) and Italy (n=1513). The characterization of indicator foods is divided in two steps. Firstly, "healthy diets" of individuals are identified in the 5 national dietary surveys by comparison to the Eurodiet reference intakes. Secondly, indicator foods associated positively or negatively to the "healthy diets" are determined. These "Indicator foods" were classified according to each of the three profiling schemes tested. The performance and effectiveness of each profiling scheme in correctly classifying the "indicator foods" were assessed using sensitivity and specificity ratios.

With a p-value of 10-3 for the test of comparison of food intakes between the "most healthy eaters" and the "less healthy eaters", it was possible to identify 294 indicator foods out of 1669 foods tested in the five countries. In all the countries except Italy, there were more indicator foods positively associated than indicator foods negatively associated with the "healthy diet". The food categories of these indicator foods were in good agreement with Food Based Dietary Guidelines like fruit and vegetable intake recommendations. The sensitivity and the specificity ratios of the three profiling schemes tested were relatively good. There were only small differences of performance between the three systems.

In conclusion, a new reference method for the validation of profiling schemes was developed based on dietary intake data from using dietary surveys in five European countries. Only a minority of foods consumed in these dietary surveys could be used as indicator foods of healthy or unhealthy diets in order to subsequently test nutritional profiling schemes. The level of concordance between the classification of the "indicator foods" and the classification by each of the three profiling methods tested was quite good. Further work is needed to build a list of indicator foods that could be considered as a "gold standard". Very recently, another validation method was proposed in UK using the contribution of foods to nutrient intakes as a criteria to define indicator foods.

SESSION 15
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Adam Drewnowski

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- MA in Biochemistry from Oxford University; PhD in Psychology from the Rockefeller University, New York; Postdoctoral training at the University of Toronto, Canada.

- Assistant Professor in the Laboratory of Human Behavior and Metabolism, the Rockefeller University, NY; Professor of Public Health, Psychology, and Psychiatry at the University of Michigan School of Public Health.

- Research on the role of taste, cost and convenience in determining food choices; studies on diet quality and diet cost in relation to obesity; nutrient profiling of foods using NutriScore – a new research tool; studies on beverages, appetite and satiety.

- Research funding from the National Institutes of Health, the US Department of Agriculture and the private sector. Director of NIH-funded Center for Obesity Research, focusing on the environment, economics and policy.

- Awarded the 2005 French Food Spirit Award – the Sciences Trophy.

Nutrient profiles, pleasure, and cost

Nutrient profiling of foods, described as the science of ranking foods based on their nutrient content, is one way to convey the concept of nutrient density to the health-conscious consumer. In accordance with current knowledge of diets and health, nutrient profiles typically include beneficial nutrients, protein, fiber and a variety of vitamins and minerals, expressed per 100 g or per 100 kcal of food. Nutrient profiles also include nutrients that the public is advised to limit: total fat, saturated fat, total or added sugars, and sodium. The final algorithm that balances the beneficial nutrients and nutrients to limit is designed to ensure that the profile models capture not only the energy density of foods but also the total nutrient package. A number of nutrient profile models have now been developed by research scientists, regulatory agencies, and by the food industry. Most of them have abided by the same science-driven rules. These included the selection of appropriate index nutrients and reference daily values, and the choice of reference amounts: 100 g, 100 kcal, or legislated serving sizes. Many have been tested against each other or against other attributes of foods and some have been validated with respect to independently obtained measures of a healthy diet. In some cases, food rankings generated by nutrient profile models were very strongly associated with energy density, suggesting that the profiles did little more than capture energy content as opposed to the micronutrient content of foods. In other cases, the highest-ranked foods were substantially more costly (per calorie) than were the lower-ranked alternatives, suggesting such that following a more nutrient dense diet would entail economic costs. The development of nutrient profiles needs to be sensitive to both energy density and to energy cost. Eating pleasure and enjoyment are additional issues that need to be taken into consideration. The nutrient density approach will not score with the consumer if the highest-ranked foods are expensive, unpalatable, and hard to prepare. In other words, the development of nutrient profile scores is merely the first step in dietary recommendations and consumer guidance. Numerous optimization models, including linear programming, can be used to select foods that are both nutritious and affordable. Foods that provide maximum nutrients per Euro at high levels of enjoyment can be identified using linear programming models. Very likely such diets will contain lean meats, low fat and fat free dairy products and fresh vegetables and fruit.

Reference

Drewnowski A, Fulgoni V. Nutrient profiling of foods: creating a nutrient-rich food index. Nutrition Reviews 2008;66:23-39.etetic Association, 106: 1172-1180.

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How to communicate nutrient profiles to the consumer ?

Panel:
- AFSSA point of view. **A. Martin**
- EFSA Representative. **L. Heng**
- Consumer's Association Representative. **Ch. Pernin**

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Nutrient profiling of foods: Afssa point of view

Afssa has been requested by the French Public Authorities to give an opinion on nutrient profiling systems. During this work, Afssa developed a nutrient profiling system by adaptation of an approach that had demonstrated its usefulness in the research concerning the issue of nutritional quality of foods and their price. This system put emphasis on some points considered as important. First, the choice of nutrients includes the so-called "positive" or qualifying nutrients, considering that a food bearing a claim should not only be not "dangerous" but also of nutritional interest. Second, though the initial system is across the board, it recognizes the possibility and the interest of some specific categories, as it is suggested in the request to Efsa by the European Commission in considering the possibility of a mixed system; in addition, it indicates that using optional nutrients might be a way of managing the issue of categorization. The chosen nutrients display the best correlation with all the other non included nutrients of the tested food database; therefore they are of nutritional significance by themselves and as proxy nutrients. Third, it uses two references: weight for disqualifying nutrients and energy for qualifying nutrients (nutrient density), avoiding the drawback of a single reference. There is no compensation of the two types of nutrients. Four, the system uses an exact score, avoiding some effects that could be linked to the use of entire values; it is thought that a scoring system leaves more flexibility for the reformulation of products, depending of the technological, economical or organoleptic constraints. It is also demonstrated that a scoring system allows to apply the derogation laid down in the regulation for nutrition claims, without the need to define separate thresholds. Finally, since the comparison of the results of this system with other systems obviously shows differences in the classification of eligible foods, proposals have been made for various methodologies for validation. As an example, subsequent work using linear programming has demonstrated that it is possible to design a well balanced diet covering the requirements for all nutrients by using only eligible foods, whereas, conversely, it is not possible to design a diet exceeding the recommendations for macronutrients.

Though it is not expected that this system will be adopted as such, since the European decision will take into account additional issues such as practical non scientific considerations, the development of a system appeared as a valuable help to go in depth in all the issues related to nutrient profiling.

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Leng Heng

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- Dr Leng HENG is a Senior Scientific Officer of the European Food Safety Authority's Team on Dietetic Products, Nutrition and Allergies (NDA). She joined the EFSA in 2004 as the scientific secretariat of the EFSA Panel on Dietetic Products, Nutrition and Allergies (NDA Panel). The NDA Panel is in charge of providing scientific advice at European level on nutrition matters related to Community legislation.

- She is a pharmacist by training and worked for the European Medicines Agency in the past 8 years prior to join EFSA in the field of authorisation-evaluation of medicines for human use.

EFSA's role in nutrient profiling

Following a series of food scares in the 1990s (e.g. BSE, dioxins) which undermined consumer confidence in the safety of the food chain, the European Union (EU) concluded that it needed to establish a new scientific body charged with providing independent advice on food safety issues associated with the food chain. Its primary objective was to contribute to a high level of consumer health protection in the area of food safety. The result was the European Food Safety Authority (EFSA).

Set up in 2002, EFSA provides independent risk assessment on all matters linked to food and feed safety, including also animal health and welfare, plant protection and plant health, and provides scientific advice on nutrition in relation to Community legislation. Communicating on risks associated with the feed and food chain is the second key element of the European Food Safety Authority's mandate.

Requests for scientific assessments and scientific advice are received from the legislators and risk managers: the European Commission, the European Parliament and EU Member States.

EFSA's risk assessments are carried out by its Scientific Committee and nine Scientific Panels, each composed of external experts and specialised in different aspects of food and feed safety. EFSA's risk assessments and scientific advice provide risk managers with a sound scientific basis for allowing them to take final legislative or regulatory decisions required to ensure a high level of consumer protection.

The EFSA Scientific Panel on Dietetic Products, Nutrition and Allergies (NDA) is the Panel dealing with questions related to dietetic products, human nutrition and food allergies.

Under the framework of the Regulation (EC) No 1924/2006 on Nutrition and Health Claims made on Foods which entered into force on 19th January 2007, the NDA Panel has been mandated to provide the scientific advice of EFSA on questions related to nutrition and health claims. Article 4 of that Regulation foresees that the European Commission shall establish (by 19th January, 2009) specific nutrient profiles that foods or certain groups of foods must respect in order to bear nutrition and health claims. The European Commission had requested EFSA to provide relevant scientific advice for the setting of nutrient profiles.

This presentation gives an overview on EFSA's work in the area of nutrition and health claims focusing on nutrient profiles.

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Biographical sketch

- Since 2005, Charles Pernin is in charge of food issues at CLCV (Consommation Logement et cadre de Vie), one of the main French consumers organisation.

- CLCV promotes better food habits and consumers' information through a strong network of local associations. We also implement lobbying actions to ensure a better nutritional quality of both at national and European levels. CLCV is representing consumers in the PNNS (Programme National Nutrition Santé) steering committee.

Background

- Agriculture engineer (Institut national agronomique, 1999)

- Degree in economics (Licence Université Lyon 2, 2000)

- Food and agriculture project manager (Afd 2001, Madagascar 2002 -2005)

Consumer's Association point of view

Charles Pernin will discuss the usefulness of nutrient profiling for consumers. This tool, designed to avoid the multiplication of conflicting nutritional and health claims, should contribute to improving consumer's information. However its practical implementation in the case of fruit and vegetables, which is in principle well justified, raises several questions and concerns: what would be the format of communication on fresh fruit and vegetables? What would the message be? What is the perception of consumers? Etc.

Session 16
(Parallel)

From interventions to national programs - What works?

Chair

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- Introduction: from interventions to national implementation.
K. Glanz

- Canteen Takeaway - worksite provision of healthy meals in the home.
GL. Hansen

- More Matters - targeting F&V consumption at sporting events.
G. Rebnes

- Successful national expansion of the Danish Worksite Fruit Program - Utilizing partnerships and multiple motives.
RM. Pederson

SESSION 16
(PARALLEL)

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- Karen Glanz, Ph.D., M.P.H. is a Professor of Behavioral Sciences and Health Education and Epidemiology, Georgia Cancer Coalition Distinguished Research Scholar, and Director of the Emory Prevention Research Center at the Rollins School of Public Health (RSPH) at Emory University. Dr. Glanz's current research emphasizes understanding and preventing health risk behaviors related to nutrition and obesity, skin cancer prevention, cancer screening, and tobacco control. She has been continuously funded for the past 15 years with more than $ 25 million in grants as Principal Investigator.

- Karen Glanz's scholarly contributions consist of more than 260 journal articles and book chapters. She is senior editor of Health Behavior and Health Education: Theory, Research, and Practice (Jossey-Bass Inc.), a widely used text now in its third edition. Dr. Glanz is the 2007 recipient of the Elizabeth Fries Health Education Award from the James and Sarah Fries Foundation. She is currently a member of the federally appointed Task Force on Community Preventive Services and was recognized in 2006 as a Highly Cited Author by ISIHighlyCited.com, in the top 0.5% of authors in her field over a 20-year period.

Introduction: From interventions to national implementation

Effective interventions to promote fruit and vegetable (F & V) intake will have little impact if they are not used beyond research or local settings. To improve the public's health, the best evidence-based F & V interventions must be disseminated widely. Both dissemination of well researched interventions, and real-world diffusion studies to help us learn about their exportability and effectiveness in less controlled conditions are needed. This presentation will discuss the types of "evidence" that are important for national diffusion and dissemination; the range of sources of evidence; pathways to dissemination, and challenges for research and action.

From the perspective of community and government audiences, there are two other types of evidence that must be taken into consideration: evidence of need, and evidence of demand.

Evidence of need establishes the need for more fruits and vegetables as a public health priority, and is comprised of the size, importance, and cost of a problem. Poor nutrition contributes to the leading causes of death – cardiovascular disease and some cancers. The extent to which inadequate F & V intake is a health concern varies across counties and regions. A separate but related issue is, what is the evidence of demand for an interventions and national programs to improve health by increasing F & V intake? The perceptions of the intervention strategies by the public and decision makers will help to determine whether it will be seen as feasible, acceptable, and compatible with the culture and social environment.

A third type of evidence that is important involves an intervention strategy's efficacy for improving F & V consumption. Evidence can be based on a single evaluation or on a broader evidence review that assesses both efficacy and cost-effectiveness.

Once the developers of a nutrition intervention have demonstrated its success, as well as the need and demand for the program, it can take one of several pathways to dissemination. The first path can be described as "direct to practice." In this approach, an intervention or program is developed into an exportable package or tool-kit and distributed through public health or organizational channels. This dissemination may involve training leaders or instructors to deliver the program, and giving away or selling program materials and curricula. A second pathway involves "policy to practice." The availability of, and evidence for, an effective intervention may either lead to, or fit within, a public health policy. A third pathway to dissemination involves diffusion research – in which a study is used to monitor patterns of dissemination and/or test different strategies for their success at promoting dissemination. This latter pathway may be the least frequently used, yet it has much to contribute to the body of knowledge about diffusion and dissemination.

Examples of various F & V promotion programs that have been disseminated with more or less success will be described in this Introduction and in the following presentations.

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Gitte Laub Hansen

National Coordinator Canteen TAKEAWAY

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- Gitte Laub Hansen is trained as food scientist, and later she became PhD in nutritional epidemiology and psychological and social aspects affecting dietary habits. In 1982 she graduated as food scientist and in 1991 gained her PhD in human nutrition and epidemiology, both degrees are from the Royal Veterinary and Agricultural University, Copenhagen.

- Gitte Laub Hansen has been a central figure in consumer and nutrition education and healthy eating campaigns I Denmark, first at National Consumer Agency later in the National Board of Health. Through her work as the National Consumer Agency's member of the 6 A Day board of director, Gitte has become an active proponent of the positive role of Public-Private Partnerships in achieving sustainable change.

- As a member of the Danish Nutrition Council and working groups in the Nordic Council of Ministers she has contributed to the development of National and Nordic Action Plans against Obesity. Gitte was recently the acting director of the Suhrs' University College Research Center. Gitte is currently employed as the National Coordinator for Canteen TAKEAWAY hosted by the Danish Cancer Society on a grant from the Danish Strategic Research Fund.

Canteen Takeaway – provision of healthy meals in the home by worksite

Background: The CANteen Take Away project is a new innovative health promotion initiative targeting workplace provision of food for employees. The project is funded by the Danish Council for strategic Research and includes at national research network and practitioners implementing CANteen Take Awa. CANteen Take Away is ready-to-heat-meals and meal-elements freshly prepared in workplace canteens for the employees to take home at subsidized or market prices. CANteen Take Away reduces the time needed for shopping, prep-work, cooking and cleaning at home and is expected to improve the nutritional quality of the diet of employees and their families.

This multi-disciplinary research will offer insight and new solutions to the societal challenges posed by the obesity epidemic, increasing frequency of fast food meals and lack of time to prepare healthy meals. This research will also improve our understanding of the role of economical instruments, availability and convenience as effective tools in promoting healthy eating habits. The program is designed to systematically collect and translate evidence into action and sustain new societal norms and new social responsibilities to be taken on by private and public workplaces. CANteen Take Away is a public-private partnership, with 15 partners representing diverse sectors and discipline. Partners are actively engaged in all aspects from developing the concept and necessary tools to, analyzing impact, and disseminating the results and the best practice generated by Canteen Take Away. CANteen Take Away is a groundbreaking project for the Danish Strategic Research Council – the first to examine the effect of availability and accessibility of healthy food on dietary habits.

Objectives and settings: The overall objectives are to:

1. Identify and disseminate solutions to practical challenges associated with setting up a take away service in workplace canteens (intervention development)

2. Develop, validate and implement an easy-to-use instrument that enables canteens to evaluate and improve the nutritional quality of take away meals and to assess the nutritional efficacy of the CANteen Take Away concept and healthier eating at work on the employees' diet

3. Investigate economic incentives crucial to the penetration of CANteen Take Away (willingness to pay and cost benefit analysis)

Methods and theoretical framework: This strategic network will conduct multi-level intervention / action research over a 3-year period. The network includes 3 research institutions and many relevant and powerful public, private and civil organizations. Research will be conducted in real life situations to provide evidence for the efficiency of the CANteen Take Away concept. The research will be conducted in close dialogue with worksites to ensure maximum practical and strategic relevance and feedback, and to facilitate future implementation of results of the project. It is our hypothesis that health promotion activities such as CANteen Take Away relatively quickly and cost-effectively can lead to healthier eating habits among employees and their families - especially in lower socioeconomic groups.

Results: Moving from healthy eating interventions to full scale expansion and market penetration requires addressing multiple motives among stakeholders. The CANteen Take Away design has attempted to address this by identifying stakeholders and their primary motivation. Preliminary results from a Willingness to pay survey and a review of cost benefit analysis of worksite health promotion and perceived opportunity costs will be presented and discussed.

SESSION 16
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- 2002- **Managing Director, Norwegian Fruit and Vegetables Marketing Board, Oslo, Norway**
- 2000-02 **Partner and Business Developer, Runway AS, Oslo, Norway, an incubator company focusing on the biotech and wireless industry.**
- 1995-00 **Management Consultant, Roos & Co. AS, Oslo, Norway**
- 1992-95 **Market Analyst, Yankelovich AS, Oslo, Norway**

Education

- 1991 **SDA Bocconi, Milano Italy**
  Master of Science – Master of International Economics and Management
- 1990 **University of California, Berkeley, Ca, USA**
  Modern Middel Eastern History
- 1985-88 **Økonomisk College, Oslo, Norway, Bachelor of International Business**

More Matters - targeting F&V consumption at sporting events

Objective: MER (MORE) is a large-scale awareness campaign run by the Norwegian Fruit and Vegetables Marketing Board that target children and adolescents. Its main objective is to increase the availability of appetizing, ready-to-eat fruits and vegetables. The MER Campaign moves away from recommending eating a specific amount of fruits and vegetables, but emphasizes eating more because it is good. "MER" is more than a traditional campaign; it is a campaign aimed at increasing the availability of fruit and vegetables at all meals in day-care institutions, at all concession stands at sports events for kids, and in all company cantinas. The MER Campaign influences people to incorporate more fruit and vegetables in meal occasions. The key objective is to increase consumption through increased availability for kids, teens and their parents

MER at sports events: Norway's Athletic Association has 2 million members, and 1 million of these members are under 24 years of age. Members spend a large portion of their free time at sports clubs. This makes it important to make healthier choices available at sports clubs, tournaments and other events. Surveys have shown that junk food often is sold at clubs and tournaments, and fruit and vegetables are not readily available. The same studies showed that only 5% of sports associations and sports clubs offer fruit and vegetables for sale. However, more than 80% of sports associations would like to improve the selection at their concession stands.

MER provides a concept, tips, practical advice and PR kits for clubs that want to serve more fruit and vegetables at their facilities. The different campaign tools are thoroughly tested to help the clubs to draw attention to and to be able to sell these healthy snacks. The clubs purchase the fruit and vegetables, cut it and pre-pack it into individual plastic containers, and sell the containers for approx. USD 1-1,50 per container. The clubs keep the entire profit.

Sports clubs that want to put MER on the menu must sign a letter of intent, after which they will become MER representatives and receive a toolbox that makes it easy to get started selling pre-cut fruit and vegetables. The sign on is done though automatic routines on the internet. All further communication is also done through the internet.

Results: An evaluation of the campaign indicated the following:

- High profitability for the sports clubs
- Easy to implement
- Trendy and tempting
- Positive image
- Easy to get volunteers

The campaign has been a huge success. By March 2008 20 counties and 28 sports federations promote the MER Campaign, and more than 1 200 clubs have signed letters of intent and re-use the concept over and over again. To further confirm the success more than 900 have reported successful sales reports on the MER website.

The MER Concept is thoroughly tested, easy to implement and very much welcomed to be copied in other countries.

