Securing Child Food Safety
A Vital Tool Towards Healthy Ageing

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Introduction

- Nowadays we live, on average, 8 years more than what we used to live back in 1960.
- In the next 4 to 5 decades, the life expectancy is to increase on average by 5 years.
- At the same time birth rates are decreasing and life expectancy is rising.
- Consequently, aged people are increasing and we are facing a demographic ageing almost in the whole Europe.

Dietary patterns and lifestyle factors are associated with mortality from causes such as :

- **coronary diseases,**
- **cardiovascular diseases,**
- **Cancer and**

Chronic diseases such as diabetes

Old age is still associated with illness and dependency and older people feel excluded from employment, from family and community life.

The steadily ageing population is having an impact on

- **public services**
- **finances of health care**
- **pensions and**

Consequently weakens the solidarity between generations.

However

- **Healthy life expectancy is much shorter than life expectancy**
- **it is clear that a healthy population is necessary for a sustainable future and**
- **this can be achieved by reducing preventable diseases**

Prevention

- **should begin early in life**
- **from pregnancy and infancy onwards**
- **Should ultimately aim at continuously reducing and if possible removing exposure to potentially harmful and toxic substances that can hinder healthy ageing**
- **WHO: we can prevent over 45% of colon cancer cases and 38% of breast cancers by making changes in our diet, physical activity and weight control**

- Healthy Ageing is a result of healthy childhood.

- Investing in children's health will reduce NOT ONLY childhood ill health, but Adult chronic diseases, cancer, which take several decades to appear.

- **A healthy Childhood will lead to a healthy adulthood** and promote healthy ageing.

Children and food safety

Children

- are not only small human beings,
- are unique,
- have no control over their food and the environment they live in,
- rely on adults to provide them with a clean environment and safe food,
- are very vulnerable (especially during embryonic and foetal periods).

Children s vulnerability

Children's metabolic pathways especially in the five months are immature. Therefore their detoxification and excretion ability is a lot less than that of adults.

Depending on age, they eat, breath, drink 2 to 5 times more per Kg body weight than adults

Their intake/exposure to toxic chemicals (food, water, environment) is up to 5 times more than adults

Their brain development is completed by 80% by the age of 4

➢**From conception to adolescence rapid growth and development processes occur that can easily be disrupted by exposure to toxic and hazardous chemicals (food contaminants, articles in contact with food, cosmetics, toys, environment).**

➢**New hazards are continuously emerging from industrialisation, increased use of chemicals, new technologies and processess.**

➢**Chemical exposure can lead to neurotoxicity, neurobehavioral and reproductive problems, immune and hormonal disruption , respiratory illnesses and asthma (from air pollution) leading to severe health problems in adult life and cancer.**

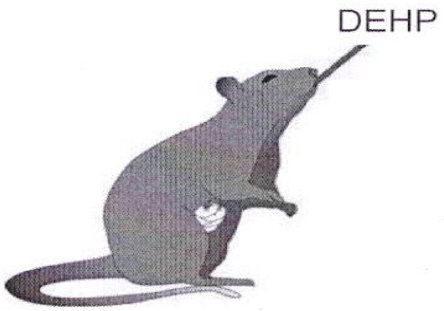
Therefore , public authorities, industry, parents, society bear a heavier burden of responsibility in protecting children from harmful exposure to chemicals thus leading them into healthy ageing.

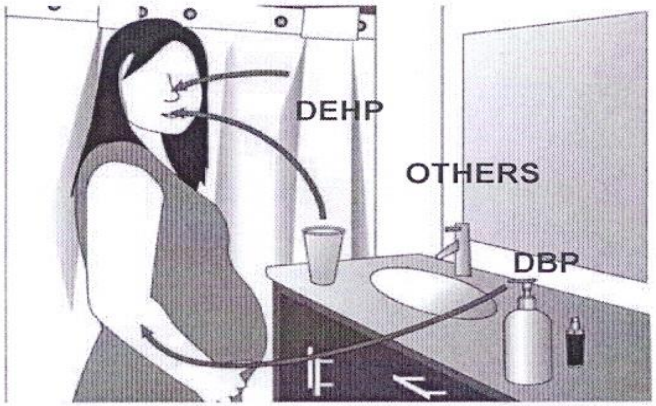
Actions at an EU level

DG SANCO is continuously taking steps towards protecting children from exposure to chemical substances , for example by setting lower and more strict maximum limits for hazardous chemicals in regulations of Foodstuffs, which are more based on Risk Assessment carried out by EFSA(European Food Safety Authority)thus…

EFSA is carrying out an increased number of risk assessments on new as well as known potentially hazardous chemicals with new approaches e.g. cumulative exposures

Current toxicity testing may underestimate risks to people





Single route of exposure	Many routes of exposure
Single chemicals tested	Mixtures of chemicals (including ones we don't know about)

In animal testing when rats are exposed to a mixture of phthalates ,for example ,at levels where each phthalate alone is safe cumulative effects are seen

Examples of new approaches in risk assessment

- Pesticide residues –ACROPOLIS (Aggregate and Cumulative Risk assessment of Pesticides)project

  (Cyprus taking part) including new toxicological testing to identify possible synergistic effects
- Probabilistic approach parallel to the existing deterministic approach.
- Based on existing risk assessment models a number of examples for most frequently found hazardous substances in baby & children' s food are reported in the RASFF system of EU

EU RASSF (Rapid Alert System) on Baby / Adolescent Food / Baby Formulae

Results 1994 - 2011

➢97 Notifications under this specific category

•Pesticide Residues:	19
•Aflatoxins:	15
•Microbiological:	31
•Heavy Metals:	4
•Allergens:	5
•Nitrates:	4
•Others:	19
Total:	97

Objectives of Ministry of Health

Protecting public health-Public health is inherently about identifying and avoiding risks to the health of populations, as well as about identifying and implementing protective measures.

- **Securing preventive monitoring and surveillance food and drinking water programs targeted more towards children.**

- **Coordinating Multi Annual food control programs through The Food Safety Council (under the Ministry of Health) implemented by two of its Departments (Public Health Services and State General Laboratory), as well as the Veterinary Services, Department of Agriculture, Department of Consumer Protection.**
- **Risk assessment is carried out by expert committees under the Food Safety Council.**

Cyprus Multi-annual control plans

- These plans have a proactive element aiming at prevention (samples are taken at critical control points: import, primary storage, factory, market) as far as possible.
- They are based on the requirements of the framework (Regulation (EC) No. 882/2004 etc) and specific EU legislation concerning appropriate frequency and on the categorisation and prioritization of risk

  i.e. vulnerability of the foodstuff to spoilage, information from RASFF system, previous poor results, known safety problems, increased consumption by the consumer-especially high risk and vulnerable population groups (e.g. Children and pregnant women etc.)

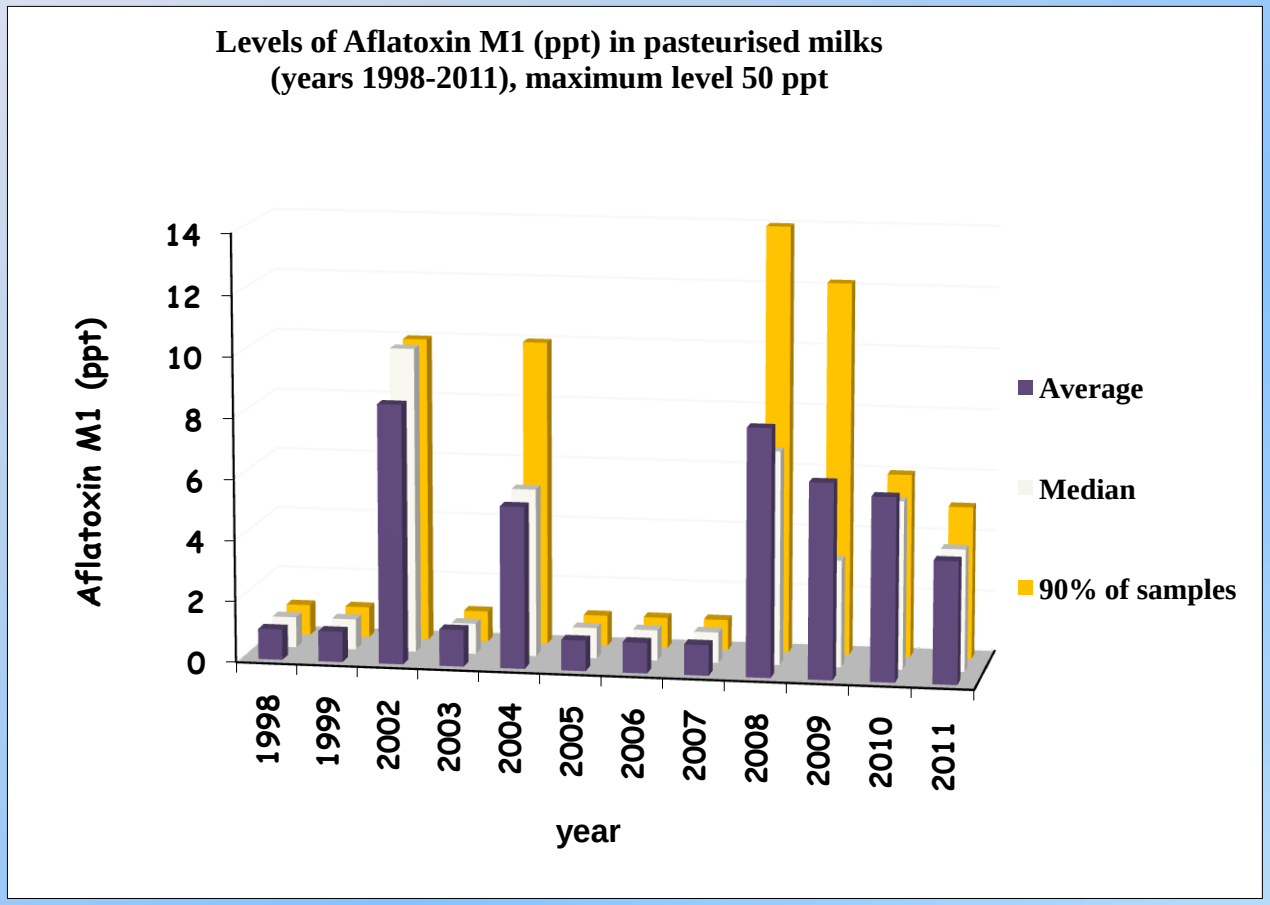
Priorities in control plans are based on prevention

Prioritization is given to:

- Natural Toxins
- Environmental, Industrial and Processing Contaminants
- Endocrine disrupting substances
- Pesticide residues
- Radionuclides
- Food Additives
- Antibiotic Residues
- Microbiological/biological hazards