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Robert Pederson

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- Robert Pederson holds a MSc. in Food Policy from City University in London. He is a project consultant at the Danish Cancer Society and has worked with promoting increased fruit and vegetable consumption in Denmark for the last 8 years for the Danish Cancer Society and 6 A day program. He has contributed to a number of 6 A Day research projects, which focused on increasing availability and accessibility to fruit and vegetables in workplace, school and retail settings. His focus has been on documenting and disseminating results from intervention projects.

- He was the project manager for the "Joint-Marketing of School Fruit and Vegetable Program" a large scale Public-Private Partnership.

- Robert Pederson was a board member of the Children, Food and Physical Activity Model project in the County of Fynen. - He is currently a member of the 6 A Day planning committee, International Fruit and Vegetable Alliance (IFAVA) board of directors and the IFAVA scientific clearing house committee. He has organized international workshops on school fruit and vegetable programs and is currently a member of the EU expert group on School Fruit Schemes. Prior to working with Nutrition and Food Policy, he worked as chef/executive chef in Copenhagen.

Successful national expansion of the Danish Worksite Fruit Program - Utilizing partnerships and multiple motives

Background : The Danish Worksite Fruit Program originated as part of the original 6 A Day research program. The program targeted increasing availability and accessibility to fruit and vegetable snacks during the work day by supplying employees with free or low-cost fruit.

Worksite fruit schemes cover a variety of schemes ranging from extra fruit provision by canteens to decorative fruit baskets delivered by companies specializing in worksite fruit schemes. Financing of schemes range from 100 % employer financed schemes to 50/50 % financing scheme. A more complete description is given in the International Labour Office publication on worksite food programs- The program has been a huge success from growing from 623 workplaces at its inception in 2001 to 9288 workplaces in 2004 (see table 1). In 2004, it was estimated using supply statistics that the program reached 9 % of the total workforce. A representative survey of the Danish population indicated that 32% and 33% of the Danish workforce were reached by the program, respectively in August 2006 and February.

Table 1 Number of public and private sector companies offering worksite fruit schemes from 2001 – 2004

	2001	2002	2003	2004
Private sector	602	1425	4502	7925
Public sector	21	96	484	1363
Total	623	1521	4986	9288

An intervention study measured fruit and vegetable intake was measured at 5 intervention and 7 control worksites at baseline (n=283) and follow-up (n=248) and showed a significant increase of 70 g fruit per day for employees at intervention workplaces and 50% decrease in candy and sweet snacks*. Although this study gave the project legitimacy as a health promotion project, it was primarily a range of other softer evidence and political feasibility that facilitated national expansion of the program.

Methods : The purpose of this paper is to identify key factors that have facilitated national rollout of the worksite fruit schemes using Multi-stakeholder analysis. Key to the success of the program has been identifying multiple motives, working in a broad partnership and demand for new products and services driven by a workforce health agenda.

Results : Multi-stakeholder analysis of the program has identified key motivators for stake-holders affected by the program:

Fruit and vegetable industry: key motivator is access to a new market with relatively high added value. A number of SME specializing were established to meet this new market.

Government: cost-effective method of increasing fruit and vegetable consumption fruit and vegetable consumption in adults as part of healthy eating strategy

Employers: Low cost fringe benefit for employees, ease of implementation, modern corporate image, low opportunity cost compared to other health promotion initiatives, low cost related to cost of sick days.

Employees: shows that their employer cares about their well-being, easy alternative to less healthy snacks and inexpensive way to eat healthier.

Labour Unions: concrete initiative improving health of their member as part of commitment to improving lives of Union members.

Conclusion : Although measuring the schemes effect on fruit and vegetable intake has given the scheme legitimacy, analysis of the program has shown that the successful national expansion of Worksite Fruit Schemes has been addressing multiple motives of Stakeholders and using targeted network communication to stakeholders. New results will be presented and discussed.

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SESSION 17
(PARALLEL)

VALUE AND ORGANISATION IN AGROFOOD CHAIN

Chair

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- Quality strategies as value sources.
E.Valceschini

- F&V value: the consumer's approach.
P. Gurviez

- Brand alliances and value creation: a network approach.
M. Coulibaly

- Brand Equity and Co-branding in the F&V sector.
M. Gonzalez-Diaz

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- Doctor in Economic science - 1983
- Director of Research : National Institute on Agricultural Research (INRA)
- French Representative at Standing Committee on Agricultural Research (European Commission) 2006

Quality strategies as value sources

Product differentiation and customer segmentation strategies rely on the heterogeneity of consumer preferences and inequalities of purchasing power to satisfy the new quality demands linked to changes in lifestyles and eating habits. These demands traditionally concern four main areas: safety, health, satisfaction and service. To this must be added the emerging quality demands which concern the environment (protection of nature and the countryside, preservation of natural resources and biodiversity) or ethical values ("fair trade" or animal welfare for example).

In all these areas, the concern and indeed the demands of consumers regarding the products themselves, their origin, producers, production methods, etc., are growing exponentially.

Information on product labelling and, more particularly, marking products with brands (commercial brands, labels, PDO, logos and variable claims, etc.) is a predominant way of responding to these demands. Commercial brands of industrial manufacturers or majors retailers' brands, or even official quality certificates are the chief pillars of this process.

The key concept is the quality signal. By this is meant a summary of information achieved by affixing to the product a logo, acronym, name or even some text promoting one or more characteristics of a product which are not directly visible et the time of purchase, or even in use, and which the supply may, at one stage or another, control. The information summary may concern certain attributes of the product and/or certain characteristics of the production process. Such signals are capable of generating value, which is measured, in particular, by the difference in consumers' propensity to pay for a branded product and a reference product. However, the question remains as to where this value comes from.

The economic value of the brand comes from its two essential economic functions: the relevance of the information and its summary, and the credibility of the information summary. In others words, differentiation strategies can generate value not only because they can produce different qualities (characteristics), suited to different categories of consumer (relevance criterion), but also because they can efficiently signal these qualities in a credible manner.

This communication will analyse more deeply these functions as value sources.

SESSION 17
(PARALLEL)

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- HDR in 2006
- PhD in 1998 (Trust in Brand-Consumer Relationship)
- 9 years as executive in advertising agencies (1983-1992)
- Research topics : consumers behaviour and perception regarding food/consumers trust

F&V value: the consumer's approach

Price is not the only reason to F&V too weak consumption. Consumer's perceptions and attitude strongly influence their preferences and choices. Sensory factors have a particularly significant impact on a fruit or vegetable rejection. To take into account every choice dimensions, we propose to apply the concept of "consumer value" to F&V consumption. This allows a larger approach for the analysis of preferences antecedents including non cognitive bases. This approach applied to a bibliographic research confirms the importance of hedonic value (pleasure). The "healthy value" of F&V is well known but limited and can even be negatively perceived (too weak energy contribution for instance). Symbolic and social values are very few studied considering F&V, just as consumption situations, despite they are essential dimensions to understand consumers attitudes and behaviours.

Contribution to self image, sharing and accordance to social norms are in fact very strong factors to accept or reject food products including F&V. When considering the numerous and various obstacles to F&V consumption (price, convenience, time and know-how needs) specially perceived by young people, we measure the need for a better understanding of mechanisms which could enhance hedonic, symbolic, social and convenience dimensions of F&V consumption value.

SESSION 17
(PARALLEL)

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Brand alliances and value creation: a network approach

The main objective of this communication is to propose an analytical framework for the study of brand alliances in using a network perspective. Indeed, the research upon brand alliances has been mainly focused on the impacts of such strategies on the consumer side (Cegarra and Michel, 2001; Abratt and Motlana, 2002). Few authors have developed research on the organizational side of brand alliances (Vaidyathan and Aggrawal, 2000; Bucklin and Sengupta, 1993).

Theoretically, our research combines two streams of literature. In the tradition of network theory, the first stream is the approach of value creation in network (Henneberg and Mouzas, 2004). This approach helps considering networks as complex exchange systems and provides an overview of "all interactions and relationships that are value-relevant within the holistic value chain". A second stream of literature is mobilized: the governance value and relational governance analyses (Ghosh and John, 2005; Heide, 1994). In this governance literature, brands are considered through the lens of the institutional matrix and device: partners entering into a brand alliance will craft inter firm agreements such as contractual rules, social norms and so on, to protect their specific investments and safeguard the joined value of their brands (Sauvée and Coulibaly, 2007).

Our analytical grid is then applied the alliance between the private certification brand Fair Trade (Max Havelaar association or MH) and a banana brand Oké (Agrofair's company). MH is an association with no lucrative goals which offers outlets for trade to producers. The brand Fair Trade is a promise of ethical value releasing a strong image for the product and positive attributes on the market. Agrofair is a banana importer that buys bananas to producers in developing countries, to sell them to developed countries (indirectly to final customer via hypermarkets). MH and Agrofair are thus in relation with producers, distributors, organizations of control (like FLOCERT, a certifying organization) and final consumers. By granting its license to Agrofair realizing the payment of a royalty, MH checks that information on fair trade banana is in conformity with the standards of the market without being responsible for quality. Thus in the relationship, MH seeks to protect its reputation and image of its strong brand via the fair trade concept. Agrofair permanently wants to improve its image in putting in front of access its brand Oké. This trend fuels the inter organizational dynamics between the partners and create the conditions to maintain in the long run the competitive advantage. So on this communication, we show to managers of brand alliances the importance of governance mechanisms to develop and maintain interdependence between partners of alliance and create value; and we explain that value creation on brand alliances not depend only partners' resources (notoriety, reputation...).

SESSION 17
(PARALLEL)

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- Ph.D. University of Oviedo (Business Economics), 1994.
- Research Fellow at Economics Department, University of Strathclyde, from Sep. 1994 to Jan 1995.
- Visiting Professor at University of Michigan Business School, from Sep to Dec 2002.

Brand equity and Co-branding in the F&V sector

This paper tries to explain brand equity and why consumers are willing to pay an extra price for branded (and co-branded) products. We departed from the agency theory arguments of Klein & Leffler (1981) whereby companies develop reputational capital (brand names) to solve informational asymmetry between producer and consumer. We then argue that the ability of a brand name to solve situations in which transaction costs are potentially high increases brand equity. Consequently we also state that the greater the specialization and the higher the number of quality signs, the higher the added value for the consumer. This is because each brand specializes in assuring a different type of quality aspect (homogeneity, organoleptic attributes, safety,...), giving the end consumer greater certainty about his purchase. Other hypothesis are that, first, a brand name is less valuable when the recipient of the brand does not show a substantial informational disadvantage, as in business to business transactions. Second, when it is difficult to assess quality because of high search and measurement costs (numerous, small pieces, fragility and perishability), brand name will be more valuable by the buyer because the brand name saves on such costs. Third, brand equity will be higher if external and independent control systems have been established as these are perceived by the consumer as proof that the firm is not trying to cheat.

Due to the lack of a strong theoretical background regarding both the problem and the theoretical tool, we have used a case analysis approach. Consequently, our results should be taken with caution since they require more formal validation. Following some classic guide lines on case analysis, we selected fourteen brand names from seven different EU countries in order to cover the most relevant brand names and to offer a broad overview of the fruit and vegetables sector in the EU. This heterogeneity partially guarantees that neither the produce nor the country bias conclusions about brands, and that most of the theoretical situations (the value of different kinds of brand) are considered.

Results broadly support the argument that the higher the contractual hazards, the higher the price premium, which can be considered as a measure of the brand equity. Particularly, all firms presenting more than one type of brand name (Geographical Indicators and private brand names) show substantial price premiums. Statistical results tie in with this, indirectly supporting our argument that brands can be complementary. Again, more research is needed to understand why and when co-branding appears. Our suggestion that the private brand complements the Geographical Indicator by covering its errors and guaranteeing homogeneous quality should be checked in other industries. Other results show that the price premium is larger when the brand name is directed at the end consumer (instead of at a business-to-business brand name) and when produce is difficult (high search/measurement costs) to assess. However, we have not found clear evidence on the positive link between price premium and the rigour (independence and exhaustiveness) of quality controls.

Session 18 (Plenary)

Reports from the parallel sessions of Thursday 29th

by:

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- Dr. Schatzkin received his B.A. degree from Yale University in 1969, his M.D. degree from S.U.N.Y. Downstate in 1976, and an M.P.H. (1976) and Dr.P.H. (1982) from Columbia University School of Public Health. He completed residency training in internal medicine at Montefiore Hospital, Bronx, N.Y. (1976-9) and preventive medicine at Mount Sinai Medical Center, New York, N.Y. (1979-81).
- He joined the National Cancer Institute in 1984 where he is currently Chief of the Nutritional Epidemiology Branch, Division of Cancer Epidemiology and Genetics (DCEG).
- Dr. Schatzkin's primary areas of research are the nutritional epidemiology of intestinal cancer and neoplasia, prospective cohort studies of nutrition and cancer, methodologic problems in nutritional epidemiology, and the integration of biomarkers in observational and intervention studies.
- He is a Principal Investigator for the NIH-AARP Diet and Health Study, a prospective cohort study of diet and cancer among over a half million men and women in the U.S, the Polyp Prevention Trial, an intervention study of the effect of a low-fat, high-fiber, fruit- and vegetable-enriched diet on colorectal adenoma recurrence, and the Observing Protein and Energy Nutrition (OPEN) study, a biomarker-based investigation of the measurement error structure of dietary assessment instruments.

Session 19 (Plenary)

F&V consumption in disadvantaged population

Chair

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- Obesity and social class in developed nations.
A. Drewnowski

- Social determinants of health inequalities.
E. Brunner

- How to lower inequalities?
Ph. James

SESSION 19
(PLENARY)

Adam Drewnowski

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- MA in Biochemistry from Oxford University; PhD in Psychology from the Rockefeller University, New York; Postdoctoral training at the University of Toronto, Canada.

- Assistant Professor in the Laboratory of Human Behavior and Metabolism, the Rockefeller University, NY; Professor of Public Health, Psychology, and Psychiatry at the University of Michigan School of Public Health.

- Research on the role of taste, cost and convenience in determining food choices; studies on diet quality and diet cost in relation to obesity; nutrient profiling of foods using NutriScore – a new research tool; studies on beverages, appetite and satiety.

-Research funding from the National Institutes of Health, the US Department of Agriculture and the private sector. Director of NIH-funded Center for Obesity Research, focusing on the environment, economics and policy.

-Awarded the 2005 French Food Spirit Award – the Sciences Trophy.

Obesity and social class in developed nations

The obesity epidemic in the developed world is not so much a failure of biological systems but a social and an economic phenomenon. At the individual level, higher rates of obesity and diabetes are found among certain racial and ethnic minorities and among groups with lower education and lower incomes. At the environmental level, highest rates of obesity are found in lower-income states, lower-income legislative districts, and in the more deprived neighborhoods. Based on detailed census tract data, the proportion of families living in poverty was a strong predictor of both obesity and diabetes. Regardless of their social status, all groups in the US seem to be gaining weight at an approximately equal rates. Early reports suggest that the rise in obesity rates among women may have been stemmed; it is not clear whether this has occurred equally for all social groups. Data from France suggest that interventions to prevent childhood obesity were more successful among the more affluent than among the poor.

The energy density hypothesis holds that the observed links between food supply trends and rising obesity rates are mediated by the economics of food choice. Disparities in obesity rates may be accounted for, in part, by inequities in access to healthy foods. This includes both economic and physical access. The current structure of food prices is such that refined grains, added sugars, and added fats provide dietary energy at the lowest cost. One reason for rising obesity rates may lie in abundant choices of inexpensive energy-dense foods that are readily available, convenient, and taste good. Lower-income consumers may select fats and sweets, as opposed to healthier options, as an effective way to save money. Physical access to food sources may also play a part. Lower-cost foods that are nutrient-poor may be the only dietary option available in disadvantaged neighborhoods with low purchasing power.

A focus on obesity, social class and the economics of food choice is greatly overdue. The obesity literature has addressed the consumption of sugars and fats, without mentioning food prices or diet costs. Taxes, levies and outright bans are among measures proposed to reduced the consumption of low-cost foods. The main challenge in preventing the obesity epidemic is to make a meal of grilled meat, broccoli and fresh fruit costs less and be more convenient than the less healthful options. We need more studies on diet quality and food costs on which to base responsible nutrition interventions and fiscal food policy.

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SESSION 19
(PLENARY)

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- **EURO-PREVOB partner (6th Framework)**
- **European Diabetes Epidemiology Group member**
- **Cochrane Heart Group co-editor**

Social determinants of health inequalities

The important determinants of social inequalities in health, and health overall, are to be found outside the healthcare system. Promoting public health effectively therefore means checking that that healthcare is functioning well for the whole population, rich and poor alike, and then giving emphasis to the wider social determinants of health, the roots of health and well-being over the course of life. Several policy-orientated frameworks have been developed to conceptualise the social determinants of health and health inequalities. There is population-based evidence for nine important determinants in developed countries (1) stress (2) early life factors (3) social exclusion (4) work (5) unemployment (6) social support (7) addiction (8) transport, and (9) food (See: The Solid Facts, WHO European Office 2003 http://www.euro.who.int/document/e81384.pdf). This framework is built on the fact that ill-health and mortality is unevenly distributed across the whole social hierarchy. Individuals and families living in poverty have the worst health. But above the poverty level, however it is defined, disease risk for almost all disease categories declines with each additional step up the social ladder. Cardiovascular disease (CVD) is the most common single cause of death in developed countries and there is a stepwise social gradient (lower social position – higher CVD risk). Dietary quality shows clear social patterning. It contributes to CVD risk through several mechanisms including the specific effects of nutrients and the effect of dietary pattern on likelihood of weight gain. For cancer causation, the picture is complex because the risk factors differ by cancer site, and research continues. An important recent finding from the European Prospective Investigation into Cancer and Nutrition (EPIC study) is the link between Mediterranean dietary pattern and longer life expectancy. Dietary patterns are established early in life, subject first to cultural and socioeconomic influences within the family, and then to the influences of advertising, school, peer group and neighbourhood environment. Poor working conditions and insecure employment, unemployment and social exclusion further influence diet throughout adulthood. Among the elderly, social support may be a vital prerequisite of good nutrition and may help to explain the link between Mediterranean diet and longevity.

Recent major reviews conclude that a high level of fruit and vegetable consumption protects from cardiovascular disease and several types of cancer. National and international health policies advocate 5-a-day and other campaigns. Traditional health promotion methods have at best modest success in increasing fruit and vegetable consumption. A key reason for this finding is that healthy people, particularly those lower in the social hierarchy, are not motivated to change their dietary behaviour by brief interventions when they are immersed in an environment dominated by opposing forces.

The links between the social determinants of health noted above and dietary pattern can be divided into two broad groups: material and psychosocial. Both these sets of determinants must be tackled if the dietary contribution to health inequalities is to be reduced.

SESSION 19
(PLENARY)

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- Professor James, a medical physiologist, spent 3 years in paediatrics in Jamaica and a year at Harvard before returning to the London School of Hygiene and Tropical Medicine.

- In 1974 he became Assistant Director, MRC Dunn Nutrition Unit, Cambridge and then Director of the Rowett Research Institute, Aberdeen, a large biological nutrition research institute relating to the whole food chain.

- He chairs the International Obesity Taskforce, responsible for global initiatives relating to food and health with particular emphasis on the pandemic of obesity. He chairs a Presidential Council of 5 WHO related medical NGOs for cardiology, diabetes, paediatrics, nutrition and obesity operating globally to stem the pandemic of adult chronic disease. He chaired and wrote the UN Millennium Commission Report on global issues relating to nutrition up to 2020, wrote Blair's plans for the UK Food Standards Agency and those for a new EU Food and Health Authority.

- He currently operates globally, focusing on creating National Councils to prevent childhood obesity and persuading governments to change their policies.