Natural Toxins as Food contaminants

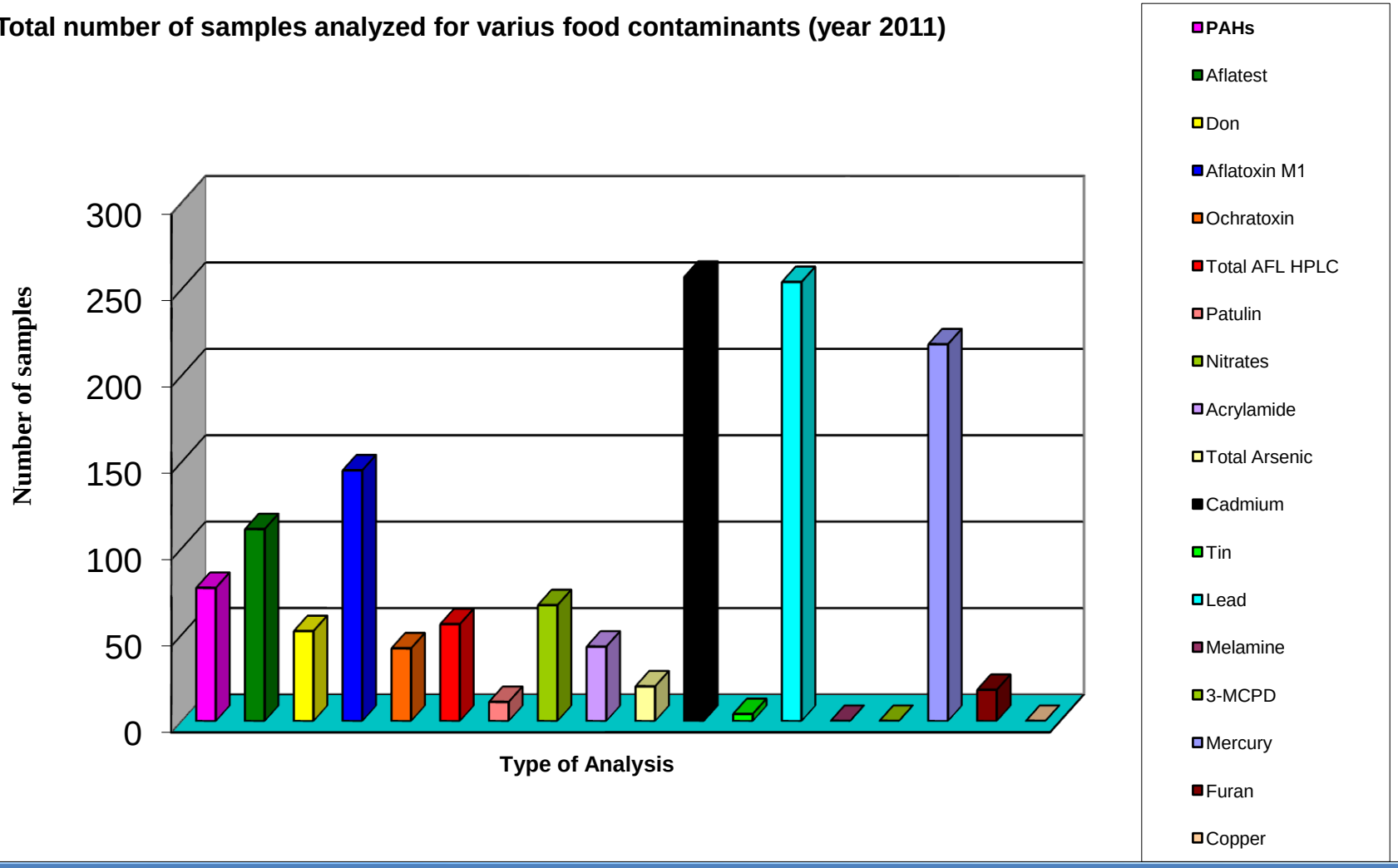
- Mycotoxins & especially Aflatoxins produced by fungi found in cereals, nuts, coffee etc
- Aflatoxins are **genotoxic carcinogens** with Aflatoxin B1 being by far the most toxic compound.
- Aflatoxin M1 is also a human carcinogen. It is a metabolite of Aflatoxin B1 in mammals and may be found in the milk of animals ingesting feed contaminated with Aflatoxin B1.
- These types of contaminants in baby and children's food should **continuously be monitored** and controlled.


Levels of Aflatoxin M1 (ppt) in pasteurised milks
(years 1998-2011), maximum level 50 ppt
Aflatoxin M1 (ppt)
0
2
4
6
8
10
12
14
1998
1999
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
year
Average
Median
90% of samples

- **Industrial/Environmental & Processing contaminants** (furan, acrylamide etc.) which are steadily increasing
- 80,000 chemicals are currently in commerce
- In relative terms, few have been banned (e.g. DDT, Chlordane , some phthalates)
- A wide spectrum of chemicals must be covered in monitoring and surveillance control programs

Several food contaminants

Total number of samples analyzed for varius food contaminants (year 2011)

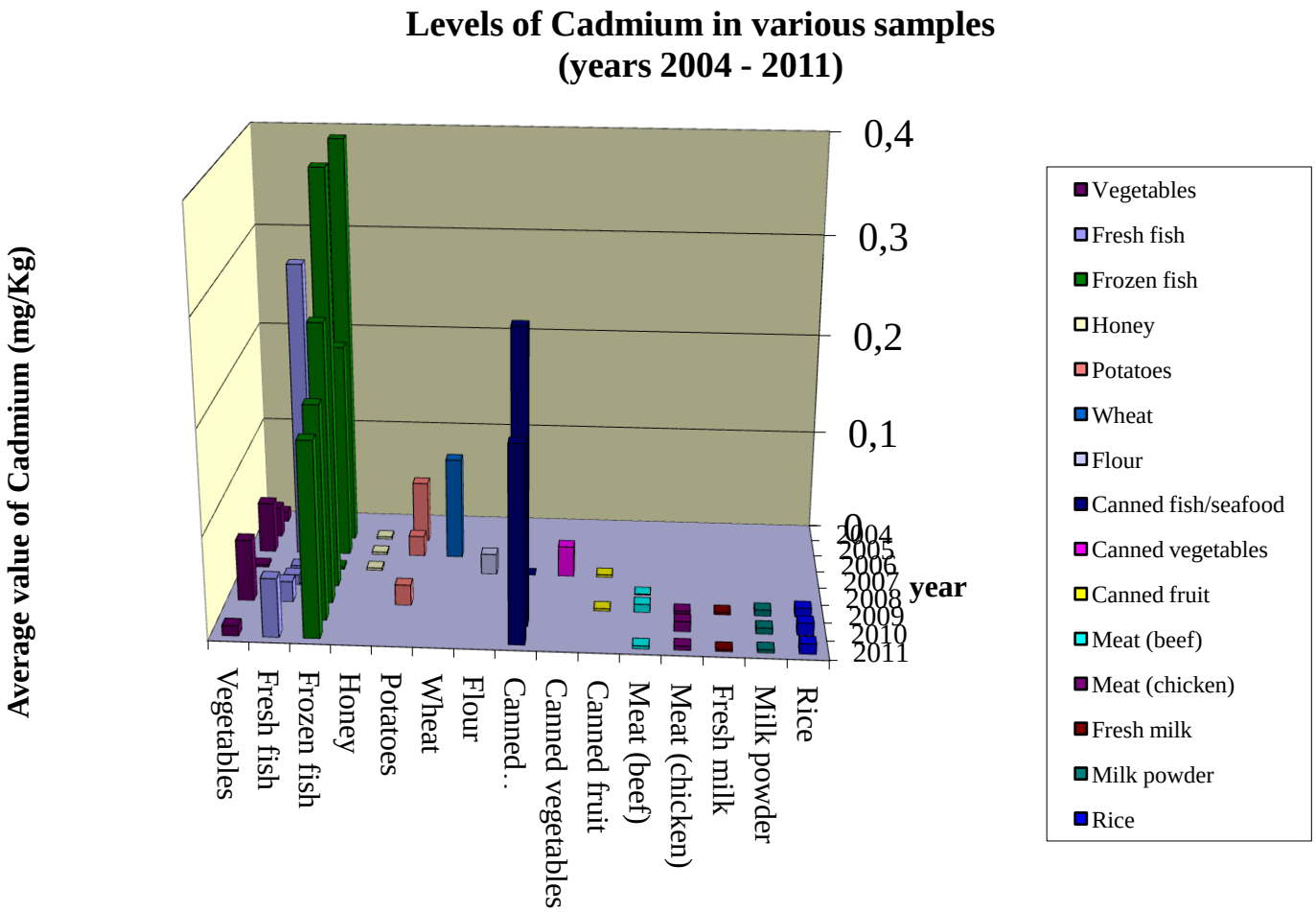


Industrial / Environmental Contaminants

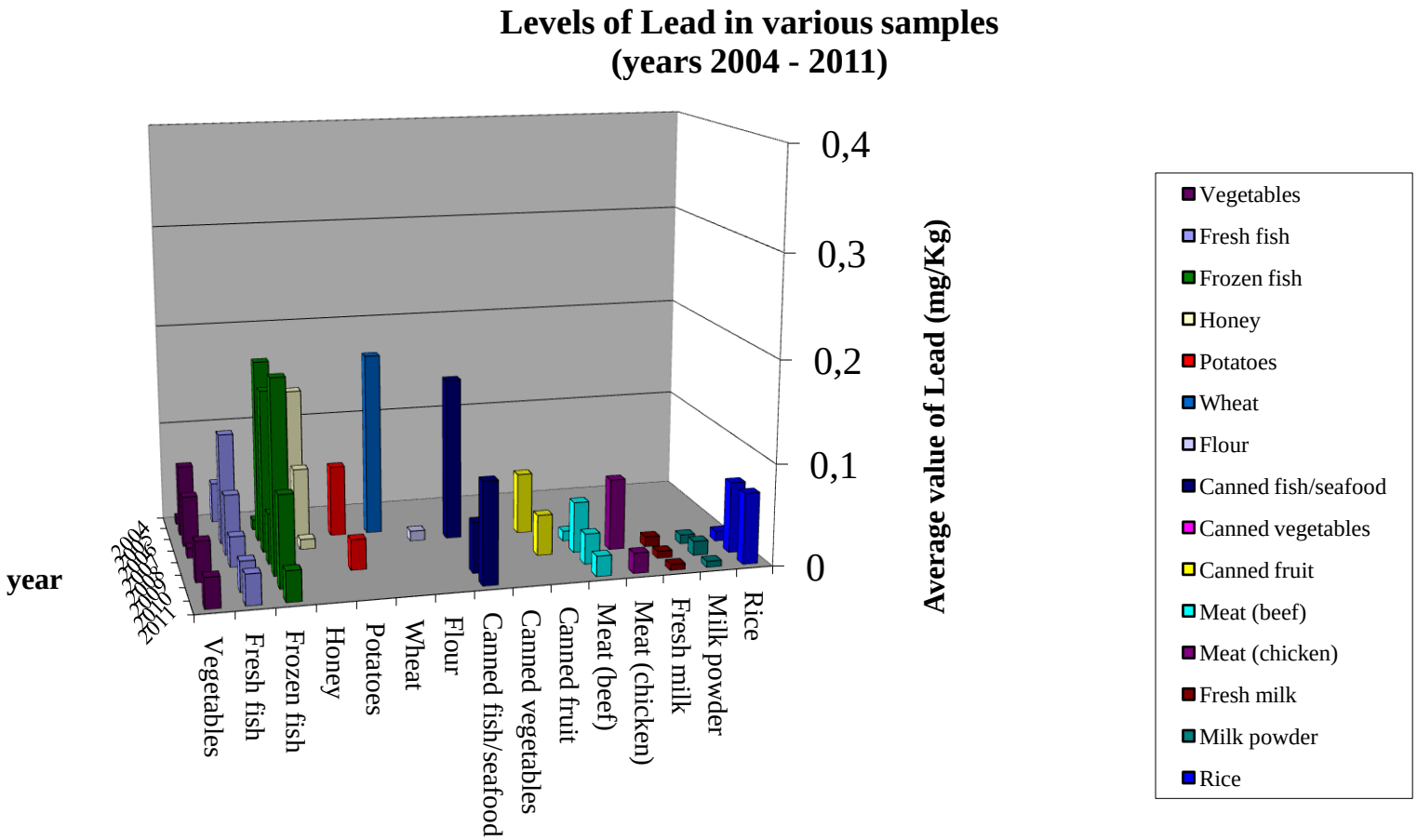
Examples

- **Some metals** can play a vital physiological role in humans e.g. Iron in haemoglobin, copper as an integral part of enzymes, selenium in the enzyme glutathione peroxidase
- **But some heavy metals like Pb, Cd, Hg, As**, as industrial and environmental contaminants , can cause serious harmful effects to public health especially children
- **Cadmium Cd ,**is associated with an increased risk of cancer (lungs, bladder, breast, endometrium) and can cause kidney failure . It can also cause skeletal and cardiovascular problems. Food (especially