Tackling the inequalities in F&V consumption

Given the striking disparities in fruit and vegetable (F & V) evident on a social class geographical, and international basis new approaches to improving F & V consumption are needed. Within a country it is clear that young children need to be exposed to a sustained and varied F & V intake from 6 months of age. This need, set out by WHO as a clear approach to complementary feeding, is rarely implemented and should now form the absolute requirement for all arms of policy making relating to e.g. nurses and medical education. It should be the requirement for all child minders and pre-nursery facilities with analyses of the need to explicitly subsidise this in an effort to overcome the policy and industrially driven marked relative price increases in the cost of F &V over the last 2-3 decades. Norwegian policies of specifying the same price for F & V wherever it is sold e.g. in remote areas has shown good responses. Finnish policies of providing F & V at no extra cost to the main meal for children and adults should also be tested in other countries. The original World Cancer Research proposals to promote urban agriculture is now part of modern urban planning and in the rapidly industrialising countries new approaches to facilitating the transport of F & V into cities requires novel approaches to distribution and refrigerated storage which is not yet on the agendas of governments. The sudden focus on world food supplies also needs to incorporate new approaches to F & V and not assume land for meat production has the priority. This requires explicit government standards and innovative approaches to agriculture both in research and extension terms and in regulatory approaches to land use. Reliance on health education is guaranteed to increase not decrease the socio - economic differences in diet and health. Thus explicit policies including all those affecting food supply supported by any government funding should now change to favour F & V: the evidence of benefit is clear.

Session 20 (Parallel)

Intervention studies to increase F&V consumption in disadvantaged population in developed countries

Chair

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- Nutrition interventions in low-income groups:
Dearth of research on effective interventions.
AS. Anderson

- Providing an economic supplement for fresh F&V purchase.
H. Bihan

- Effect of a targeted subsidy on intake of F&V among Low-income Women in the Special Supplemental Nutrition Program for Women, Infants and Children.
D. Herman

SESSION 20
(PARALLEL)

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- Professor Annie Anderson is a Public Health Nutritionist and dietician with extensive experience in designing, implementing and evaluating dietary intervention trials whilst based at the Universities of Cambridge, Aberdeen, Glasgow and Dundee. Since taking up the post of Director at the Centre for Public Health Nutrition Research in 1997 a number of studies have contributed to a programme of work on theory based, behaviourally focused dietary interventions.

- Advisory work includes activities at an international level through the UICC (International Union against Cancer) Taskforce on Cancer Prevention. At national level she is currently an expert advisor to the National Institute for Health and Clinical Excellence (NICE) Programme development group on Maternal and Child Nutrition, UK Scientific Advisory Committee on Nutrition and the Food Standards Agency, Low Income Diet and Nutrition Survey. She was editor of The Journal of Human Nutrition and Dietetics (Blackwell Science) from 2001 to 2006. In 2003 she was awarded The Caroline Walker Trust Award for Public Health Nutrition..

Nutrition interventions in low-income groups: Dearth of research on effective interventions

In the western world, women from low income backgrounds are more likely to eat less fruits and vegetables, whole grains and fish and more processed meat, fat spreads, sugar and sweetened drinks compared to those from more affluent. In the UK dietary intake across all social classes is suboptimal and although there are indications of increasing consumption of fruits and vegetables intakes remain lowest amongst poorest families. The recent Low Income Diet and Nutrition Survey (LIDNS) (Nelson et al, 2007) reported that only 9% of women met the government recommendations of at least 5 portions per day and 21% of women consumed less that 1 portion of fruit and vegetables over the 4 day period of study.

Food and nutrient intake contribute to the health inequalities evident in less affluent women throughout their lifespan. High rates of diet related morbidity (Including obesity), mortality (including cardiovascular disease) and maternal and child health considerations (including breast feeding and family diet practices) have major impacts on quality and duration of life for the women and the next generation.

Attempts to alter dietary intake in nutritionally vulnerable groups have tended to focus on micro-environmental approaches, using nutrition education of the individual, health promotion activities in the media and small scale community food initiatives. Whilst it is recognised that the impact of such campaigns is fundamental to informing the public (raising awareness) there is a dearth of research on effective interventions undertaken with low-income women (reflecting some of the challenges of engaging and evaluating programmes with this "hard to reach" sub- population). Intervention programmes from the US including "Wisewoma", The Womens Health Initiative, WIC and EFNEP and the "Healthy Start" programme in the UK provide models for changing behaviours but do not take account of wider macro environmental promotion of inappropriate food choices (e.g. marketing and availability of inexpensive energy dense snacks and meals) (Anderson, 2007).

Lack of evidence for effectiveness does not mean that that interventions should not be a part of policy work but it is essential that such work should be evaluated for ability to reach and engage with target groups as well as behavioural change and health outcomes. Ways in which to optimise policy level dietary interventions also need to be evaluated to taking account of cost effectiveness whilst remembering that the health burden and costs of ill health amongst the low income population are considerable.

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SESSION 20
(PARALLEL)

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- 1998-2003 Medical Doctor, specialization in Endocrinology (APHP, Paris)

- 2002 : Master of Endocrinology and Cellular Interactions, Dr MANTEL- INSERM U341 Laboratory , Pr REACH, Hôtel-Dieu.

- 2003 : Speciality in Endocrinology

- 2004 : University Diploma in Pituitary Disease

- 2003-2007 Assistant in Endocrinology-Internal Medicine, Pr KRIVITZKY, Avicenne Hospital - BOBIGNY

- 2007 Hospitalo University Physician, Department of Endocrinology, Diabetology et Metabolic - Diseases, Pr REACH, Avicenne Hospital

- 2007 Doctoral fellow at the UREN (Nutritional Epidemiology Research Unit), Pr Hercberg, Thesis Title: « Precarity, alimentation and prevention of diabetes ».

Providing an economic supplement for fresh F&V purchase

Objective: Low socio-economic level consumers have a greater tendency to have an unhealthy diet, and in particular a diet poor in fruits and vegetables (FV), compared with high-income subjects. Programs aiming at increasing FV intake such as face-to-face education or counselling or public health policies were shown to be less effective in lower socio-economic groups. The objective of our study is to evaluate the effect of an economic supplement for fresh FV purchase in a deprived population.

Design and setting: The study was designed as a randomized controlled trial. A total of 300 subjects who have socio-economics difficulties (EPICES score of 38.5 or higher) are planned to be recruited, they were invited to participate in the study by the local Health Examination Center. Subjects were randomly assigned to receive vouchers to buy FV or only dietary advices targeting foods purchasing for low-income individuals. Voucher amount depends on the family size (from 10 Euros for a single person to 40 Euros for a couple with more than 2 children). Baseline and 3 month visit includes a clinical examination (height, weight, blood pressure) and blood sampling (creatininemia, glycemia and lipids levels, ferritinemia, vitamins A and C levels). A self-administered questionnaire is used to collect socio-demographic data, food purchasing habits, consumers' attitudes towards access, availability, affordability and motivation to eat FV. Dietary habits were assessed through a short food frequency questionnaire and a 24-hour recall completed during a face-to-face interview conducted by a dietician.

Inclusion began in December 2007, and we present here baseline data for the first 200 subjects (88 men and 112 women).

Results: The mean age is 45.6 ± 8.0 years (range 30 to 60 years). Average family size was 3.7 ± 2.1 people, children are present in 66.8 % of the families and 26.4 % of subjects live with 3 children or more. Only 29.4 % of participants have a full-time job and more than 57.2 % are unemployed. Sixty seven percent reported that they are sometimes, from time to time or often anxious to have enough money for food purchasing.

Distribution of the participants (number (%)) according to categories of FV intake (n= 200):

Serving/day	1	1- 2	Ž3	Missing value
Fruit	87 (43.5)	73 (36.5)	33 (16.5)	7 (3.5)
Vegetable	96 (48.0)	91 (45.5)	10 (5.0)	3 (1.5)

More than 67 % agreed that buying more FV is difficult on their budget and 38 % reported that they eat enough FV.

Discussion: These first results show that, in a deprived population and before any intervention, nearly half of the subjects consume FV less than once a day. After randomization, all subjects in the group receiving the vouchers accepted them positively. At 3 months, it will be possible to evaluate the efficiency of vouchers to increase FV intake and vitamin levels.

Conclusion: In a deprived population, the daily consumption of FV is extremely low. This is the first French study evaluating the efficiency of vouchers to increase consumption of FV.

SESSION 20
(PARALLEL)

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- Dena R. Herman, PhD, MPH, RD, is a Senior Scientist at Nutrilite, a Division of Access Business Group where she where she conducts research investigating the use of novel botanicals and other plant materials with a particular focus on their use for weight management, sports activities, and children's products. She is also an Adjunct Assistant Professor in the Department of Community Health Sciences at the UCLA School of Public Health where she teaches nutritional assessment. Dr. Herman received her Master's degree in Nutritional Sciences from the Friedrich-Wilhelms University in Bonn, Germany and her doctorate degree in Public Health Nutrition at the UCLA School of Public Health. She has conducted research examining the association of food security to dietary quality among low-income, minority populations as well as the effect of offering an economic intervention to purchase fresh produce on consumption and variety in purchasing choices.

- Dr. Herman is a Registered Dietitian with special training in pediatric nutrition. She is a member of the American Society of Nutrition, American Dietetic Association, and an alumnus of the Dannon Nutrition Leadership Institute. She also serves as part of the secretariat for the International Union of Nutrition Sciences Task-Force on Diet, Nutrition, and Long-term Health for the Quadrennium 2005-2009.

Effect of a targeted subsidy on intake of F&V among Low-income Women in the Special Supplemental Nutrition Program for Women, Infants and Children

Background: Greater consumption of fruits and vegetables is associated with reduced risk of cancer, stroke and perhaps other cardiovascular diseases, and type 2 diabetes. Increased fruit and vegetable consumption may be useful in weight maintenance or intentional weight loss. Recommendations from various national and international agencies are that optimal diets to prevent chronic disease should include 400-800 g/day fruits and vegetables, or 5-9 servings. The recent report of the Dietary Guidelines Advisory Committee in the US recommends 5-13 servings/day, or 2 ?-6 ? cups/day depending on energy needs. Study Design: We provided vouchers for fresh fruit and vegetable (FV) purchase to low-income women participating in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) in Los Angeles, CA. The supplemental foods provided as the program is currently constituted, contain no fresh produce except for carrots for exclusively breastfeeding women. We investigated whether providing supplemental financial support specifically for purchase of fresh FVs would result in high uptake of the supplement, and what the individuals would choose to purchase. Sample: We recruited 602 women enrolling for postpartum services at three selected WIC program sites in Los Angeles. Sites were assigned to intervention with vouchers redeemable at a local supermarket, a nearby year-round farmers' market, and a control site with a minimal non-food incentive. Vouchers were issued bimonthly, at the level of US$10 /week and carried out for six months.

Results: Of 454 participants who completed the study (75.4%), 86% were Hispanic, 7% African-American, and 7% of other ethnic backgrounds. Assessment of uptake was by voucher redemption rates and was approximately 90 percent for both groups. Participants reported purchasing a wide variety of items at both sites. The ten most frequently mentioned items were oranges, apples, bananas, peaches, grapes, tomatoes, carrots, lettuce, broccoli and potatoes.

Conclusion: We conclude that these low-income women used the supplement provided almost fully, and purchased a wide variety of fresh FVs for their families. No particular barriers arose to redemption of the vouchers by either the participants or retail vendors.

This study was supported in part by the California Cancer Research Program, California Department of Health Services, #00-00758K-20148, USDA #43-3AEM-1-80038 through the University of California at Davis, and the National Institutes of Health through the UCLA Cancer Education and Career Development Program in the Division of Cancer Prevention and Control Research, UCLA/Jonsson Comprehensive Cancer Center (#5R25 CA87949) and the UCLA Clinical Nutrition Research Unit (#5PO1CA42710).

Session 21
(Parallel)

Tool kit: Adaptation and implementation of intervention programmes: A Practical Guide

Chair

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The tool kit has been developed to meet the need for a comprehensive "framework" document to support the development and expansion of national fruit and vegetable programs. It provides the necessary basic tools to assist in this process.

On a global level there are a variety of different programs and interventions promoting the consumption of fruit and vegetables in order to reduce or alleviate the burden of chronic disease. These national and regionally based programs are structured and delivered by four core models:

1. Public,
2. Private,
3. Non Government Organizations (NGO), and
4. Public / NGO or Private Partnerships.

While the organization or organizations delivering the program may vary by country or region, the vehicles and tactics to successfully change behaviour and increase consumption remain consistent.

- Introduction : Overview of tool kit components.
R. Lemaire

- Brand development.
E. Pivonka

- Resource development within a developing country framework.
J. Badham

- Overall partnership development.
C. Rowley

Session 21
(Parallel)

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- Ron is Chairman of the International Fruit and Vegetable Alliance, and was instrumental in the development and incorporation of this entity. IFAVA is an international organization incorporate in Canada 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. Member Countries include: Canada, USA, France, Denmark, New Zealand, Australia,

South Africa, Peru, Japan, China, Argentina, and Chile.

- Ron has been with the Canadian Produce Marketing Association (CPMA) since 1998. CPMA is a not-for-profit association committed to increasing the market for fresh fruit and vegetables in Canada. The CPMA represents over 650 members, including approximately 220 foreign firms and organizations representing over $8 billion dollars in produce sales in Canada. As Executive Vice President and Director of Marketing for the CPMA, Ron is responsible for the development, strategic alliances and the implementation and management of sound and strategic programs which will support the goals and objectives of the Canadian based international Association..

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- Elizabeth Pivonka is President and CEO of the Produce for Better Health Foundation, a nonprofit 501(c)(3) foundation devoted to increasing consumption of fruits and vegetables for America's better health.

- Dr. Pivonka has been integrally involved with the Foundation's efforts since it was incorporated in 1991 as a founding partner of the National 5 A Day for Better Health Program. She served as Director of Nutrition and Science and then as Deputy Executive Director before she was selected as President in 1997. She guides the Foundation's efforts to work through industry members and government partners to advance the overall effort of increasing fruit and vegetable consumption through past implementation of the 5 A Day Program and now through the roll-out of the new Fruits & Veggies—More Matters health initiative. Dr. Pivonka is co-chair, together with CDC, of the National Fruit & Vegetable Alliance's Steering Committee. The Alliance is a confederation of government, nonprofit and industry groups working together to increase fruit and vegetable consumption for improved public health.

- A nationally-recognized expert on nutrition and the role fruits and vegetables can play to promote better health, Dr. Pivonka regularly interfaces with policy makers, regulators, academia and industry on increasing fruit and vegetable consumption, and is widely quoted in consumer media. Dr. Pivonka was recognized in 2007 as one of the "Top Women in Grocery" by Progressive Grocer. She was also recognized as one of the "Top 25" produce industry leaders in 2005 and as the 2001 Marketer of the Year, both by the produce industry's leading publication, The Packer. Dr. Pivonka is a Registered Dietitian, and holds a doctorate in food and nutrition science from Kansas State University.

Session 21
(Parallel)

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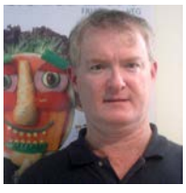
- Jane has a B.Sc Dietetics degree and a Postgraduate Diploma in Hospital Dietetics, as well as a Masters degree in Nutrition (cum laude) and a Diploma in Marketing Management (cum laude). She is a registered dietitian in South Africa. Before starting her own health communication and strategy company some 16 years ago, Jane headed the dietetics and catering divisions of a private hospital and was the Public Relations Officer for the Association for Dietetics in South Africa (ADSA). Since 2005 Jane has also been the Chief Executive Officer of the 5-a-Day for Better Health TRUST that encourages the increased consumption of vegetables and fruit amongst South Africans – something Jane is passionate about.

- JB Consultancy focuses on ad¬vising the media, food manufacturers, pharmaceutical industry and NGO's on nutri¬tion issues and trends, food labelling and fortified and functional foods. Jane is well known in the media and is on the advisory board of Shape Magazine and Food Review and is also in demand as a motivational speaker and strategy facilitator. Jane has contributed to a number of books and recently co-edited the guidelines for the eradication of nutritional anemia for the organisation Sight and Life. Jane is very involved in an exciting project, the African Nutrition Leaders Programme that aims to develop and network young leaders in the field of nutrition in Africa.



Chris Rowley

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- Chris is a communications and public relations consultant specializing in rural industry.

For the past four years he has worked with the Western Australian Department of Health to develop a national framework for the Australian Go for 2&5® fruit and vegetable campaign. The licensing approach has allowed industry and private sector interests to work with government under a uniform national approach to the promotion of fruit and vegetables.

- As Health Initiative Coordinator his role is to promote and manage the widest possible involvement in the Go for 2&5® campaign by Horticulture Australia member industries; commercial interests and non government health organisations.

Ongoing evaluation of Go for 2&5® shows high levels of campaign awareness and understanding of the message to eat two serves of fruit and five serves of vegetables. Western Australian evaluation has shown an increase of nearly one serve per person per day over a three year campaign period.

Session 22 (Parallel)

Promotion of F&V consumption targeting disadvantaged population in developing countries (WHO-FAO)

Chair

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Work experience
- 2005: Regional Adviser Nutrition and Food Security, World Health Organization Regional Office for Europe
- 1998-2005 : Senior Scientist, INRAN
- 1986-1998 : Scientist, INRAN
- 1985-1986 : Medical officer, CISP

Responsibility in WHO
Design of nutrition policy and public health strategy document at the Regional level (Action Plan on Food and Nutrition Policy, European Charter on Counteracting obesity)
Technical support to the development and implementation of nutrition policy and programmes in Member States
Monitoring of indicators of nutritional status and nutrition policy development

Appointments and representations
- General Secretary, Human Nutrition Society (elected, 1997-2003)
- President, Federation of the European Nutrition Societies (elected, 2003-current)
- Member of the EFSA panel on Nutrition (appointed, 2004- current)

- The new policy framework on diet and physical activities in schools in the context of WHO-FAO Initiative on Fruits and Vegetables for Health.
G. Xuereb

- Food-based dietary guidelines as an entry point for F&V promotion: regional perspective on promotion of F&V in Caribbean the context of food-based dietary guidelines.
P. Samuda

- The WHO-FAO Initiative in the context of regional and country interventions linked to various initiatives like PROFEL, GLOBALHORT and Urban and Peri-urban Agriculture.
A. Hodder / J. Ganry / R. Kahane

- Promoting F&V in schools: FAO's approach to promoting lifelong healthy eating habits.
E. Muehlhoff

- ISHS Commission on Fruits and Vegetables & Health a bridge between agriculture and health sciences.
Y. Desjardins

SESSION 22
(PARALLEL)

Godfrey C. Xuereb

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- From 2001 to 2008 worked as Public Health Nutritionist with the Pan American Health Organization at the Caribbean Food and Nutrition Institute (CFNI) in Jamaica.

- Currently pursuing his PhD studies on Nutritional management of Diabetes in resource poor settings.

- Set up the dietetic services in the Health Department in Malta and has held various posts including Officer in charge of the Department for Health Promotion and Advisor on International Health at the Ministry of Health in Malta.

- Led the team that was awarded the WHO award for Health Promotion in 1998.

- Represented the Maltese Ministry of Health on various delegations to the World Health Assembly and other Health Promotion Conferences. During his term at PAHO represented the organization at various International Conferences on issues relating to nutrition and chronic non-communicable diseasesServed on various commissions related to health promotion, task forces on the development of NCD protocols and also served as member and secretary of the Maltese National Steering Committee on Diabetes Prevention and Care.

- Held the post of Honorary Secretary of the Diabetes Education Study Group (DESG) for IDF/WHO between 2000-2004.

- Author and co-author of a number of patient education documents as well as training documents for health care professionals including the Curriculum for Therapeutic Patient Education for DESG.

- Author of various publications in both peer reviewed and other journals and is also co-author of a number of books.

- Registered Dietitian and Registered Public Health Nutritionists in the United Kingdom and elected fellow of the Royal Society for the Promotion of Health (UK).

The new policy framework on diet and physical activities in schools in the context of WHO-FAO Initiative on F&V for Health

Childhood obesity is a serious public health challenge. About 20% of children and adolescents are overweight in several European countries, and a third of these are obese. The annual rate of increase in the prevalence of childhood obesity has been growing steadily, and the current rate is ten times that in the 1970s*.

In response to this increase, the Fifty-seventh World Health Assembly on 22 May 2004 endorsed the Global Strategy on Diet, Physical Activity and Health**. This Global Strategy (DPAS) embraces a wide set of policy recommendations for national and local governments, the private sector, non-governmental organizations and civil society, other organizations of the United Nations and WHO itself.

Policy recommendations made in DPAS to change the environment include school policies that improve health literacy, promote healthy diet and provide physical education and facilities. To this effect DPAS has developed a school policy framework to guide policy makers from low and middle income countries in the development and implementation of policies that promote healthy eating and physical activity in the school setting..