of grain and plant origin) is the dominating source of human exposure to cadmium and inhalation from cigarette smoking
- **Lead Pb,** is also an environmental contaminant and its past presence in water pipes, paint and petrol increased its general presence. Food is the major source of exposure but toys can also be a contributing factor. Lead affects seriously the developing neural system in young children and its chronic toxicity is of great concern due to its long half life and can have cardiovascular and nephrotoxic effects in adults .

Cadmium Levels in food



Lead Levels in food



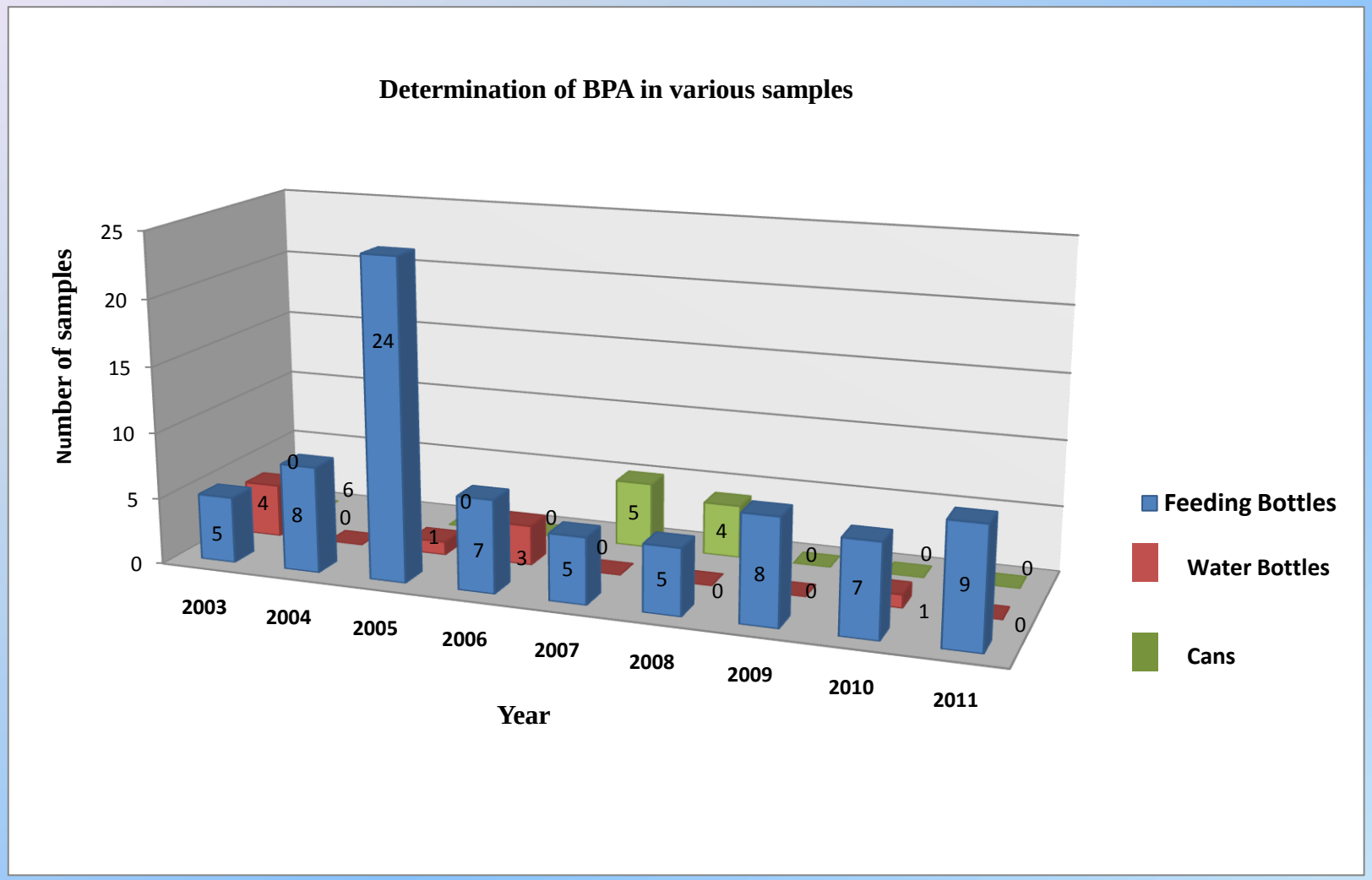
Industrial and Environmental contaminants

- ***Endocrine disruptors EDCs***
- **Health effects of EDCs (DDT, Bisphenol A, some Polychlorinated Biphenyls, Polybrominated Diphenyl Ethers, Phthalates such as in PVC)**
- **Reproductive issues /changes in hormone levels**
- **Reduced fertility**
- **Early puberty**
- **Brain and behavior problems**
- **Impaired immune functions**
- **Various cancers**

Endocrine disruptors

- Bisphenol A BPA-(in 1940 industry discovered that BPA was an excellent hardener of epoxy resins and plastic poly carbonates. Effects on the endocrine system occur at very low doses
- Phthalates in soft plastic articles (PVC) used in contact with food, in cosmetics, in toys

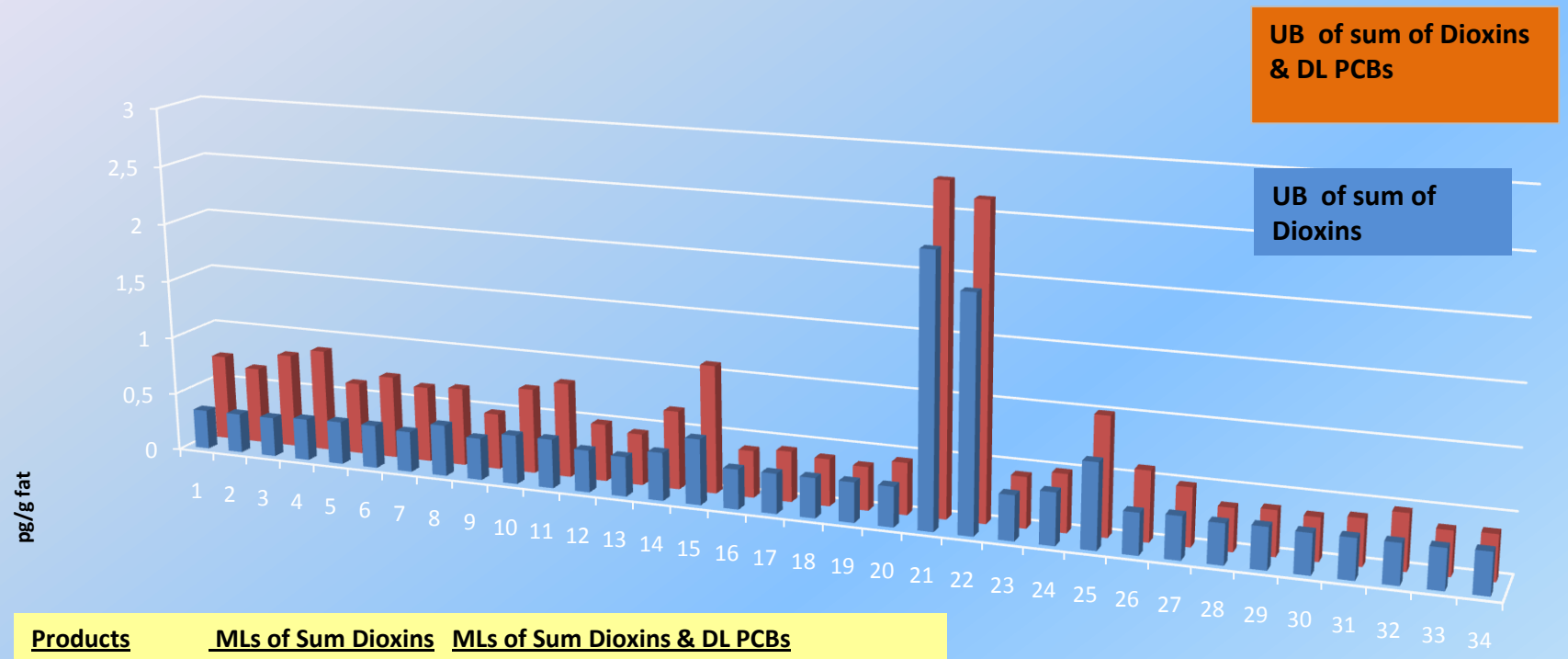
BPA in various samples



Industrial and environmental contaminants

- ***Dioxins and Polychlorinated Biphenyls (PCB's)***
- **are lipophilic and persistant environmental contaminants and linked to adverse effects on nervous, immune and endocrine systems impair reproductive function and may cause cancer.**
- **Fish, meat and dairy products appear to be the highest contributing food groups to dietary exposure**
- **Unlike exposure to lead for example which occurs predominantly in economically disadvantaged families exposure to PCB's and Dioxins (highly toxic and genotoxic) is unrelated to socioeconomic status as they are found in types of food more highly consumed by such families fish (salmon), butter, cheese, fatty meats, milk etc**