Starting an effective school policy to promote healthy eating and physical activity requires national strategic leadership and the framework recommends the setting up of a coordinating team to guide the development, implementation, monitoring and evaluation. A situation analysis is essential to provide a baseline assessment which would inform on the needs, resources and conditions that are relevant to planning interventions. Once this is established then a work plan and monitoring system can be developed with specific goals and objectives.

Food service programmes are policy options that can be established as part of the framework, which aim at increasing the consumption of fruits and vegetables in schools.

One programme is the development of nutrition standards for foods served in schools and the framework recommends using the national food-based dietary guidelines or, if appropriate, regional guidelines. These guidelines all recommend the increase in fruit and vegetable consumption.

School food programmes aimed at increasing the availability of healthy food in schools is another approach recommended in the framework. These can be provided alone or in partnership with relevant stakeholders. When public-private partnerships are established it is important to ensure that all meals served are compliant with the national nutrition standards for schools or with the national food-based dietary guidelines for school aged children. The framework also encourages the development of school gardens and promotes interactions with relevant agencies to mobilize additional support to the development of such projects.

At all the stages of the development of these policies it is important to involve all the relevant stakeholders. These policies should be disseminated in different communication formats so as to reach the target audiences. This will facilitate the promotion of healthy eating patterns and physical activity in schools.

*: The challenge of obesity in the WHO European Region and the Strategies for Response. World Health Organization, Regional Office for Europe, 2007

**: Available from: http://www.who.int/dietphysicalactivity/strategy/eb11344/en/

SESSION 22
(PARALLEL)

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- Current work experience: Nutrition Educator, Caribbean Food & Nutrition Institute/PAHO -1997-2008.

- Areas of focus: Nutrition human resource development including curriculum review and development for regional tertiary institutions in 18 English-speaking Caribbean countries; research and training in the nutritional management of NCDs; provision of technical guidance to countries in the development, dissemination and promotion of Food-Based Dietary Guidelines; writing, editing and publishing of nutrition promotion materials.

- Educational experience: MPH, Public Health Practice (University of Massachusetts); Ph.D, Food and Nutrition Sciences (University of Maine); M.Sc, Community Nutrition (University of Queensland); B.Ed (Hons), Nutrition Education (University of Sussex).

Food-based dietary guidelines as an entry point for F&V promotion: regional perspective on promotion of F&V in Caribbean the context of food-based dietary guidelines

The United Nations (UN) and governments worldwide have declared that all people have the right to nutritionally adequate diets at all times. The development and promotion of Food Based Dietary Guidelines (FBDGs) contribute towards achieving this goal. As part of its work in the Caribbean region, The Pan American Health Organization/World Health organization (PAHO/WHO) through its specialized agencies for nutrition, the Caribbean Food and Nutrition Institute (CFNI) and the Institute of Nutrition for Central America and Panama (INCAP), with technical and financial assistance of the Food and Agriculture Organization (FAO) have been encouraging the development and promotion of FBDGs as one of the strategies to promote healthy dietary practices.

Following the International Conference on Nutrition (ICN) in 1992, when the "World Declaration and Plan of Action for Nutrition" called upon governments to promote appropriate diets and healthy lifestyles, Caribbean governments have taken on the task of developing National Plans of Action for Nutrition (NPAN). Central to the NPAN of each country is consideration for the development and promotion of dietary guidelines. The development of FBDGs is seen as part of a broader strategy for health and nutrition improvement as well as for national development.

To date, eight of the seventeen English-speaking Caribbean countries have developed Food Based Dietary Guidelines and are in the process of dissemination and promotion, while another three are currently at the developmental stage. The process of development used in each country was highly participatory, was driven by a multi-sectoral Task Force and was guided by the health conditions of the country. The involvement of the population at various stages ensured cultural appropriateness.

Commonalities based on culture; language; patterns of agricultural production, trade, food consumption; and, rates of chronic disease resulted in countries arriving at several similar key dietary recommendations. Pertinent to this paper is the fact that all eight completed national FBDGs have a key recommendation to the population on increasing F & V consumption.

This recommendation is based on the strong scientific evidence that a healthy diet which includes adequate amounts of F & V play an important role in the prevention of chronic diseases.

This paper puts forward the position that national FBDGs present a unique entry point for the promotion of increased F & V consumption in developing countries, with specific reference to the English-speaking Caribbean. It will be posited that the development and promotion of FDBGs presents the opportunity for developing countries to promote F & V consumption through various avenues such as: review and development of food and agricultural policies which seek to improve fruit and vegetable production; development of appropriate marketing systems to increase F & V accessibility; forging of public-private alliances for improving availability, accessibility and motivating consumer demand for F & V; guiding the development of information systems for the evaluation of dietary practices that will enable the analysis of trends in F & V consumption.

SESSION 22
(PARALLEL)

Alison Hodder
Jacky Ganry
Rémi Kahane

The WHO-FAO Initiative in the context of regional and country interventions linked to various initiatives like PROFEL, GLOBALHORT and Urban and Peri-urban Agriculture.

SESSION 22
(PARALLEL)

Ellen Muehlhoff

Senior Nutrition Officer

of the Nutrition and Consumer Protection Division

Head of the Division's Food and Nutrition Education and Consumer Awareness Group

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- Ellen Muehlhoff is Senior Nutrition Officer in the Nutrition and Consumer Protection Division at FAO. She heads the Division's Food and Nutrition Education and Consumer Awareness Group, whose work focuses on the dissemination of unbiased nutrition knowledge and support to policy formulation and capacity building in nutrition information and education with the aim of creating demand for healthy foods and diets and stimulating sustainable agricultural development.

- Ms. Muehlhoff has 25 years of normative and field experience in Africa, Asia, Latin American, the Caribbean and the Near East regions in nutrition research, household food security, consumer awareness, and the development of national food and nutrition education and communication strategies. She has been with FAO for 18 years. She obtained a B.Sc. in Social Anthropology, London School of Economics and Political Science in 1980 and a M.Sc. in Human Nutrition (Faculty of Medicine), London School of Hygiene and Tropical Medicine, 1983.

Promoting fruits and vegetables in schools: FAO's approach to promoting lifelong healthy eating habits

Schools can make a vital contribution to countries' efforts to achieve food security and nutritional wellbeing. Children are the current and future consumers. Eating habits are learned early and schools can play an important role in promoting healthy and sustainable food consumption patterns.

FAO's strategy for promoting good nutrition and dietary habits aims to create lifelong healthy eating habits. Schools can encourage increased fruit and vegetable consumption through complementary actions such as serving fruits and vegetables in school meals, establishing school gardens, integrating nutrition education in school curricula and reaching out to families and communities. If effectively implemented, this strategy can help to raise demand for micronutrient rich horticultural produce along with creating opportunities for small-scale farmers to increase and diversify fruit and vegetable production for improved income and value addition. The paper documents experiences and shares lessons from different countries.

SESSION 22
(PARALLEL)

Yves Desjardins

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- Yves Desjardins is native of Montreal. He started a B.Sc. in agriculture at Laval University and finished his undergraduate training in horticulture at the University of Guelph. He undertook a master at this University in tissue culture of asparagus and graduated in 1984. After teaching vegetable production in an agricultural college for some time, he joined Laval University as a research professional and worked in horticultural plant physiology and tissue culture. He obtained a Ph. D., in 1990 from Laval University. The topic of the thesis was the ecophysiology of tissue cultured plantlets.

- He was hired as a professor in 1991 and has put together a comprehensive research program on the physiology of horticultural plants and more precisely on strawberry physiology. He teaches Plant Physiology at the undergraduate level and conducts many projects in this area at the University. As Director of the Horticultural Research Center (2000-2002) he was instrumental in the creation of INAF, the Institute on Nutraceuticals and Fonctional Foods at Laval University. He was involved in the characterization of a new « nutraceutical strawberry », containing 30 % more ellagic acid, a strong antioxidant presumed to have anticarcinogenic properties. He has been involved in the characterization of the antioxydant properties of cranberries, and marine products (Laminaria longicruris). He is also involved in an extensive clinical study on the effect of cranberry juice on cardiovascular disease prevention. After a sabbatical leave in Mexico, where he worked on biotechnology of coconut, he undertook to study the expression profiles of genes linked to primairy metabolism of some horticultural plant (tomato, potato) with the DNA micro-array technique. Dr. Desjardins was academic Director of INAF, where he was in charged with implementing and developping the graduate program at the Institute amd putting together continous education program for the health industry. He is also in charge of establishing exchange programs with other international institutions. As director of INAF he organized the first international symposium on F&V and health (FAVHEALTH 2005) which regrouped for the first time researchers working in the field of horticulture, food science, nutrition and medicine. He has been appointed as Chair of the new ISHS Commission F&V and Health. He has published more than 60 scientific papers and more than 10 book chapters. He has been leading many research network both at the provincial and national level. He is involved in many international initiative relating to health effects of F&V.

Improving health properties of fruits and vegetables: ISHS Commission on Fruits and Vegetables & Health a bridge between agriculture and health sciences

In the last 15 years, a wealth of scientific results has demonstrated the benefits of fruits and vegetables (FAV) to improve health and prevent and/or cure diseases. These results have guided the recommendation of FAO/WHO to consume more FAV in order to reduce the incidence of chronic diseases : men and women should respectively consume at least 800 and 400 g of FAV daily to reduce the burden of chronic diseases like diabetes, cardiovascular diseases, obesity and even cancer (WHO Technical Report Series 916, 2003). In this context, horticultural sciences face new challenges if FAV are to meet the specific health attributes recognized by nutritionists and clinicians. Indeed, we must understand how bioactive compounds found in FAV are synthesized and standardize their content for clinical trials; determine what strategies must be implemented to optimize their concentration in horticultural commodities, and strive to maintain their quality attributes in the food chain both in developed and developing countries. In this context, it also becomes crucial to join forces with food chemists, nutritionists and clinicians to characterize the bioactive compounds, to justify the epidemiological evidences of their protective or curative roles on specific diseases, to evaluate the validity and applicability of supportive studies on humans, to understand their mode of action and document their counteractive effects. It is only through the collaboration of research scientists with vast and differing background and perspectives that it will be possible to tailor new “healthy” horticultural commodities.

Conscious of the pivotal role of FAV on health, the Board of ISHS created a new Commission entitled “Fruits and Vegetables & Health” to bridge together horticultural sciences, nutrition and medical sciences. The goal of this commission is to create communication streams with these disciplines and let horticultural sciences be recognized as an important player in the creation and supply of FAV with improved health benefits. ISHS is already the meeting place for the specialists involved in breeding, in cultural management and in quality of horticultural commodities, with its 10 crop specific sections, its widely distributed publications, and the numerous symposia organized worldwide. ISHS is now becoming even more pertinent in the area of people welfare with its willingness to bring horticultural sciences to developing countries. The support of the Global Horticultural Initiative is a good example of the central role the scientific society wants to play in this arena. We will thus present in this presentation how ISHS can support the promotion of FAV consumption in developing countries and want benefits can be expected from this action.

Session 23 (Plenary)

1. Reports from plenary and paralell sessions of the day

E. Brunner
S. Hercberg
R. Lemaire
F. Branca

2. Round table:
Increasing F&V consumption in disadvantaged populations: What should decision makers do?

Animated by
Adam Drewnowski *and* **Elio Riboli**

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Animée par
A. Drewnowski,
Université de Washington, Seattle

et
E. Riboli,
Imperial College, Londres

2. TABLE RONDE *(French)*

ACCROÎTRE LA CONSOMMATION DE F&L CHEZ LES POPULATIONS DÉFAVORISÉES : QUELLE MARGE DE MANŒUVRE POUR LES DÉCIDEURS ?

Prémisses :

1. Les régimes de faible qualité à haute densité énergétique et de faible contenu nutritionnel ont été associés à l'obésité et à d'autres problèmes de santé (Drewnowski, Revues Epidémiologiques, 2007).

2. Cependant, les régimes à calories vides sont souvent moins chers et plus accessibles que certains choix alimentaires de meilleure qualité (Drewnowski Darmon, 2006).

3. Les légumes et les fruits constituent la marque des régimes de bonne qualité (Ledikwe, Rolls, 2006).

4. Comment faire des F&L le « choix facile » –en particulier pour les groupes ayant une capacité de choix limitée ?

5. Faut-il intervenir sur les subventions, les prix, la publicité, le marketing, les allégations nutritionnelles/de santé, ou les politiques au travail ou à l'école?

6. Quel est le rôle des parents, de l'industrie, des agences gouvernementales et des responsables politiques?

7. Quels seront les niveaux de preuves nécessaires aux responsables politiques pour agir?

Les problèmes :

• Qualité nutritionnelle, pauvreté, inégalités et politique alimentaire : **E. Brunner**, Professeur d'Epidémiologie et de Santé publique à l'Université-Collège de Londres.

• Evolution des habitudes alimentaires dans l'Union Européenne et le monde : **F. Branca**, Conseiller régional pour la nutrition et la sécurité alimentaire auprès de l'OMS-Europe.

Les acteurs :

• Directeur Général de l'Alimentation : **JM. Bournigal**

• Directeur Général de la Santé : **D. Houssin**

• Haut Commissaire aux Solidarités Actives contre la Pauvreté.

• Vice Président de l'Assemblée Nationale : **JM. Le Guen**

• Vice -Président de la Ligue contre le cancer : **A. Hirsch**

Les solutions (thèmes de discussion) :

On pense souvent que le gouvernement doit faire quelque chose pour prévenir l'obésité infantile.
En réalité, le gouvernement ne peut pas se contenter de faire une seule chose – il doit tout faire.
Comment définir ce « tout » ? Si la politique est l'art du possible, il s'agit de définir les limites du possible.

Les intervenants répondront aux questions suivantes :

• Comment percevez-vous le rôle de l'alimentation dans la promotion/prévention de l'obésité infantile ? De quels facteurs nutritionnels votre agence/organisation s'occupe-t-elle davantage ?

• Quels sont les niveaux de preuves sur lesquels se fondent vos décisions ? Sont-ils appropriés ? Le manque de données probantes compromet-il votre action ? (donnez votre opinion)

• En ce qui concerne le problème de l'accès à une alimentation saine, quelle est d'après vous la responsabilité des familles, des populations, de l'industrie agroalimentaire et des gouvernements ?

• Mettez-vous l'accent sur les programmes en direction des individus et des familles, ou préférez-vous des approches à plus petite échelle ?

• Existe-t-il des leviers d'intervention sur lesquels on devrait agir ? Quel est, d'après vous, le type d'intervention le plus efficace :

- o Politique : labels, allégations nutritionnelles et de santé,
- o Environnemental : environnement alimentaire, publicité et marketing,
- o Economique : structure des prix, subventions, taxes, commerce.

• Pour être efficace, toute mesure/politique doit être politiquement et socialement acceptable. Quelles contraintes ou obstacles identifiez-vous ?

• Pour atteindre le meilleur résultat possible, qui devrait agir, et en coordination avec qui ?

Session moderators:

Adam Drewnowski
University of Washington, Seattle

and

E. Riboli,
Imperial College, London

2. ROUND TABLE *(English)*

INCREASING F&V CONSUMPTION IN DISADVANTAGED POPULATIONS: WHAT SHOULD DECISION MAKERS DO ?

Conceptual premise:

• Low-quality diets that are energy-dense but nutrient-poor have been associated with obesity and ill health (Drewnowski 2007).

• However, empty-calorie diets are often cheaper and more accessible that some healthier options (Drewnowski Darmon 2005, 2006).

• Vegetables and fruit are the signature of a high-quality diet (Ledikwe et al. 2006).

• How do we make the healthy F&V choice the easy choice – especially for groups whose choices are limited to begin with? (RWJF initiatives)

• Do we need interventions at the level of subsidies, prices, advertising, marketing, nutrition or health claims, or policy changes in workplaces or at schools?

• What is the role of parents, industry, government agencies – and politicians?

• What evidence base will politicians need in order to act?

Statement of issues and problems:

• Diet quality, poverty, inequality, and food policy: **E. Brunner**, Reader in Epidemiology & Public Health, University College, London.

• Trends in the EU and global diets. **F. Branca**, Regional Advisor for Nutrition and Food Security - WHO (Europe).

The actors: French authorities

• General Director of food (DGAL): **JM Bournigal**

• General Director of Health: **D. Houssin**

• High commissioner for active solidarity against poverty:

• Vice-President of the French Assembly: **JM LeGuen**

• NGO Representative: Vice-President of the Anti-Cancer League: **A. Hirsch**

The search for solutions (topics for discussion):

People ask: What is the one thing that the government can do to prevent childhood obesity. The answer is that the government cannot stop with one thing – it needs to do everything. What are the boundaries of "everything"? Where does it stop? Politics is the art of the possible – let us define what is possible.

Participants will be asked to answer the following:

•How do you view the role of diet in the promotion/prevention of childhood obesity? Which dietary factors most concern your agency or organization?

• What evidence base do you rely on? Is it adequate? Are there evidence gaps that may prevent you from action? (Give your judgment)

• When is comes to assuring access to healthy diets, what are responsibilities of families, communities, food industry, or governments – in your opinion?

• Do you favor programs aimed at individuals or families – or do you prefer broader policy approaches?

• Are there specific pressure points that ought to be acted upon? In your opinion, which type of intervention is likely to be most effective:

- o Policy: food labels, nutrition and health claims
- o Environmental: food environment, advertising and marketing
- o Economic: price structure, subsidies, tariffs, trade

• Effective policies need to be politically and socially acceptable. Are there barriers or obstacles that you foresee?

• For maximum effect, who ought to act and in concert or alliance with whom?

SESSION 23
(PLENARY)

Eric Brunner

Reader in epidemiology and public health

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- **Reader in epidemiology and public health**
- **directs the nutrition component of the Whitehall II prospective cohort study**
- **co-director of Masters course 'Health and society: social epidemiology'**
- **collaborator Centre for Nutritional Epidemiology in Cancer, Cambridge**
- **EURO-PREVOB partner (6th Framework)**
- **European Diabetes Epidemiology Group member**
- **Cochrane Heart Group co-editor**

Diet quality, poverty, inequality, and food policy

UK governments over the past 100 years have refused accept the principle of a 'minimum income for healthy living' (MIHL) to define food poverty in health and social policy. An alternative relative poverty definition is used to set an arbitrary threshold relative to national income, for example 60% of median income after housing costs. MIHL has been calculated for older people based on (1) knowledge of the determinants of health (nutrition, physical activity, housing, psychosocial relations/social inclusion, travel, medical care and hygiene) and (2) expenditure survey data for the costs of these elements (Morris et al, Int J Epidemiol 2008). At 2007 prices, MIHL is 170 € (£131) for a single person and 270 € (£208) for a couple per week. These estimates are 50% above the state pension level. A scandalous level of malnutrition accompanies the systematic neglect of the poorest sections of our rich societies. In the UK, the official Low income diet and nutrition survey (2003/04) shows that among adults on low incomes and /or receiving state benefits, 25% of men and 16% of women had plasma vitamin C levels indicating deficiency (<11?mol/L). Using the 'depletion' threshold (28?mol/L), almost half (46%) of men and a third (35%) of women had poor vitamin C status.

Policy to address the inverse gradient in diet quality across the social spectrum is not well developed. A combination of material and psychosocial factors influences dietary pattern, and both aspects should be considered in policy development. The UK minimum wage is £5.52 (£4.60 for 18 to 21-year-olds), corresponding to 287 € [£221] (239 € [£184]) for a 40h working week. It is not clear what impact introduction of the minimum wage has had on the diet of low paid workers or on social differences in food consumption. Food token schemes are designed to encourage recipients to consume healthy foods but breach the principle of autonomy. Fiscal measures such as food taxation and price controls are options likely to influence consumption. Controls over food advertising, particularly aimed at children, school food and drink provision are examples of measures that will modify the psychosocial food environment. With political will, it is possible to create momentum to drive up overall dietary quality and drive down social disparity in dietary quality.

SESSION 23
(PLENARY)

Francesco Branca

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Work experience
- 2005: Regional Adviser Nutrition and Food Security, World Health Organization Regional Office for Europe
- 1998-2005 : Senior Scientist, INRAN
- 1986-1998 : Scientist, INRAN
- 1985-1986 : Medical officer, CISP

Responsibility in WHO
Design of nutrition policy and public health strategy document at the Regional level (Action Plan on Food and Nutrition Policy, European Charter on Counteracting obesity)
Technical support to the development and implementation of nutrition policy and programmes in Member States
Monitoring of indicators of nutritional status and nutrition policy development

Appointments and representations
- General Secretary, Human Nutrition Society (elected, 1997-2003)
- President, Federation of the European Nutrition Societies (elected, 2003-current)
- Member of the EFSA panel on Nutrition (appointed, 2004- current)

The promotion of F&V in the WHO European Region

Fruit and vegetables (FV) are important components of a healthy diet, especially in the prevention of major diseases such as CVDs, diabetes, obesity. The 2nd Action Plan for Food and Nutrition Policy recommends to establish strategies to promote FV consumption and to boost production and supply. WHO performed two WHO surveys (2003 and 2007); analysed existing national policy documents; as well as further projects and initiatives for the promotion of FV resulted from an internet search.

The study shows the discrepancy between FV recommendations and the actual intake, pointing out how the policies that determine FV production, availability, accessibility and supply can affect consumption. The study indicates the main barriers to FV consumption at different steps of the food supply chain, such as lack of technology, low farmers' income, labour constraints and policies, low accessibility of supermarkets, high prices of FV, taste, lack of knowledge. Possible drivers and good practice examples are emphasized, in particular economic measures, local street markets, improvement of public transport systems to supermarkets or delivery services, facilitated and standardized nutrition labelling and signposting, FV school schemes, vending machines, education of health benefits of FV.

The study stresses the link between health and agriculture and indicates possible policy instruments, such as changes in agricultural policies to increase the availability by encouraging farmers to produce more FV and by selling their produce directly and locally to the consumers; mass media campaigns and enhanced education in schools and workplaces promoting FV consumption. Intersectoral work is needed, such as public-private partnerships to integrate different sectors and to strengthen collaboration between stakeholders.

Session 23
(Plenary)

Didier Houssin

General Director of Health

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• Professor Didier Houssin has been Director General for health (Chief Medical Officer) and Interministerial Delegate against pandemic flu since 2005. He began as research fellow at the National Institute for Health and Medical Research (INSERM), and was subsequently Professor of surgery at René-Descartes-Paris-5 University and Cochin Hospital as of 1988. From 1994 to 2003, he was Director General of the French Transplantation Agency, and Head of the Department of Surgery at Cochin Hospital from 1998 to 2003. During this time (from 2001 to 2004), he was vice-president (on the scientific council) of René-Descartes-Paris-5 University. From 2003 to 2005, he was Medical Director of Paris hospitals.

• Professor Houssin wrote two books (L'aventure de la greffe, Denoël Editor, Paris, 2000; Maintenant ou trop tard, Essai sur le phénomène de l'urgence, Denoël Editor, Paris 2003) and more than 300 peer-reviewed scientific articles.

Jean-Marc Bournigal

General Director of Food

Chief Inspector of Veterinary Public Health

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• Jean-Marc BOURNIGAL is since March 2006 the General Director of Food. He has held several posts prior to his current position, namely: 2002 to 2006: Delegate for European Agricultural Affairs at the Permanent Representation of France at the European Union;

• 1999 to 2002: Agricultural Attaché at the French Embassy in Italy;

• 1997 to 1999: Chief of Mission of the International Hygiene Coordination at the General Direction of Food, Ministry of Agriculture; • 1995 to 1997: Technical Advisor to the Ministry of Agriculture, Fisheries and Food (Philippe VASSEUR) • 1995: Advisor to the General Director of Food, Ministry of Agriculture, in charge of relations with the Cabinet of the Minister of Agriculture

• 1992 to 1995 : Head of Office, office of Aviculture, Meats, Seafood, Prepared dishes, Catering, and Foods for animals at the General Direction of Food, Ministry of Agriculture; 1990 – 1992: Technical officer at the office of General Regulation at the General Direction of Food, Ministry of Agriculture;

• 1988 – 1990: Deputy Agricultural Attaché at the French Embassy in London.

• 1988: Deputy Chief of Food Safety at the Veterinary Services, Pyrénées-Orientales.

Session 23
(Plenary)

Etienne Grass

High commissioner for active solidarity against poverty representative.

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Etienne Grass has been technical advisor to Martin Hirsch, the High commissioner for active solidarity against poverty since May 2007. He in charge of the « Income of active solidarity » (revenu de solidarité active).

From 2004-2007, he was Member of the General Inspection of Social Affairs. He is also in charge of the secretariat of "comité des pairs Santé et organisation des soins" and "Contrôles de gestion du Fonds Social Européen: Région PACA, Limousin, Centre et Basse-Normandie".

He is graduated from the National School of Administration, the famous french school : ENA.
He has a lawyer background.

Within his mission, Etienne Grass wrote different reports:

http://www.ladocumentationfrancaise.fr/rapports-publics/064000763/index.shtml

http://www.ladocumentationfrancaise.fr/rapports-publics/064000351/index.shtml

http://www.ladocumentationfrancaise.fr/catalogue/9782110062710

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• Jean-Marie Le Guen is a Doctor in Medecine, graduated in High Studies in Economy of Health. He was a founder member of the independent and democratic U.N.E.F., in 1980 and Vice-President of the National Mutual Insurance Company of the students of France, between 1980 and 1982.

• Between 1992 and 1995, he was a member of the High Committee of Public Health.

• In 1983, he was Councillor of the 13th district of Paris. From 1988 to 1992, he was Deputy of the 9th district of Paris. In 1989, he was also elected at the Council of Paris, from which he became Vice-President in 1995. Between 1992 and 1997, he was a Regional Councillor of Ile-de-France.

• In 1997, Jean-Marie Le Guen was elected Deputy of the 9th district of Paris (13rd municipal district) and re-elected in June 2002. He was named President of the Supervisory Board of the National Health Insurance Fund of the Salaried Workers between 1997 and 2002.

• He is delegate of the French National Assembly to the Council of Europe and the Western European Union (UEO) as a member of the Commission of the cultural, familial and social questions, since 2002 to 2007.

• Dr Le Guen is responsible for the socialist party for the health and sickness insurance questions and he is the representative of his party at the High Council for the Future of the Health Insurance. He is also Chairman of the Parliamentary Study Group on Obesity.

Albert Hirsch

Vice-President

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• Vice-president of the French cancer League
• Vice-president of the French alliance against tobacco
• Emiritus Professor of Pneumology at Paris VII University
• Head of the department of pneumology, Hôpital Saint-Louis, Paris 1984-2003
• Author of the report to the French government Lutter contre le tabagisme
(La documentation française, Paris, 1987)
• President of the CNCT (Comité National Contre le Tabagisme) 1991-1993
• Organiser of the 9th World Conference on Tobacco or Health - Paris 1994
• Chairman of the UICC tobacco and cancer programme 1994-2003
• Chairman of the International liaison group on Tobacco or Health 1994-2003
• President of the European Network for Smoking Prevention 1998-2000
• Member of the panel of WHO experts on tobacco or health

Poster Abstracts

P 1

Fruit and vegetable availability at US elementary schools

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Substituting fruits and vegetables (FV) for other energy-dense meals and snacks can aid childhood obesity prevention efforts, and schools are an important venue for promoting FV consumption. In 2007, the Food and Fitness project conducted a mailback survey in a nationally-representative sample of elementary schools. Results reported are from 837 public and private elementary schools (57.7% response rate). School stores or snack bars operated in 21.2% of schools; among those schools, fresh fruits were available in 46.6%, and vegetables were available in 34.7%. The majority of schools (94.3%) offered school lunch, however, few of those schools (18.6%) offered a salad bar at lunch "most or every day," and 14.8% offered a salad bar "some days." In 39.8% of schools, additional foods were offered at lunch as "a la carte" purchases; many of these schools made available fresh fruits (75%), vegetables (67.8%%), or pre-made salads (49.8%) either some, most, or every day. In addition, 60.0% of schools reported that they display advertising for fruits and vegetables in the cafeteria. Preliminary comparisons between lower- vs. higher-SES schools indicate relevant differences, such as more-frequent availability of fresh fruit in a la carte service among higher-SES schools. Demographic differences will be further explored, as well as discussing the implications for school-based promotion of FV consumption.

P 2

Knowledge towards the role of fruit and vegetables in protecting against Non-Communicable Disease among women from Burkina Faso, Senegal, Tunisia and the UK

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Objective: To assess the knowledge of the protective effect of fruit and vegetables and non-communicable disease (NCD) in women living in Burkina Faso, Senegal, Tunisia and the United Kingdom (UK).

Method: Cross-sectional, population studies using the same questionnaire translated into the local language of each country, administered by face to face interview or postal survey (UK only). The pre-validated questionnaire consisted of 24 items measuring dietary and behaviour-related determinants of NCD. For this study, 6 items measuring women's knowledge of whether they believed that fruit and vegetable consumption was associated with NCDs were extracted. Scores were created ranging from 0 to 100 points (by giving 1 point for a correct answer and 0 points otherwise and by standardising the sum as a percentage).

Subjects: In each country, women aged 18 to 65 years, living in urban areas, were randomly selected. Samples ranged from n=201 to 301.

Results: The knowledge scores developed suggest that awareness of the protective effects of fruit and vegetables was rather poor in all of the four countries investigated. Mean scores ranged from 8.8 to 41.0/100 and were as follows: Burkina Faso (8.8), Senegal (19.9), Tunisia (34.9) and the UK (41.0). The scores suggest that knowledge increases with the UN development index for the country of origin.

In the UK and Tunisia, knowledge of the protective effects of vegetables was better known than for fruit, i.e. the percentages of correct answers were higher for vegetables than fruit (Tunisia: 44.3% vs. 25.4% and UK: 44.6% vs. 37.9%). Whereas in Senegal and Burkina Faso, women's knowledge was better for fruit than for vegetables (Senegal: 21.8% vs. 18.4% and Burkina Faso: 9.9% vs. 7.7%).

Conclusions: Findings suggest poor knowledge of the protective effects of fruit and vegetables. Education campaigns focusing on health benefits of fruit and vegetables are needed.

P 3

Inequality in obesigenic environments: fast food density in New York City

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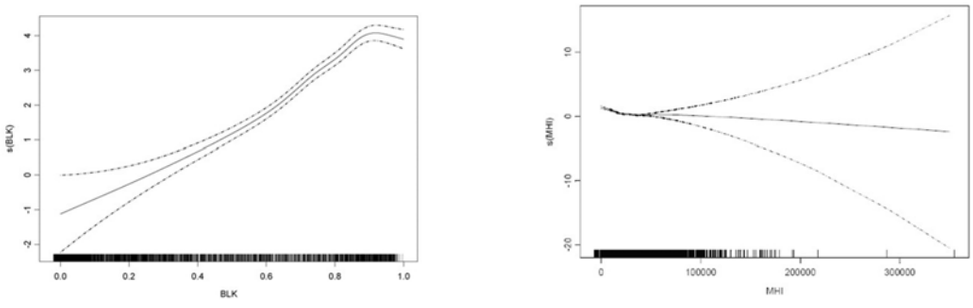
The high prevalence of obesity in African American populations may be due to the nature of the foods available in residential communities, and the density of fast food restaurants is critical. This study investigated whether there is a positive association between proportion of Black residents in New York City (NYC) census block groups and fast food density; whether Black and White areas comparable in income had similar exposure to fast food; whether high-income Black areas had lower exposure than low-income Black areas; and whether the distribution of national chains differed from local outlets. We examined fast food density in the 5,730 census block groups comprising NYC's five boroughs: Manhattan, Brooklyn, Queens, The Bronx, and Staten Island. Fast food was defined as national chains and local establishments whose primary menu items were hamburgers, hot dogs, and fried chicken. Restaurant addresses were obtained from The NYC Department of Health and Mental Hygiene's on-line directory of restaurant inspections. We employed generalized additive models to analyze the data. Results showed that percent Black was the strongest predictor of fast food density, above median household income and other covariates. High-income Black areas had similar exposure as low-income Black areas, again underscoring the influence of racial, rather than socioeconomic demographics. The graphs below show the estimated partial effects of percent Black and median income on fast food density (the smooth curves replace the more familiar regression coefficients in linear regression). The dashed lines show approximate 95% confidence limits for the estimate. We also found that local chains were prevalent in Black neighborhoods, but national chains were most dense in commercial areas. The results bring U.S. racial disparities in food environments into bold relief and highlight the importance of policy level interventions in obesity prevention.



P 4

Crunch&Sip®: Increasing fruit, vegetable and water consumption in Western Australian primary schools

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The proportion of overweight children has tripled in Western Australia over the last two decades. A 2003 statewide children's survey found 40% ate no fruit and 30% ate no vegetables on any given day. As a result, the Crunch&Sip® program was developed. Crunch&Sip® is a set break for students to eat fruit or vegetables and drink water in the classroom. Parents provide children with fruit or vegetables for the break.

Objective: Crunch&Sip® aims to increase the fruit, vegetable and water intake of students in the classroom.

Methodology: To become certified, schools submit their Crunch&Sip® policy and application online. Once accepted, schools are provided with waterbottles for each student, fence sign, and classroom tallychart. The website includes a sample policy, newsletter inserts and classroom activities. Directions to establish Crunch&Sip® in the classroom is provided. Canteen and whole-school materials have also been developed. Targeted fruit and vegetable promotions (e.g. Crunch&Sip® Week and Fruit 'n' Veg Week) are used to increase awareness and promote consumption in schools.

Result: To date, there are over 200 Crunch&Sip® schools (including regional and remote) which represents 21% of WA primary schools. Research will be conducted in Term 2 to collect information on whether the implementation of Crunch&Sip® increases the number of servings of fruit or vegetables consumed by children each day at school. Data will be available at the time of the conference. A repeat of the 2003 statewide survey will be conducted later in 2008, and a question has been included on whether the school conducts Crunch&Sip®. Fruit and vegetable consumption of students will be compared between certified and non-certified schools.

Conclusion: Through Crunch&Sip®, schools demonstrate their commitment to nutrition education and creating a supportive school environment. A summary will be provided of support strategies to encourage uptake and maintenance of the program.

P 5

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Relationship between fruit, vegetable and fruit juice consumption at adolescence and subsequent respiratory health in early adulthood: Northern Ireland Young Hearts Project

Dietary intake may influence respiratory health. Fruit and vegetables have been shown to have positive effects on lung function primarily through antioxidant properties.

Objectives: The present study investigated the relationship between fruit, vegetable and fruit juice consumption at adolescence and lung function in early adulthood.

Methodology: Habitual dietary intake was assessed by diet-history in 485 adolescents aged 12 and 15 years. Anthropometric measurements were taken and lifestyle factors were assessed by questionnaire. When subjects were aged 20–25 years, forced vital capacity (FVC; ml) and forced expiratory volume in 1s (FEV1; ml) were measured by spirometry. Multivariable linear regression analyses were carried out with lung function measurements (FVC and FEV1) as the dependent variables. Explanatory variables included fruit, vegetables and fruit juice (g/100g/day), with adjustment for age, height, weight, BMI, social class, education, physical activity, smoking status, pack years of smoking and total daily energy intake.

	Males (n = 247)				Females (n = 238)			
	FVC		FEV1		FVC		FEV1	
	B†	SE	B	SE	B	SE	B	SE
Multivariable analysis								
Vegetable intake	77.29	99.25	69.18	83.59	256.14**	83.28	165.89*	70.38
Fruit intake	37.99	42.06	−10.79	35.43	−19.64	28.31	−3.97	23.93
Fruit juice intake	57.45	41.47	25.95	34.93	13.20	34.94	26.06	29.53

*P<0.05, **P<0.01. †Values are unstandardised regression coefficients.

Results: No associations were evident between fruit or fruit juice intake and lung function measurements in either gender. Total vegetable intake in adolescent females was positively associated with FVC and FEV1. The multivariable models explained ≤52.7 and ≤45.9 % of the observed variance of FVC and FEV1 in females respectively.

Conclusion: Our results suggest that in females, a high vegetable intake at adolescence may be predictive of respiratory health in young adulthood. These results offer some support for the hypothesis that early-life fruit and vegetable intake is beneficial to respiratory health in young adulthood.

P 6

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Relationship between iron status and dietary fruits and vegetables based on their vitamin C and fiber content

Background: Dietary fruits and vegetables may enhance iron status because of their high vitamin C content. The potential association between iron status and intakes of specific fruits and vegetables, according to sex and menopausal status, must be investigated.

Objective: The objective was to assess the relation between dietary fruits, vegetables, and juices (FVJ) according to their vitamin C and fiber contents and serum ferritin and hemoglobin concentrations.

Design: A total of 4358 subjects, aged 35–60 y, of the Supplementation with Antioxidant Vitamins and Minerals (SU.VI.MAX) cohort were selected. Subjects had completed at least 6 24-h-dietary records over 2 y. The relation between serum ferritin and hemoglobin, measured at inclusion, and dietary FVJ according to their vitamin C and fiber contents was assessed by multiple regression analysis.

Results: In premenopausal women, serum ferritin was positively associated with intakes of fiber-poor FVJ (up to 10% higher serum ferritin in the third tertile compared with the first tertile). In the whole sample, hemoglobin was positively associated with fruits, vitamin C–rich FVJ, FVJ ascorbic acid, and fiber-poor FVJ categories (up to 1.5 g/L higher hemoglobin concentration).

Conclusions: Intakes of fiber-poor FVJ were associated with higher serum ferritin concentrations in premenopausal women and with higher hemoglobin concentration in the whole sample. Our results suggest that the fiber content of fruits and vegetables influences iron stores in premenopausal women but has no influence in groups in whom nonheme iron absorption is limited because of high iron stores. Other mechanisms are likely to be involved in the case of hemoglobin.

P 7

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"Program for Nutrition, Prevention and Health of children and adolescents in Aquitaine": How to improve fruits and vegetables consumption among children

Background: The "Program for Nutrition, Prevention and Health of children and adolescents in Aquitaine" (southwest France) is managed by a public healthcare insurance organism, with local authorities of ministry of health, education and sport. It involves numerous non-governmental organizations for health promotion, the Public Health Institute, health professionals, regional and local governments and municipalities.

For children aged 3-11, various actions were implemented since 2004, regarding 3 axes:

1) Early screening, prevention and management of childhood obesity

2) Implementation of health promotion activities in the field of nutrition and physical activity

3) Improvement of supply of healthy food at school and recreational centres.

Objectives: Objectives of this program are to improve dietary behaviour by promoting healthy food consumption (particularly fruits and vegetables) and physical activity. We present the results of a baseline study conducted in 2004-05 to evaluate dietary behaviour and the actions concerning fruits and vegetables consumption.

Renewal of the descriptive studies will enable us to evaluate the impact of the interventions on dietary habits and measure the increasing of fruit and vegetables consumption. Methods: the baseline survey was conducted in 2004-05 in a random sample of 145 schools.

Results: Among the 2664 children 8-9 y old, 96% had a breakfast (among which 7% of fruits and 32% of fruit juices) and more than 44% had morning snacks (among which 19% of fruits and 11% of fruit juices). This data helped defining among main objectives the promotion of fruits and vegetables consumption.

Actions implemented include:

- Health promotion workshops and visits with children such as: discovery and tasting of fruits, visit of a prune factory, making of portraits using fruits and vegetables.

- Buffet offering fruit skewers and fruit cocktails made by children for their parents

- Training sessions about nutritional recommendations for teachers, recreational centres directors and catering staff.

Renewal of the descriptive studies will enable us to evaluate the impact of the interventions on dietary habits and measure the increasing of fruit and vegetables consumption.

P 8

THIBAULT Hélène[1], CARRIERE Caroline[2], BAINE Magali[2], RUELLO Martine[3], DELMAS Colette[4], ATCHOARENA Sylviane[4], DEVAUD Jean-Yves[5], BARATCHART Béatrice-Anne[6], MAURICE-TISON Sylvie[1]

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"Program for Nutrition, Prevention and Health of children and adolescents in Aquitaine":Improvement of food supply in middle and high schools in Aquitaine by promoting the consumption of fruits, bread and water among adolescents

"Nutrition, Prevention and Health of Children and Adolescents in Aquitaine" program is implemented in Aquitaine (southwest France) since 2004 and managed by public healthcare insurance organisms, with local authorities of ministry of health education and sport, local territorial authorities, public health and school professionals. As a part of this program, actions are focussed on the improvement of food supply (particularly fruits and vegetables) in middle and high schools.