Results of Dioxin and DL- PCBs in Animal Origin products expressed in pg/g fat for the year 2011

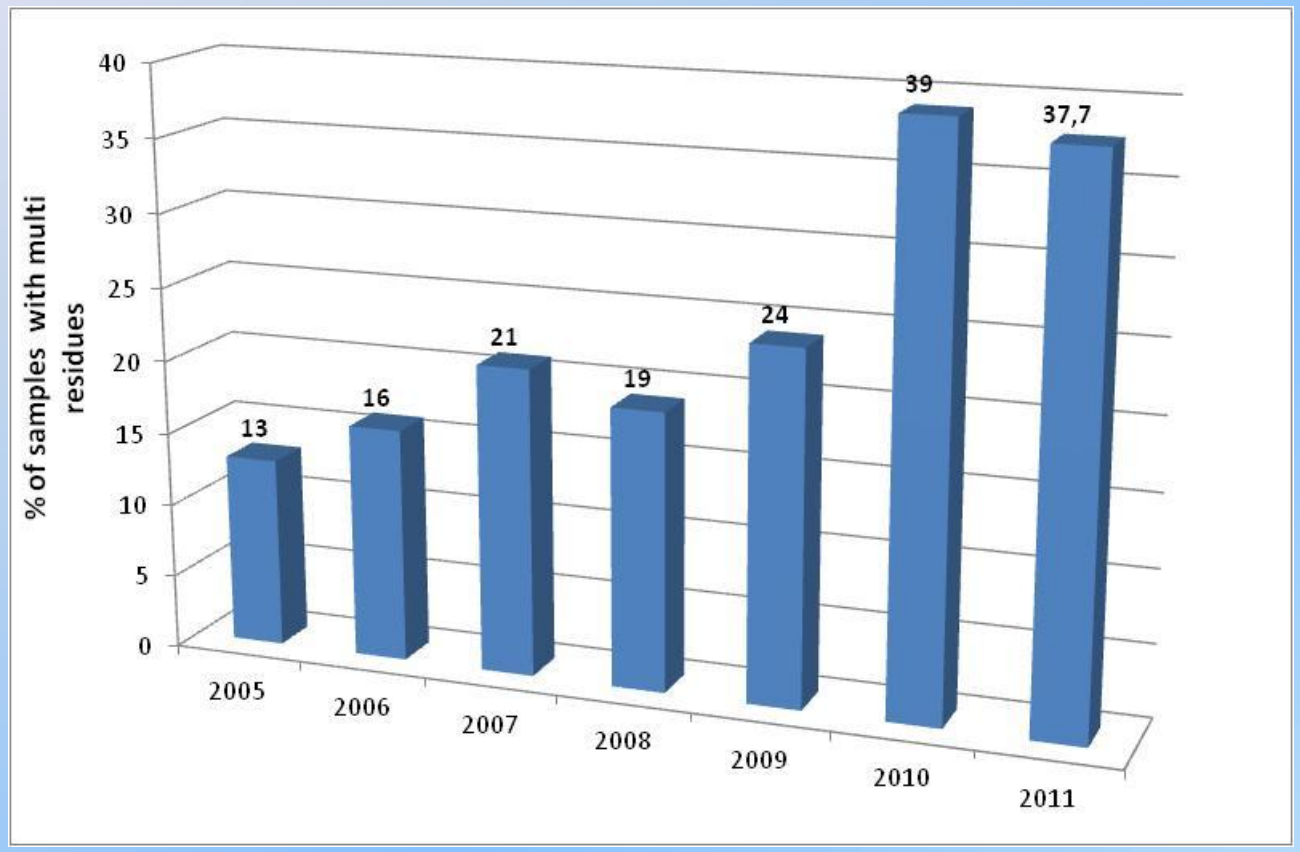


Products	MLs of Sum Dioxins	MLs of Sum Dioxins & DL PCBs
1-11: raw milk	3,0	6,0
12-15: eggs	3,0	6,0
16-19: meat	1,0-2,0	1,5-4,0
20-26: liver	6,0	12,0
27-34: processed food	0,75-1,0	1,5

UB (upper bound) : Levels of sum of dioxins including the Detection Limit (DL)

Pesticides Residues in foodstuffs of plant origin

Trends of multiple pesticide residues of Plant Origin samples over the years 2005-2011



Radionuclides

- The accident at the Chernobyl nuclear reactor in 1986 triggered a more stringent monitoring system in food as well as the environment in many countries including Cyprus
- Thyroid cancers(more than 6000 until 2005)were reported in children and adolescents in Ukraine and the neighbouring countries
- The recent incidence in Fukushima called for more tight controls on food
- Iodine 131 is short lived (half life 8 days) so even more importance is given in monitoring programmes on long lived isotopes such as Caesium 137 (half life 30 years)

Results of radioactivity measurements (Cs-137, Sr-90) in baby food and food for young children

Cs-137 (2002-2011)

Radionuclides	No of samples	No of samples with non detected levels of Cs-137	No of samples below MDA*	MDA* ranges Bq/kg	No of samples with positive levels of Cs-137	Range of results Bq/kg
gamma radionuclides Cs-137	114	78 (68,4%)	13 (11,4%)	0,01 - 0,14	23 (20,2%)	0,02 - 1,6

* MDA = Minimum Detectable Activity

Note that the measured concentrations of Cs-137 are much lower than the maximum permited levels (370 Bq/kg) in milk and food intented for infant (up to 6 months) consumption.