Objectives: Operational objectives are to limit sweet and fat foods sales at the morning break and increase fruits and bread availability in schools. Final objective is to globally improve teenagers' dietary habits in Aquitaine. We present the results of a baseline studies conducted in 2004-05 to measure food supply in middle and high schools.

Methods: The study was conducted among 536 schools.

Results: Concerning food supply in answering middle and high schools:

- 20% offered free snacks [bread (67%), fruits (39.3%)].

- 63% had food sales [pastries (74.6%), chocolate bars (30%), fruits (6.7%)]

These findings justify actions offered by the regional program to all voluntary middle and high schools:

1) Help them turning sweet and fat foods sales to seasonable fruits and loaves of bread by providing suppliers of quality. Already 15 schools (more than 4000 students) offer various fruits (apples, grapes, dry fruits...). Contacts are made with local producers in proximity to the schools.

2) Explain the change made to students through actions of health promotion concerning nutrition (rhythm of meals, health effects of bread and fruits, consequences of heavy sweet and fat food consumption...).

Before and after surveys will measure the global impact on teenagers' dietary behaviour and the possible increase of fruits and vegetables consumption.

Renewal of the preliminary survey will appreciate the impact on food supply in middle and high schools in Aquitaine.

P 9

Influence of fruit and vegetable variety on nutrient intake among schoolchildren

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Background and Objectives: Several studies demonstrated that diet variety may be a useful health indicator. However, in some other studies varied diet was also associated with high energy intake and increased body weight. Thus, it may be reasonable to promote a variety of healthy foods, such as fruits and vegetables, rather than total diet variety. The aim of this study was to evaluate the association between fruit and vegetable variety and nutrient intake among 10 to 12 year old schoolchildren.

Methods: The study, which was part of the Pro Children cross sectional survey, covered 718 schoolchildren with mean age 10.6 years (SD: 0.7) in eastern Austria. Nutrient intake was assessed by a single 24-h-recall. Fruit and vegetable variety was determined by counting the different types of fruits and vegetables reported in the 24-h-recalls. In multiple linear regression models, associations between fruit and vegetable variety and intake of 24 nutrients were tested, adjusting for total energy intake, total amount of fruit and vegetable intake, sex, self-reported body mass index (BMI) and age.

Results: A high fruit and vegetable variety was associated with significantly higher intakes of 17 nutrients. Strongest associations were found for folic acid, beta-carotene, vitamin C, potassium, magnesium, iron, iodine, and dietary fiber. For example folate intake increased by 27.72% when going from fruit and vegetable variety of 1 or less to 5 or more ($p<0.001$). No associations were found between fruit and vegetable variety and age, sex, and BMI.

Conclusion: A diet diverse in fruits and vegetables can be recommended to improve nutrient intake.

P 10

Recommendations of the WHO and European Union versus realization of demand for vitamins and minerals of pregnant women's diet in Poland

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Proper combination of all necessary nutrition elements, affects frequency of pregnancy's complication, fetus' growth and children's future illnesses. Taking in to account the WHO's and UE's recommendations supply of fruits and vegetables over 400g per day will cover daily demand for vitamins and minerals. The purpose of this study was to assess diets' quality of pregnant women in Poland against recommendations of WHO and European Union especially on realization of demand for vitamins and minerals. 128 women pregnant for 20-30 weeks took part in the research. Consumed products were analyzed by the means of DIETETYK software developed by the Polish National Food and Nutrition Institute (NFNI). Obtained macro and micro values were averaged. The results were confronted with WHO's, UE's and NFNI's recommendations for pregnant women and analyzed statistically (test Chi2).

Average value of micro components supplied with the diet, did not deviate from EU and NFNI's nutrition recommendations: protein – 72,1 g/person daily, fats overall – 72,8 g, multiunsaturated fatty acids – 10,93g, cholesterol – 283 mg, carbohydrates – 257g. Lower consumption than 400g/day of fruit and vegetables in diets was in 4,68% of pregnant women. How ever mean values for vitamins: D – 2,64 ug/person., B6 – 1,76 mg/person and folic acid – 160,3ug/person. as well as average values for mineral components: calcium 689mg/person, magnesium 255mg/person, iron – 10,1mg/person, zinc – 9,2 mg/person have been lower than daily recommended values. Daily level for sodium, phosphorus and vitamin A have been exceeded. There has been a significant relevance between quality of a diet during pregnancy and higher and secondary education as well as place of residence (urban). Supplementing most vitamins and mineral components, beginning with a first pregnancy trimester, is necessary. Women in their child age must be educated on proper nutrition during and before a pregnancy.

P 11

Association between dietary patterns and plasma lipoprotein profile determined by nuclear magnetic resonance in men and women

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Objectives: To investigate relationships between dietary patterns and plasma lipoprotein profile determined by nuclear magnetic resonance.

Methodology: Seven hundred and sixteen volunteers (403 women) aged 40-69 years at baseline (1990-1994) participated in a community-based, cross-sectional study using the Melbourne Collaborative Cohort Study, Australia. Dietary factors were identified from a self-administered food frequency questionnaire using principal components analysis.

Results: Four dietary factors were identified explaining 69% of intake variance and reflecting frequent intakes of Mediterranean foods, vegetables, meat and fresh fruit. For men, the Mediterranean pattern was not associated with lipoproteins. The vegetable pattern was positively associated with small VLDL and total LDL concentrations. The meat pattern was positively associated with large LDL, LDL size and total HDL. The fresh fruit pattern was inversely associated with large VLDL, VLDL size, total LDL, IDL, small LDL, total and small HDL, and positively associated with HDL size. For women, the Mediterranean and vegetable patterns were not associated with lipoproteins. The meat pattern was positively associated with total and small HDL, and inversely associated with HDL size. The fresh fruit pattern was positively associated with total and small LDL. Covariates most frequently associated with lipoproteins were WHR and BMI for men, and WHR and smoking for women. Dietary patterns explained 0.8-2.2% of variation in lipoprotein measures.

Conclusions: Frequent consumption of traditional Mediterranean foods is not associated with lipoproteins. Other dietary patterns were associated with both cardioprotective (high HDL) and atherogenic (increased LDL and large VLDL) lipoproteins, and differ by gender. NMR provided more detail of diet-lipoprotein relationships than conventional lipids, but effects are small.

P 12

What fruit and vegetable supplies would meet WHO nutrition guidelines?

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Several researchers mistakenly assume that a food supply of 400 grams per day fruit and vegetables would meet the WHO nutrition targets for daily consumption at that level. Clearly due to processing and wastage a higher supply figure is needed, but how much higher?

We took 14 EU member states' dietary surveys and compared the reported actual consumption levels with the supply of fruit and vegetables shown in the FAO Food Balance Sheets for the matching year. Using a simple regression provides an initial estimate of the supply quantities required for different consumption levels. To meet the WHO recommended consumption of at least 400g per day, a supply of approximately 284 kg/year (780 g/day) per person is required. Further analyses identifying specific components – such as pulses, nuts and fruit juices – and adjusting for different population distributions may refine these estimates, but it can be clearly seen that in much of northern Europe the supply of fruit and vegetables fails to meet the levels recommended for population health.

The technique needs refining and validating but we believe it provides a useful tool for nutrition policy evaluation. It also links nutrition policy to the agricultural and trade policies which need attention if we are to improve public health.

P 13

Is it possible to increase fruit and vegetable intake in people with Chronic Obstructive Pulmonary Disease (COPD) when key barriers are removed? - The DISCO study

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Objective: To examine if it is possible to increase fruit and vegetable (F&V) intake, and so improve antioxidant status, in people with COPD when two major barriers (cost and access) to increased consumption are removed.

Methodology: Participants with moderate to severe COPD and habitually low F&V intake (≤2 portions/day) were randomised to either a low (≤2 portions/day) or high (≥5 portions/day) F&V group. F&V was delivered to all participants on a weekly basis for 12 weeks, free of charge. At weeks 0 and 12, dietary intake was assessed by a 7-day diet-history and a blood sample was collected for the assessment of antioxidant status.

Table 1: Changes in biochemical markers in response to fruit and vegetable intake

Variable	low F&V diet (n = 11)			high F&V diet (n = 13)			Between group
	Week 0 [2]	Week 12 [3]	% change	Week 0	Week 12	% change	comparison (P) [4]
F&V (portions/day)	1.37 (0.54) [1]	1.83 (0.41)*	33.6	1.37 (0.55)	7.12 (1.78)***	419.7	< 0.001
Vitamin C (_mol/l)	27.28 (22.60)	33.70 (17.03)	23.5	39.82 (18.44)	47.98 (24.57)	20.5	0.816
lutein (_mol/l)	0.17 (0.08)	0.18 (0.06)	5.9	0.16 (0.08)	0.20 (0.08)**	25	0.046
zeaxanthin (_mol/l)	0.03 (0.01)	0.04 (0.01)	33.3	0.03 (0.01)	0.04 (0.02)*	33.3	0.450
_-cryptoxanthin (_mol/l)	0.04 (0.02)	0.07 (0.05)	75	0.05 (0.03)	0.09 (0.07)**	80	0.340
_-carotene (_mol/l)	0.06 (0.03)	0.08 (0.04)*	33.3	0.06 (0.02)	0.07 (0.04)	16.7	0.686
_-carotene (_mol/l)	0.21(0.12)	0.31 (0.23)*	47.6	0.16 (0.06)	0.23 (0.13)*	43.8	0.494

[1] Values are mean (Standard deviation)
[2] Baseline values (before diet) did not differ significantly between groups, P > 0.05 (independent samples t-test)
[3] Within group comparisons analysed by paired samples t-test, significantly different from baseline (* P < 0.05, ** P < 0.01, *** P < 0.001)
[4] Analysed by independent samples t-test

Results: Self-reported intake of F&V increased significantly in both groups. Within the low F&V group, two biomarkers (Ð- and Ð-carotene) increased significantly, compared to four (lutein, zeaxanthin, Ð-cryptoxanthin and Ð-carotene) within the high F&V diet. However, the only significant difference between groups was for lutein.

Conclusion: In terms of self-reported intake of F&V, home delivery of free F&V appears to work as a strategy to increase F&V intake in people with COPD. In terms of biomarkers of intake, when the low versus high intake group was directly compared the change in intake was only reflected in a differential response in one key biomarker (lutein). This may be owing to the background disease or the low numbers reported to date.

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P 14

Associations between fruit intake and bodyweight management - a review

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Objective: to provide a thorough overview of a possible association between fruit intake and bodyweight.

Methods: literature search with the following inclusion criteria: intervention, prospective observational, and cross-sectional studies with separate analyses of the fruit intake, with bodyweight as the main outcome of interest, and with a study population consisting entirely of adults.

Results: five intervention, nine prospective observational, and three cross-sectional studies met above mentioned inclusion criteria. Four of the intervention studies showed that fruit intake had a reducing effect on bodyweight, five of the prospective observational studies showed that fruit consumption reduced the risk of developing overweight and obesity, and two of the cross-sectional studies found an inverse association between fruit intake and bodyweight. The intervention studies, all consisting of overweight or obese subjects, were either strictly controlled, or were behavioural intervention studies, attempting to alter the whole lifestyle including dietary habits of the intervention group,

Conclusion: the majority of the included studies suggest that fruit intake probably is inversely associated with bodyweight. Making a firm conclusion is difficult, as most studies focus on fruit intake together with various other dietary and lifestyle factors and their associations with bodyweight. Thus, additional intervention studies among free-living overweight or obese subjects, focusing on the effect of fruit intake alone on bodyweight are required in order to establish a more firm conclusion.

P 15

Fruit and vegetable-rich dietary patterns and risk all cause mortality and cancer incidence in the Iowa Women's Health Study

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Objectives: Correlation among dietary constituents and interactions among multiple nutrients indicate advantages for a patterns approach, rather than a reductionist, single-nutrient approach, to studies of diet and chronic disease.

Methodology: The Iowa Women's Health Study cohort was comprised of 38,740 Iowa women who completed a 127-item food frequency questionnaire in 1986. Principal components factor analysis identified two primary dietary patterns. On the first factor, vegetables, lean meats, and fruits heavy positive loadings. On the second, skim milk, breakfast cereals and whole grains loaded positively while fried potatoes, pizza, sweets, and fatty meats had negative loadings. Registry linkage identified 11,873 deaths and 8,887 cases of incident cancer through 2004. We used multivariable-adjusted, proportional hazards regression to estimate hazard ratios for total mortality and total cancer incidence by quintile of factor score for each of the factors.

Results: Women in the top quintile of factor scores for both factor 1 and factor 2 had modest but statistically significant reductions in multivariable-adjusted risk of total mortality compared to women in the bottom quintile (HR = 0.92, 95% CI 0.87-0.98 for factor 1; HR = 0.90, 95% CI 0.85-0.95 for factor 2). The top quintile of factor score for each factor was also associated with a modest, though non-significant reduction in total cancer incidence (HR = 0.96, 95% CI 0.90-1.03 for factor 1; HR = 0.94, 95% CI 0.87-1.00 for factor 2).

Conclusions: Dietary patterns rich in vegetables, lean meats and fruits as well as patterns typified by high skim milk, breakfast cereal, and whole grain intake but low fried potato, pizza, sweets, and fatty meat intake were associated with modest reductions in total cancer incidence. Most importantly, they were also independently associated with a statistically significant, 8-10% reduction in total mortality among Iowa women during 18 years of follow-up.

P 16

Cultural adaptation of IDEFICS intervention in Hungary

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Objectives: The IDEFICS (Identification and prevention of Dietary and lifestyle-induced health EFfects In Children and infantS) is a five-year multicentre study supported by FP6/EU targeting the widest perspective of childhood obesity. Based upon baseline survey, a comprehensive 2-years intervention plan was elaborated which is the subject of local cultural adaptation in the 8 survey centres.

Method: Hereby we focused on children's snacking behaviour surveyed by parental questionnaire as the plasticity of this habit offers wider perspective for intervention than school meals (for day-boarder children the 65% of total calorie intake is determined by child-care or educational institutions) or family meals (strong tradition of Hungarian kitchen).

Results: In the 3-days dietary recall of the 387 3-8-years-old children the parents reported 2,6±1,6 occasions of fruit and 2,7±1,9 of confectionary and savoury snacks consumption.

Parents with lower socio-economic status (SES) tended more to agree that TV food advertising is a good source of information and assists parents to achieve healthy diet ($p < .01$). Their children consumed less fruit ($p < .05$) while there was no significant difference in energy-dense, nutrient-poor snacking.

Conclusion: Among the IDEFICS survey centres Hungary has the 2nd lowest (WHO-HFA database) fruit consumption and the trend is just the opposite as in the EU15: according to Hungarian national data the fruit consumption per capita has decreased by 7,2% in the past 5 years. Our focus group investigations demonstrated that lower SES families are more vulnerable to real and perceived psychological imperatives of consumption, and attribute "sign-value" of social status to highly-advertised goods, even to those as a snack; while they don't label fruits so. It is especially so in the relatively new market economy of Hungary. The survey data reinforced these findings and underlined the importance of this aspect in the course of the cultural adaptation of the common intervention frame.

P 17

Potential of spectral methods to monitor nutritional quality changes in processed vegetables

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The nutritional quality and the health value of vegetables may be altered by cooking processes. The hydrosoluble vitamins such as vitamin C, and oxidable microconstituents, like polyphenols are the most sensitive molecules with nutritional interest. In addition, the neoformed contaminants, carboxymethyllysine (CML) and furane, essentially formed from vitaminC oxidation during processing, must also be monitored as indicators of the food safety. The time temperature parameters, the cooking technology, steam or in water, and the stabilization process, pasteurization or sterilization, are the main influencing factors.

The present study proposes to apply two spectral techniques, front face fluorescence and diffuse transmittance and reflectance to monitor globally the physicochemical changes occuring in the vegetable during processing. The spectral signature obtained from the samples gives a very sensitive information on the impact of the process on the food nutritional quality. Furthermore the approach is rapid and non destructive. Based on chemometrical tools (partial least square regressions and multilinear regressions on the scores of fluorescence PARAFAC decomposition factors over chemical data), accurate prediction of the nutritional indicators and neoformed contaminants from the spectral data is possible.

Green beans were cooked in a pressure autocooker at various times to perform kinetic analysis. Fresh carrots were pealed, crushed, cooked, smashed, and either pasteurized or in bottle sterilized to produce a stable puree. The samples taken at different process or cooking steps were analyzed for vitamin C, polyphenols, CML and furan using chromatograhic methods. The samples were also analyzed non destructively for UV-visible diffuse transmittance and front face fluorescence. Data were pretreated and analyzed using multivariate analysis (Matlab) to extract the valuable information regarding food quality changes.

Both vitaminC and diffuse transmittance decreased in green beans with cooking time. The signal related to chlorophyll was the most correlated with vitamin C concentration. Based on both the nutritional indicators and spectral data, the process critical steps of the puree production from fresh carrots were identified to be the cooking and sterilization operations. In the fluorescence fingerprint, chlorophyll signal was the main factor contributing to the regression over neoformed contaminants.

In conclusion, this preliminary approach of the potential of spectral methods to accurately monitor nutritional changes in processed vegetables is very promising. Chlorophyll is the main fluorescent pigment contributing to the information related to nutritional changes.

P 18

An improved experimental approach to distinguish in vivo antioxidant effects of lycopene and tomatoes

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Epidemiological studies have suggested preventive effect of tomatoes on cardiovascular diseases and prostate cancer. Lycopene, the carotenoid pigment conferring the characteristic red colour of tomatoes, has been suspected to be responsible of the effects of tomatoes. In vitro studies indeed showed that lycopene have antioxidant and anti-proliferative activities. However, in animal and human studies, tomatoes intake usually showed higher protective effect on oxidative stress and carcinogenesis. These data have suggested that lycopene may act additionally and/or synergistically with other compounds found in tomatoes. The objective of the present study is to introduce an improved experimental concept to distinguish the effects of lycopene from that of other micronutrients of tomatoes. This concept is based on the use of tomatoes devoid of lycopene, i.e. yellow tomatoes, and to compare its effects from those found with red tomatoes and isolated lycopene.

Male Wistar rats were fed a mildly vitamin E deficient diet supplemented with lyophilisates of red and yellow tomatoes or beadlets of lycopene. Red tomatoes diet contained a same amount of lycopene than lycopene diet. Yellow tomatoes diet had been adjusted on the weight ratio to the red tomatoes. After 6 weeks, the rats were sacrificed and oxidative stress related parameters were evaluated in the 4 groups of rats. Plasma and liver level of lycopene were similar in both red tomatoes and lycopene groups. No lycopene was detected in rats fed yellow tomatoes. The most important change was observed at the level of peroxidized lipids in the cardiac tissue. Lycopene supplementation did not reduce that level when compared to control animals. Whereas rats fed yellow and red tomatoes had significantly lower levels that the other groups. These data clearly show that tomatoes, whether or not containing lycopene, had higher capacity to protect against oxidative stress. Our data first show that, other nutrients than lycopene can be involved to explain preventive/protective effects described for whole tomato consumption.

P 19

Comparison of lycopene and tomato intake by healthy volunteers on in vivo bioavailability of lycopene and ex vivo on and prostate cancer cell proliferation

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Cohort studies suggested that men with higher intake of tomatoes and tomato products have a lower risk of prostate cancer (PCa). Lycopene, an antioxidant and antiproliferative carotenoid, has been hypothesized to be responsible for the health benefits of tomatoes. However, studies demonstrated a higher potential of tomatoes compared to lycopene to reduce oxidative stress or carcinogenesis in vivo. Our goal is to distinguish lycopene effect from that of tomato on PCa. For that purpose thirty healthy men (50-70 years) were randomized in two groups. After a lycopene depletion period (2 weeks), the volunteers tested either a supplementation with red tomato paste or yellow tomato paste (200 g/day/1 week). After a novel depletion period (2 weeks), the regimens were inverted. Then, after a last depletion period (2 weeks), group 1 received lycopene pills at he same level than with red tomato paste (16 mg/day/1 week). Group 2 received a placebo pill. Our experimental strategy permits us to significantly modulate plasma lycopene levels. In our healthy individuals, serum PSA and IGF1 levels were not significantly modified by tomato supplementation. Ex vivo proliferation studies with prostatic cell line (LnCaP) supplemented with 10% of human serum showed no modification whether ort not these serum have been nutritionally enriched with lycopene. However, in serum free culture, addition of lycopene is able to inhibit cellular proliferation at physiological concentration. Altogether, these data indicate that human serums already contain anti-proliferative molecules that mask potential effects of lycopene and/or other micronutrients from tomatoes.

P 20

Interventions and actions for the promotion of the F&V

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Objectives and methods: The international recommendations of consumption of fruits and vegetables are of at least 400g per capita a day that is 5 portions a day. To bring the consumers to get closer to these recommendations, a number of interventions were set up, with more or less success. The synthesis of the international scientific literature on this question (about one hundred recent articles) allows to list the different types of interventions and to see their effectiveness.

Results: Interventions are divided into three types.

1- Those which aim at the individual, his preferences and motivations (nutritional education, informational marketing and campaigns "5 a day"). They improve knowledge and attitudes, but have a weak impact on the behaviours, except when they are much targeted, relayed by several actors, and object of attendant measures. The passage to the act is restricted by a constrained environment or because FL is not part of the food repertory of population. Recommendations in terms of frequencies of consumption are more effective than those bearing on the quantities. The recommendation "5 a day" is therefore relevant although not always understood, because the interindividual variations are more linked to frequency than with the size of the portions. The underprivileged populations are often unable to put into practice the recommendations. These have to be accompanied by actions on their environment, otherwise they will remain vain.

2- Those which touch the environment of the consumer (bearing on the access to products or prices). They appear more effective than the first. Actions in school are encouraging, especially if they include the family. Interventions on prices are effective short-term in controlled surroundings (restaurant, canteen), but not very stable. Distribution of food stamps for the underprivileged populations is efficient only so supplemented by nutritional education and by advices of use.

3- Those which combine the action on the individual and his environment. They are most effective especially if they are local (on a community or city scale for instance).

Conclusions: Whatever the intervention, the improvement of consumption is modest: it goes from 0,2 to 1 additional portion per capita per day. That edge seems not much but constitutes a supplement of not negligible market for the producers.

* This analysis is inspired by collective expertise INRA "Fruit and Vegetables in food; stakes and determinants of consu

P 21

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Influence of individual coaching on fruit and vegetable intake in low consumers. Fleubaix Laventie Ville sante 3 (FLVS 3) study

Aim of the study: To assess the response of low consumers of fruit and vegetables to an individual coaching program

Design and methods: Subjects were 1421 adults aged 18-74 y volunteers to participate in a health promotion study. At baseline a questionnaire about life style, including a short food frequency questionnaire was administered data were complete for 909 subjects. An individual coaching aiming to increase fruit and vegetable intake was proposed to participants consuming less than 3 servings of food and vegetable per day. The coaching consisted in monthly telephone and home counselling sessions with a health adviser and lasted one year. Six months after the end of the coaching the same questionnaire was administered to the population. Social position was assessed by education level (3 levels≤ 8 years of education, 9-12 years of education), 13 years of education). Comparisons were made by variance analysis taking into account educational level.

Results: 810 subjects (89%) consumed less than 3 servings a day. They were younger than the whole population (p<0,001). At baseline, mean serving was 1,2/day, it was lower in low social class p<0,001) ; 18 month later, there was an increase of intake (1,8/day). The effect of coaching did not differ between social classes.

Conclusion: The intervention was successful in promoting increase in fruit and vegetable consumption. This study suggests that individual counselling improve consumption independently of educational level.

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Fruit and vegetable consumption among Puerto Rican children: discrepancies with perceived dietary adequacy

Hispanic children have a higher prevalence of overweight than other ethnic groups. In Puerto Rico, childhood overweight has dramatically increased over the past decades. Dietary practices are important risk factors for childhood obesity, particularly a low consumption of fruits and vegetables. In Puerto Rico, nutritional studies are scarce, particularly among children. This study measured fruit and vegetable intake among elementary school children and their perceptions of consumption adequacy and weight status. A representative sample of first to sixth grade students from public and private schools in Cayey, Puerto Rico, was selected using a two-stage stratified cluster sampling design. A validated questionnaire on lifestyle practices of children, including dietary and physical activity practices was administered. Half (51%) of the students were males with a mean age of 9±2 years. Preliminary results show that most children (75%) felt they ate healthy whereas only 15% considered themselves overweight. About 18% of those who reported eating healthy were self-reported overweight students. In addition, more males than females (84% vs 79%) reported eating healthy. Almost all students (97%) expressed liking fruits, but only half (51%) liked vegetables. Less than a third of the students reported eating fruits (30%) everyday, 25% of which consumed them only once daily. About 9% ate vegetables daily, 44% of which ate them merely once a day. When consuming these foods, only 22% ate a combination of fruits and/or vegetables at least 5 times during the day, the recommended consumption, with more females than males (28% vs. 17%) in compliance; only 26% of those who reported eating healthy and 43% of those overweight were in compliance. This study is the first one conducted in Puerto Rico that provides quantitative data on fruit and vegetable intake among children and highlights the discrepancy between actual consumption with their perceived compliance with nutritional recommendations.

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Fruits and vegetables consumption patterns and the nutrition transition in Morocco

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Morocco a Mediterranean country once known for its high consumption of fruits and vegetables is undergoing the stage of the nutrition transition. Indeed, undernutrition and especially micronutrient nutrition deficiencies are still an overload with the emerging of the burden of chronic disease amplified by dysnutrition.

Average Fruits and Vegetables per capita consumption raised from 398 to 484 g per capita per day in the last fifty years of the last century (1985- 2001). While this pattern is close to the average figure recommended, vegetables constitute 77% of the intake. Fruits consumption has gone up significantly in rural areas and caught up the urban daily consumption figure of 100 g.

However the inter socio-economic strata differences are wide and high income households more than double the Fruit consumption of the limited income ones.

Another characteristic of the F&V consumption in Morocco is the concentration. Theses items are mainly consumed at lunch, rarely in dinner and very rarely at snacks. This food habits is worth more research especially in School age children where stunting and anaemia prevalence are still high.

In this paper we will discuss the relationship of Fruits and vegetables consumption with the prevalence's of obesity and cardiovascular diseases at the national level besides some results on micronutrients deficiencies in relation to food diversity scores (Fruit and legumes frequencies) at the regional level from a sartorial survey in the region of Kenitra.

Key words: Fruits, Vegetables, Morocco, Nutrition, Transition

P 24

Protective role of Raphanus sativus extract against Fusarium graminearum growth and Zearalenone production in maize powder

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Raphanus sativus (radish) is a crucifer species, which include widely consumed vegetables, distributed in Asia, Africa and Europe and is a rich source of bioactive molecules including, flavonoids, glucosinolates, isothiocyanates, anthocyanins and phenols. In the present study, an attempt was made to evaluate the antifungal and antioxidant properties of R. sativus. Concentrated and vacuum dried methanol extract from roots and aerial parts of R. sativus was tested for the inhibition of Fusarium graminearum and Zearalenone (ZEN) production using maize powder as a model food system and ZEN was estimated by HPLC. At the concentrations between 500 and 1500 mg/l of R. sativus extract, the relative ZEN inhibition was higher than the growth inhibition. At 2000 mg/l the ZEN production was completely inhibited and the minimum inhibitory concentration of the extract comprised between 125 and 150 mgml-1. In addition to antifungal activity, the extract showed an important free radical scavenging activity towards the 1,1-diphenyl-2-picrylhydrazyl (DPPH) free radical. R. sativus extract showed 64.9 % antioxidant activity at 30 µgml-1 in DPPH model systems. The major compounds present in the methanolic radish extract were phenols including gallic acid, ferulic acid, isoferulic acid, sinapic acid, methyl ferulate, and methylsinapate as confirmed by fractionation using HPLC. R. sativus extract has both antifungal and antioxidant properties and has a potential for use as a biopreservative in food applications and radical scavengers.

Keywords: Raphanus sativus, Zearalenone, Antioxidants, Free Radicals, antifungal and phenols

P 25

Evidence review of the effectiveness of technology-based methods for dietary assessment of fruit and vegetable consumption

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Diets high in fruits and vegetable consumption are associated with a decrease in overweight and chronic diseases (CDC, 2007). Dietary factors are linked to 4 of the 10 leading causes of death--cardiovascular disease, some cancers, stroke, and type 2 diabetes. Accurately measuring dietary patterns is replete with challenges. Measurement of fruit and vegetable intake has traditionally relied on self-report instruments, 24-hour recall, food record, and food frequency questionnaires to record dietary intake. These methods have inherent limitations with reliability and validity and lack sensitivity in detecting small but important changes in fruit and vegetable consumption patterns (Lee & Neiman, 2007; Long, et al., 2006). Promising advances in technology have made possible more sophisticated techniques to measure dietary intake. Computer and web-based programs, hand-held personal digital assistant with camera and telephone care, and photographic and video recording options can reduce the burden of recording what has been consumed and may provide a higher degree of validity in visually determining fruit and vegetable consumption and further study is warranted (Long, et al., 2006; Wang, Kogashiwa, & Kira, 2006; Williamson, et al., 2003). The purpose of this poster is to present a review of the evidence on the effectiveness of technology-based methods for dietary assessment of fruit and vegetable consumption and addresses the following questions: 1) what technology-based methods have been reported for assessing fruit and vegetable intake and with what populations have they been used? 2) What is the reported effectiveness of the technology-based methods for assessment of fruit and vegetable intake? 3) What recommendations may be made for future study of technological applications for measurement of fruit and vegetable intake?

P 26

Impact of mass media exposure on fruit and vegetable consumption among adolescents

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Background and objectives: It is hypothesized that exposure to mass media is an influencing factor on fruit and vegetable consumption with both positive and negative impact, because of its role as a source of nutrition information on the one hand and of food commercials on the other hand. The aim of the present study was to examine associations between exposure to mass media (i.e. radio, TV, newspapers, the internet, periodicals, and booklets) and daily fruit and vegetable consumption among adolescents.

Methods: A sample of 2949 ethnically diverse adolescents with mean age 17.3 years (SD: 1.7) from vocational schools in Vienna, Austria, were studied cross-sectionally between October 2003 and February 2004. A food-frequency questionnaire was used to assess usual fruit and vegetable consumption. Data on mass media exposure and socio-demographic characteristics were collected by means of a self-administered questionnaire. Multiple logistic regression analyses were used to control for potentially confounding variables.

Results: Adolescents who used newspapers, the internet, or booklets as a source of nutrition information were more likely to consume fruit and vegetables on a daily basis. For example, the odds ratio for daily fruit consumption (ORfru) was 1.6 (P<0.001) when the internet was used as a source of nutrition information after adjustment for socio-demographic characteristics (sex, age, and ethnicity), body mass index, and weekly allowance. No such associations were found for radio and TV as sources of nutrition information. A negative impact on both daily fruit and vegetable consumption was found for exposure to radio ads (ORfru: 0.74, P=0.04 and ORveg: 0.67, P=0.03). Exposure to TV ads had a negative impact on vegetable consumption (ORveg: 0.81, P=0.05).

C***onclusion:*** Newspapers, the internet, and booklets as sources of nutrition information are positively associated with daily fruit and vegetable consumption among adolescents, whereas radio ads have a negative impact.

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Promotion of vegetables and fruit consumption in Chile- Progress and sustainability

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Objective: Positioning and sustainability of the five-a-day program in Chile

Methods: 3 millions of informative booklets and leaflets on why and how to consume five servings of F & V were printed during the year 2007, as well as folders, pencils, blocks and magnets to be placed in an easily visible place at home or work. These materials were distributed throughout the country by previously trained professionals, technicians and students at the public Health Centers, schools and supermarkets. The first communication campaign carried out on February, 2007 was designed to raise awareness and to motivate population to increase their fruits and vegetables consumption. Radio was the main media on which a jingle was aired on six private stations 6 times a day, which also was broadcast through 190 rural stations of the Ministry of Agriculture. Advertising and articles in newspapers and magazines was used as a complementary media. Furthermore glass rear windows of 210 cars were labeled. This campaign was evaluated by a research project conducted by the authors.

Results: There is a network of trained and motivated professionals, technicians and students from health and education sectors who are promoting the vegetables and fruits consumption in their fields, using the materials mentioned above. The campaign evaluation has shown an increase in the knowledge level of the five-a-day concept and in the intention to increase consumption of vegetables and fruits.

Conclusion: The success of the 5 Day Program in Chile can be attributed to private, public and academic coordinated and effective participation.

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Evaluation of an educational campaign to promote the consumption of fruits and vegetables in healthy adults

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Objective: To evaluate the impact of a campaign promoting the consumption of fruits and vegetables (F&V), by providing educational materials with verbal explanation, on changes in dietary habits using a food frequency questionnaire.

Methods: Participants were 1,897 adults from 17-60 years, users of public health care centers and supermarkets, from low-middle socio-economic status and from urban areas of the Metropolitan Region of Chile. Participants were distributed into three intervention groups receiving: 1) educational materials and verbal explanation, 2) educational materials, and 3) no intervention (control group). Educational materials were designed and validated to promote the consumption of F&V among population. Pre-intervention, all participants responded to a face-to-face questionnaire designed and approved for the "5-a-Day" Program, including questions related to knowledge of the "5-a-Day" message and stage of change with respect to F&V consumption. One year post-intervention, a follow-up telephone questionnaire was conducted in 915 participants. A descriptive analysis was carried out for all variables studied. Tests of symmetry and association between baseline and follow-up were carried out.

Results and conclusions: F&V consumption was lower than recommended in all groups. At baseline 58.7% reported consuming 1-2 portions/day and 48.6% 3-4 portions/day; the latter increased to 51.4% post-intervention. At baseline, lack of knowledge of recommended daily F&V consumption was observed; 74.3% considered that their daily consumption was adequate. The proportion of participants who had heard the "5-a-Day" message increased significantly post-intervention, increasing from 11.4% to 79.2% and 9.1% to 70.7% in groups 1 and 2 respectively. Knowledge of recommended number of daily F&V servings increased in groups 1 and 2 (from 3.5 to 4). An increase in reported intention to consume more F&V in the following month was also observed; from 75.9% to 89.4%, 77.9% to 84.5% and 69.8% to 80.6% in groups 1, 2 and control respectively.

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Chilean Ministry of Health Campaign against childhood obesity

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The Chilean sanitary target by the end of 2010 will be the reduction of the obesity and overweight, on children under six year old, from the actual 16 % to 12 %.

Many researches points out that TV programs have the major communication impact in changing children consuming behavior. To work with this principle, we choose a cartoon called "PULENTOS". "PULENTOS" is a high rating TV program for children between 4 to 8 years old. This cartoon referred to a kids' group of 5 hip-hop musicians. The lyrics and the music are simple and easy to remember for our target. We created a "Team Pulentos", a traveling show, with songs of health, games, posters and gifts, complementary to the TV series. The Ministry of Health created and developed a strategy of social public communications, centered in the 370 poorest public schools, to change life and feed behavior.

Objective: One objective is to improve health food habits and sport activities of our kids, through simple and easy to remember language. Consuming fruit and vegetable is another relevant objective included.

Methods: Health food consumption behavior was made through educative messages, encouraging fruits and vegetables consumption, which were spread out in songs and games. Until now, we have carried out 370 visits all over the country. These activities where supported with mass media planning, based on "Pulentos" TV show. Also was reinforcing by web-mail http://www.vivirsanoespulento.cl/, health games, food recipes and counseling of good health. In every visit we give posters, collection cards, mugs for milk or water, and others.

Results:

-370 meetings with 96.000 kids.

-Job ventures with Ministries of health, education and sports.

-Laws and regulations over what is called Junk Food

Conclusions: It is possible to educate children, in health food and active life, though TV series targeted to this groups, adding health life habits to their traditional themes, by means of government campaigns, coordinated with the producers, publicists and the media.

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Go for 2&5® to increase fruit and vegetable consumption –evaluation of a population based social marketing campaign

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Objective: The Go for 2&5® social marketing campaign aimed to increase adults' awareness of the need to eat more fruit and vegetables and encourage increased consumption.

Intervention: The Department of Health in Western Australia developed and implemented the multi-strategy fruit and vegetable social marketing campaign from 2002 to 2005. The population based social marketing campaign targeted adults, the Western Australia population was over two million in 2005. Strategies included mass media advertising (television, radio, press and point-of-sale), public relations events, publications, a website (www.gofor2and5.com), and school and community activities. The prescriptive Go for 2&5® message addressed fruit and vegetables separately and specified optimal intake.

Methodology: Two independent telephone surveys evaluated the campaign. The Campaign Tracking Survey interviewed 5032 adults to monitor self-reported attitudes towards fruit and vegetable and consumption prior to, during and 12 months after the campaign. The Department of Health's Health & Wellbeing Surveillance System surveyed 17 993 adults between 2001 and 2006 monitoring self-reported consumption.

Results: The campaign reach was high, with 90% of the target audience aware of the campaign during the three implementations and 78% awareness one-year post intervention. Awareness of the recommended servings of fruit and vegetables increased from 78% to 90% for fruit and 20% to 47% for vegetables. There was a population net increase of 0.8 in the mean number of servings of fruit and vegetables per day over three years (0.2 for fruit (1.6 in 2002 to 1.8 in 2005) and 0.6 for vegetables (2.6 in 2002 to 3.2 in 2005), significant at $P<0.05$)(1).

Conclusion: Sustained, well-executed social marketing improved knowledge of recommended servings of fruit and vegetables, attitudes towards fruit and vegetables, and changed behaviour, particularly for vegetables. The Go for 2&5® campaign provides guidance to future nutrition promotion through social marketing and has been adopted as Australia's national campaign

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Recipes for success! Translating Australian government policy into nutrition criteria to promote fruit and vegetables

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Objective: To develop nutrition criteria to encourage fruit and vegetable consumption consistent with Australian dietary guidelines for use in the Go for 2&5® social marketing campaign (1).

Method: Dietary policies and guidelines(2-5), food selection guides(6), nutrient targets, existing consumer education programs nutrition criteria, food habits, and eating styles from Australiaand elsewhere were reviewed to develop nutrition recipe criteria. The criteria were then used to assess 128 recipes currently used to promote fruit and vegetables at point-of-sale. Recipes were assessed against criterion for fat, sodium, fibre, energy, added sugar, fruit, vegetables, cereal and dairy foods content/per serve.

Results: Recipe nutrition criteria were devised for main meals; light meals (includes breakfast); soups; salads; side dishes; snacks (includes drinks); desserts; bakery and basic ingredients (e.g. stocks, dips and sauces) recipe categories. Of the 128 recipes evaluated against the nutrition criteria, almost ¾ failed. Excess fat (45%) and sodium (30%), and inadequate cereal (24%) were the main reasons recipes did not meet the criteria. Minor modifications to recipes were required to meet the criteria.

Conclusions: The Go for 2&5® nutrition criteria started with the inclusion of fruit and vegetables as key criterion. This is consistent with the categorization of these foods in other food categorization systems(7). 'Healthy' recipes promoting fruit and vegetables were often high in fat and sodium and low in cereal foods. Nutrition criteria developed for this study provided a practical way of assessing specific meals and snacks according to the dietary guidelines making them suitable for nutrition promotions encouraging fruit and vegetable consumption(8). Simple guidelines assisting recipe developers to prepare recipes consistent with Australian Dietary guidelines are presented.

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Characterization of antioxidant profile in biodynamic and conventional strawberries (Fragaria ananassa, cv. Favette)

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Nowadays organic and biodynamic agricultural practices are gaining increasing attention for their impact on food quality and healthfulness. Strawberries (Fragaria ananassa, cv. Favette) coming from southern Lazio (Latina) and cultivated by conventional and biodynamic agronomic systems were studied for their antioxidant profile. The influence of the cultivation techniques on bioactive molecules was investigated, the cultivar and pedoclimatic conditions being unaltered.

Ascorbic and dehydroascorbic acids (DHA), phenolic acids (gallic, caffeic, p-coumaric, ferulic, cinnamic, chlorogenic, ellagic) and flavonols (myricetin, quercetin, kaempferol) were determined by RP-HPLC in both strawberry samples. The total antioxidant activity was evaluated by colorimetric methods (ABTS and FRAP).

Biodynamic strawberries exhibited a much higher content in ascorbic acid (51 mg/100 g) respect to conventional samples (39 mg/100g), while DHA was found quite similar and detected in considerably low amount in both samples. The total contents of the phenolic compounds studied were slightly higher in conventionally cultivated strawberries (18 mg/100 g) compared to the biodynamic ones (16 mg/100 g). However, caffeic, ferulic, cinnamic, chlorogenic and ellagic acid concentrations were higher in biodynamic strawberries respect to conventional samples which showed, on the other hand, a higher content in gallic acid, quercetin and kaempferol. Results from total antioxidant activity evaluation were found comparable both in biodynamic and conventionally cultivated samples.

Our findings suggest that antioxidant molecule concentrations were affected by different cultivation techniques, ascorbic acid being the most sensitive compound. However, no clear correlation was found for phenolic compounds. Therefore further studies are necessary to explain the observed differences in phenolic antioxidant profile.

Acknowledgment: This study was carried out in the frame of the Project "BIOAGRIBIO" supported by Mipaaf.

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Ascorbic acid, dehydroascorbic acid and antioxidant activity in Kiwifruit (PGI Latina) (Actinidia chinensis, Planch) in relation to cultivation method and genotype

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Kiwi fruit (Actinidia chinensis, Planch) is extensively grown in center Italy (Lazio) and received the attribution of PGI (Protected Geographycal Indication) according to Council Regulation (EEC). Among bioactive molecules showing antioxidant activity in kiwi ascorbic acid is contained in high concentration. This study was addressed to estimate the concentration of both ascorbic and dehydroascorbic (DHA) acids in kiwi fruit IGP Latina and to study variations in their content in relation to the cultivation methods utilised (T-bar, patio cover) and genotype (Hayward, Cikko, Clone 8). The antioxidant activity of the selected fruits was also evaluated by ABTS and FRAP methods.

Among the three cultivars analysed (Hayward, Cikko, Clone 8), grown under the same cultivation condition (patio cover), both Clone 8 and cv. Cikko showed a slightly higher concentration of ascorbic acid than cv. Hayward. Results showed that the cultural techniques adopted markedly influenced ascorbic acid content, being this vitamin systematically higher ($p<0.001$) in "T-bar" cultivation (from 76 to 88 mg/100g) than that detected in "patio cover" cultivation (about 66 mg/100g). These differences were not evidenced in DHA content. This trend was also confirmed by antioxidant activity evaluation, being it higher in T-bar than in "patio cover" cultivation.

Our findings showed a wide variation in ascorbic acid content among the "T-bar" and "patio cover" kiwi fruit suggesting that cultivation methods turned out of primary importance in influencing its concentration. Genetic factors showed also to be responsible for small differences in ascorbic acid content, this aspect deserves further studies.

This study was carried out in the frame of the Project "QUALKIWI" supported by Mipaaf.

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Antocyanin profile of a local cherry cultivar (Prunus avium L., cv. Mastrantonio) cultivated on the slopes of the Etna volcano in Sicily

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Cherry contains different type of bioactive molecules among these anthocyanins are one of the major class of bioactive molecules showing strong antioxidant properties. In this study a sweet cherries variety (Prunus avium L, cv. Mastrantonio), a cultivar which grows exclusively on the slopes of the Etna volcano in Sicily, was selected to study the influence of pedoclimatic conditions on nutrients, dietary fiber composition and anthocyanins content and profile. The cherries of the cv. Mastrantonio were cultivated in six farms at different altitude. The influence of cultivar, of different level of altitude (200, 300, 600 mt) and ripeness on the antocyanins level was investigated. The chemical characteristics of the cultivar Mastrantonio were compared with those of the cultivar Durona, widespread in Italy, cultivated in the same area at 200m. altitude. The results did not evidence major differences in macronutrients content either among the three cultivations of the cv. Mastrantonio or between the two different cultivars. By contrast the concentration in individual anthocyanins markedly differed among the cultivations of the cv. Mastrantonio; both the anthocyanins profile and concentration between the cv. Mastrantonio and the cultivar utilized as control (cv. Durona) were different as well. The main difference between the two cultivars analysed was the prevalence of individual anthocianins: in the cv. Mastrantonio the main were keracianin and kuromarin, by contrast in the cv. Durona were keracianin and peonidin-3-rutinoside. These differences allow to utilize anthocyanins profile as cultivar markers.

Our findings suggest that genetical and environmental factors, such as cultivar and pedoclimatic conditions, turned out of primary importance in influencing the concentration of anthocyanins in the cherries studied.

This study was carried out in the frame of the Project "QUALKIWI" supported by Mipaaf.

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Uses of some spontaneous fruit in farmer's food in the North of Côte d'Ivoire

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Introduction: There is a diversity of spontaneous food species consumed by local populations in Côte d'Ivoire savannas region. These species contribute meaningful to rural community's food rations balance.

Objective: The goal of this survey was to inventory spontaneous fruit species consumed by the farmers and to value their nutritional contribution for rural communities.

Material and Methods: Some ethnobotanics investigations has been led near agricultural operators chief of 5 villages in Tengrela department in the North of Côte d'Ivoire. Twenty five farmers have been interrogated because of 5 operators by village. An investigation guide has been elaborated on the basis of food species knowledge consumed by the farmers in their farm. A bibliographic survey permitted to surround the nutritional value of each fruit identified.

Results: Many fruit species have been returned regularly in the food of the farmers. Their food habits differ according to the period of the year. They indicated that during the clearing activities of their fields (April - May). The part of fresh fruits as shea, mango and yellow and black plum in the food ration of this period has been estimated has 56,24 %. The use of the fruit juice like saba, tamarind or baobab in association with nereid or millet powder has been valued at 34,46 % and the proportion of the other food as the bean and the yams was about 9,30 %. It is evident from the bibliographic survey that these fruits are rich in glucides, proteins, lipids and vitamins.

Conclusion: The food ration of agriculture operators during clearing farm activities is essentially composed of fruits from spontaneous species. These fruits bring the necessary substances to their nutritional balance during the rustic works.

Key words: Ivory Coast – Farmers - Nutritional contribution - Spontaneous fruits

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Effect of decontamination treatments on the nutrient content and the sensory quality of grated carrots

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Objectives: Besides the effect of decontamination agents on the microbial quality of fresh-cut vegetables, only a limited amount of data is available about their effect on the nutritional value and the sensory quality of grated carrots. Therefore, different sanitizers were examined for their effects on carotenoid content, total phenol content and sensory quality of grated carrots.

Methodology: Carrots (Daucus carota L.) were peeled and grated in sticks. A mass of 100g of carrots was immersed in 1L disinfectant solution for 5 min. Afterwards the excess of surface water was removed by centrifuging during 1 min. The following disinfectant solutions were prepared: sodium hypochlorite (20 and 200 mg/L, pH 6.00), peroxyacetic acid (80 and 250 mg/L) and neutral electrolysed oxidizing water (5 and 30 mg/L free chlorine). The gaseous chlorine dioxide was produced by stripping a 1000 mg/L chlorine dioxide solution. Carrots were treated during 10 min, of which 30s were used to strip, at room temperature and 90% RH. The starting chlorine dioxide concentration in the chamber was 1,10 ± 0,18 mg/L. Carotenoids were extracted and analysed with C30-RP-HPLC coupled with a DAD-detector. For assessing the content of total phenols, the Folin-Ciocalteu method was used. Results were expressed as gallic acid equivalents (GAE) per 100g fresh weight. Triangle tests were conducted to assess the effect on sensory quality.

Results: Water washing already reduced significantly the carotenoid and the total phenol content. The use of chemical sanitizers did not change the phenol content significantly when compared with carrots washed with water. Although the liquid treatments did not have an effect on carotenoid content, a treatment with gaseous chlorine dioxide significantly reduced the carotenoid content, when compared with the water rinsed carrots. The effect on the sensory quality was highly dependent on the used concentration. The low concentration of the liquid agents did not have an effect on the sensory quality, whereas the sensory quality was changed when the high concentration was used. Gaseous chlorine dioxide did not have an effect on the sensory quality.

Conclusion: After a thorough optimization of the decontamination process, an improvement of the microbial quality of fresh-cut carrots could be achieved without adversely affecting the nutrient content and the sensory quality.

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Development of vegetable composition databases based on available data for probabilistic nutrient and contaminant intake assessments

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Objective: Food composition databases are important in (1) comparing the composition of similar foods (e.g. organic versus conventional vegetables) and (2) assessing probabilistically the combined intake of nutrients and contaminants. The purpose of the study was to develop databases of nutrient and contaminant concentrations in organic and conventional vegetables (carrot, tomato, lettuce and spinach) and potato based on secondary data.

Methodology: Nutrient and contaminant data were collected from internationally available sources and stored in separate databases. Collected data were then screened before selection and weighed according to their quality and reliability. The weighing procedure in particular consisted of attributing a weighing factor to each single data point, obtained by multiplying the number of sample units, the number of measurements and a factor for the type of study (paired or not).

Results: Newly compiled databases were obtained with a lot of relevant available information included: commercial and scientific name, origin of the food, production method, culinary processing procedure, number of samples, number of individual sample units per analyzed composite sample, (mean) nutrient or contaminant content with extra statistical data (standard deviation, minimum and maximum) and the analytical method. With the data collected, it becomes possible to describe the variability of the different concentrations, being crucial in a probabilistic intake assessment.

Conclusions: During the compilation of the databases, several problems were encountered due to a lack or inconsistency of information retrieved in available data sources. A major difficulty in this regard is due to the numerous confounding factors (e.g. growing conditions). These factors add to the difficulty in differentiating whether a potential surplus value of organic over conventional vegetables is due to a difference in composition or not. If the quality of the current databases is to be improved, more controlled paired studies and a standardization of the format for reporting is recommended.

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Value creation in fruits and vegetables sector by packaging and consumer's perceptions

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In Tunisia, promoting fruits and vegetable's packaging sector is a new experience. In fact, a national development-research project, co-financed by the Word Bank, has been set in order to develop this new sector. The objective of this work is first to study the supply and demand's evolution of fresh fruits and vegetables, second to identify the packaging firms and to determine the added value of this activity. Finally, an analysis of the consumer's behaviours towards packaged fruits and vegetables is realised.

As a methodology, two surveys were adopted. The first concerns the packaging firms, the second aims to identify the consumer's preferences and their perceptions towards the quality of the packaged products.

The production's expansion (in average, 1,8% for the fruits and 4,4% for the vegetables per year between 1961 and 2003) and the demand's evolution (285Kg/person/year in 2003 against 114 Kg in 1961) justify the value creation by packaging in fruits and vegetables sector. In spite of these results, only five firms are concerned about this activity, where the production is around 2-3 % of the fresh products. The results of the first survey showed that the added value of packaging varies from 0,14 to 0,33€/kg, where the packing represents 60% of the packaging cost and the labour 30%.

The majority of consumers (66%) consider that the packaging is an indicator of the quality but minorities (15%) buy this kind of products. This behaviour is explained by two factors. First, theses products are sold only in supermarkets, which represent 6-12% of the fruit and vegetable's supply. Second, the consumers (75%) don't accept to pay expensively these products.

In conclusion, promoting this sector needs the implication of all the actors in order to reduce the cost production and increase the demand.

Keys words: fruits and vegetables, Tunisia, value creation, packaging, consumer's perceptions.

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Is organic fruit procurement strategies associated with healthier serving practices at school?

First results from a survey among school food coordinators

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Introduction: Fruit supply schemes at school has proven to be effective in increasing fruit intake among children and adolescents at school and can be seen as a healthy eating technology. But schools are increasingly becoming the target of other strategies and technologies such as organic procurement policies, climate friendly foods and more general sustainable consumption strategies. This means that healthy eating strategies seem to be informed also by other priorities and that there might be significant associations between healthy eating and sustainable food polices. Experience based data suggest that the introduction of organic foods induces a changed dietary pattern. O'Doherty et al (2001) suggests that heavy users of organic foods may have a lifestyle and dietary habits that simply comply more easily with nutritional recommendations. Evidence shows that organic procurement policies often result in adoption of nutrition & food polices at local institutions (DFFE, 2005) and it is likely that these can create an organisational environment conducive to healthy eating in public food system. Results from analysis of the German per-capita consumption (Brombacher & Hamm, 1990) show the per-capita-consumption of meat and meat products, of sweets and alcoholic beverages was much lower among heavy-users of organic food than of the average of the German population, and correspondingly their consumption of vegetables and cereals was much higher in that group. There is evidence that there is a relationship between sustainable food consumption and choosing a healthy diet. Mikkelsen et al. (2006) showed that caterers serving organic food serve healthier meals than their non organic counterparts. Thus it seems that "health" and "organic" agenda apparently pull in the same direction.

Aim: This paper investigates the relationship between school fruit schemes and organic food procurement policies. It is based on the first results from a three-country survey in which the association between organic procurement strategies and healthy serving practices at school is studied using school food coordinators in Denmark, Germany and Norway as informants.

Methods: As a first step qualitative interviews were carried out with municipal school food coordinators in Denmark to identify the structural framework of school food provision. Based on these findings a self-administered web based questionnaire was developed. The questionnaire contain questions on school food provision in general, fruit schemes, food & nutrition policies, school health polices, organic supply polices as well as availability of foods expected to be indicators of indicators healthy eating. The project is a part of the iPOPY research project funded through the European Research Arena project CoreOrganic.

Results: The questionnaire is still open and running but first results indicate that there are associations between organic fruit procurement policies and praxis that indicate healthier eating and behaviour at school. More detailed result will be presented.

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The cost of a fresh fruits and vegetables basket within different areas of Greater Quebec City, Canada: Is there disparities?

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Objective: To examine equity in food environment in terms of fresh fruits and vegetables' cost in different areas of Greater Quebec City.

Methodology: Three different types of food stores (supermarket; conventional; fruit store) were visited within four health areas of Greater Quebec City. Stratified random sample of stores was selected according to two levels of urbanization (urban; rural) and regarding the urban, three levels of area's material deprivation. Regular prices of seven fresh FV reflecting the Quebecers' consumption frequency were collected in 42 stores (87% of total stores) within September 17th - 23rd 2007. Analysis of variance and t-tests were performed with SPSS 13.0 to determine the effects of socio-economic areas and types of stores on the cost of a fresh FV basket. Chi-squares were used to examine the distribution of food stores per 10,000 residents by level of urbanization.

Results: Each type of food stores are equally distributed between urban and rural areas. From the final sample of 35 food stores, only the type of food stores had a significant effect on the FV basket mean cost. This was significantly lower in fruit stores (17,49$) than in conventional market (21,28$; p=0,005). The basket cost varies neither by level of material deprivation in the urban area, nor by level of urbanization.

Conclusion: Although coherent with other Canadian studies, the cost of an extensive basket of FV should be examined on a larger area of Greater Quebec City before concluding on disparities in the cost of FV within different areas.

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Consumers' perception of hydroponic tomatoes in producing and customers countries

Objective: To develop hydroponic tomatoes market, it is fundamental to know the feelings of the consumers about tomatoes and soilless tomatoes that mix new technology and health.

The poster presents the behavior and the main attributes in quality of tomatoes and hydroponics tomatoes, for European (France, Germany), Moroccan and Turkish consumers. Do hydroponic products are closely linked with their preoccupations about environment, health and quality?

Methodology: Qualitative surveys were conducted on 100 consumers in each country and data were analyzed by textual analysis software.

Results: The open field round tomatoes are an essential basic product and all the consumers are globally very disappointed by the taste.

For Moroccan consumers, pleasure and good taste stay the main criteria of food choice, in opposite to environmental and health aspects. They have no idea about hydroponic tomatoes. Only traditional ways of production seem to fill up all the conditions of a good product. Urban populations are more sensitive about environmental and health aspects. The labels don't seem important. In Turkey, the most important criteria are color and good aspect. Knowing better the hydroponic tomatoes, they would accept to pay a higher price for them at the condition of very good taste, quality and no defect.

In Europe, vegetable production is increasingly associated with heavy environmental burden regarding water resource depletion and massive use of pesticides as well as high rates of fertilizer applications. The color and the firmness are the most important purchase choice, following by the price. German is more sensitive at the European origin. Hydroponic tomatoes are seen negatively (artificial and industrial). 2/3 of consumers stated not to appreciate the soilless tomato but 80% of products supply on the European market result from the soilless culture. They could consume soilless tomatoes if they are tasty, without pesticide, without GMO and with production according to sound environmental practices. Saving water is not a convinced argument in Germany, contrary to France.

Conclusion: Hydroponic tomatoes are the most consumed but the criteria "soilless product" must not be used as a purchasing argument.

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Valorization of tomato by-products: optimization of lycopene extraction peels lyophilized by combination of solvent mixture - enzymes aided and incorporation into low quality oil in order to raise their nutritional value

Several epidemiological studies have shown the importance of consumption of fruits and vegetables to prevent some diseases such as cardiovascular diseases.

Tomato is one the most important agricultural product around the world and takes an important place in our daily consumption. However, the processing of tomato fruit induces the loss of about 40 % of its total weight as agricultural by-product waste, mainly the skin and grains. Given the richness of tomato skin in carotenoids, in particular, lycopene, this by-product would be a valuable source of natural antioxidants.

In the first part of this study, we aimed to increase the extraction of lycopene from lyophilized tomato skin and tomato pulp by different solvents and by combination solvents and enzymes.

We used a solvent mixture model (hexane/acetone/ethanol) with different proportions. A mixture dominated by hexane and acetone has shown the highest yield on lycopene 889 µg/g tomato skin and the lowest yield was obtained with ethanol alone. The extraction from tomato pulp gave almost the same results for the efficacy of the solvents by with much lower yields on lycopene.

The enzymatic-solvent extraction of lycopene was conducted using pectinase and cellulase and the optimum solvent combination which gave the highest yield. The combination of these two extraction processes significantly increased the yield of extraction of lycopene independently from the type of the starting material.

In the second part, we were interested to use this agro-industrial byproduct to enrich edible oils with carotenoids and phenolics. Thus, tomato peel and purée were co-extracted with refined olive oil, extra virgin olive oil and sunflower oil. Enriched oils were then tested for stability and antioxidant capacity and assessed for acidity, peroxide value, total polyphenol, lycopene and Ð-carotene contents. The incorporation of peel enhanced the concentration of Ð-carotene and lycopene more than tomato purée (1.99 mg of lycopene/100g of oil with 10% peel versus 0.94 mg with 10% tomato purée and 1.06 mg of Ð-carotene/100g of oil with 10% peel versus 0.04 mg with tomato purée). In our oil preparations, only rutin and naringenin, as flavonoids, were detected from the tomato purée and peel. The enriched oils with tomato peels could be a mean to improve the nutritional value of low quality edible oils and as well as new approach to develop new functional foods based on the upgrading of low quality oils and valorization of agro-industrial byproducts.

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Indigenous leafy vegetable diversity and utilization in urban and peri-urban production systems in Côte d'Ivoire

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Indigenous leafy vegetables are important sources of vitamins and essential minerals. They constitute a major diet and an important source of income for the growing resource-poor urban populations in Côte d'Ivoire. However, the limited knowledge on improved agronomic practices combined to the high urban population pressure threatens their development. To promote a sustainable production system, a study was undertaken to assess the diversity of indigenous leafy vegetables in two major cities, Abidjan and Yamoussoukro, in Côte d'Ivoire. The farming practices and the market value of in indigenous leafy vegetables were analyzed. The dry matter content as well as Vitamin C and Phosphorous concentration of each accession were determined. The study revealed a large diversity of indigenous leafy vegetables produced in the urban and peri-urban areas. More than 26 species belonging to 16 botanical families were inventoried. Almost all cultivars were land races and seed production and preservation remain rudimentary. A total of 56 plants accessions were collected. They were classified into annual and perennial plants and are either nutritional or medicinal plants. The farming practices varied with plant species and include pure, mixed and spontaneous cultivation methods. Whereas men dominate the production (80%) sector, the marketing of indigenous leafy vegetables was mainly conducted by women (98%). Based on a combined analysis of production potential, nutritional values and the market value of the accessions, the most important indigenous leafy vegetable species were identified. Three groups of importance and risk levels were identified. A strategy to preserve the indigenous leafy vegetables in Côte d'Ivoire is proposed by, the selection of best types or varieties.

Key words: Indigenous leafy vegetable, diversity, accessions, landraces urban and peri-urban production.

Poster Abstracts Index

Notes

Notes

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