Sr-90 (2007-2011)

Radionuclides	No of samples	No of samples with non detected levels of Sr-90	No of samples below MDA*	MDA* ranges Bq/kg	No of samples with positive levels of Sr-90	Range of results Bq/kg
Sr-90	27	7 (25,9%)	2 (7,4%)	0,006 - 0,009	18 (66,7%)	0,011 - 0,077

* MDA = Minimum Detectable Activity

Note that the measured concentrations of Sr-90 are much lower than the maximum permited levels (75 Bq/kg) in milk and food intented for infant (up to 6 months) consumption.

Relevant Legislation

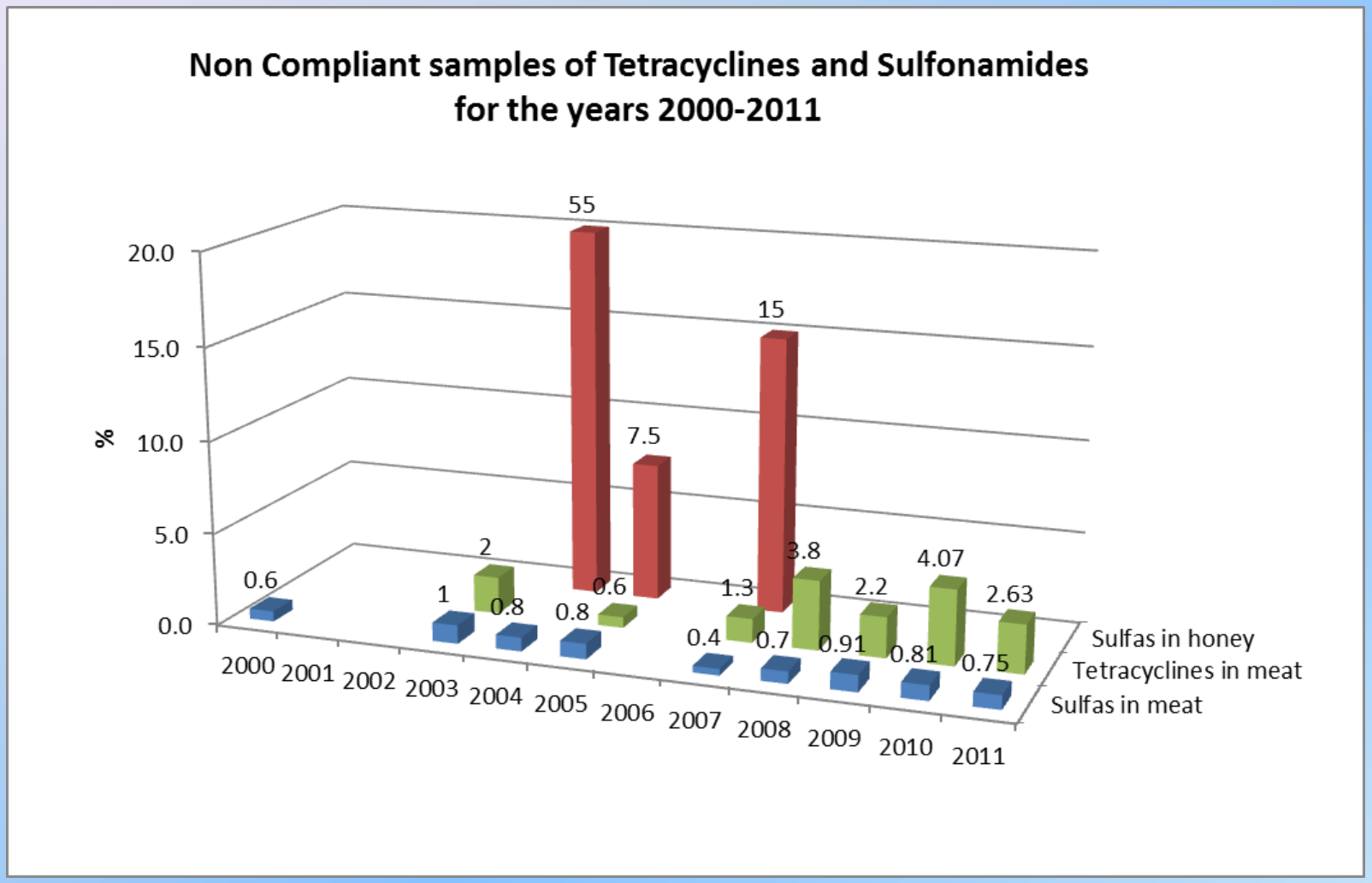
1) "The Protection from Ionising Radiation Law of 2002 (115(I)/2002) and its ammendments"
2) Council Regulation Euratom No 3954/87 and its ammendments
3) Council Regulation (EC) No 733/2008 and its ammendments

Antibiotic Residues in animal origin foodstuffs

- **Antimicrobiotics are particularly important for the treatment of patients especially young and elderly**
- **Antibiotic resistance encountered even more in the 21st Century creates a serious problem**
- **Resistance has been observed in a number of antibiotics for example in fluoroquinolones and cephalosporins of the third generation.**
- **A successful therapy is rendered more difficult or even impossible sometimes , upon antibiotic resistance**

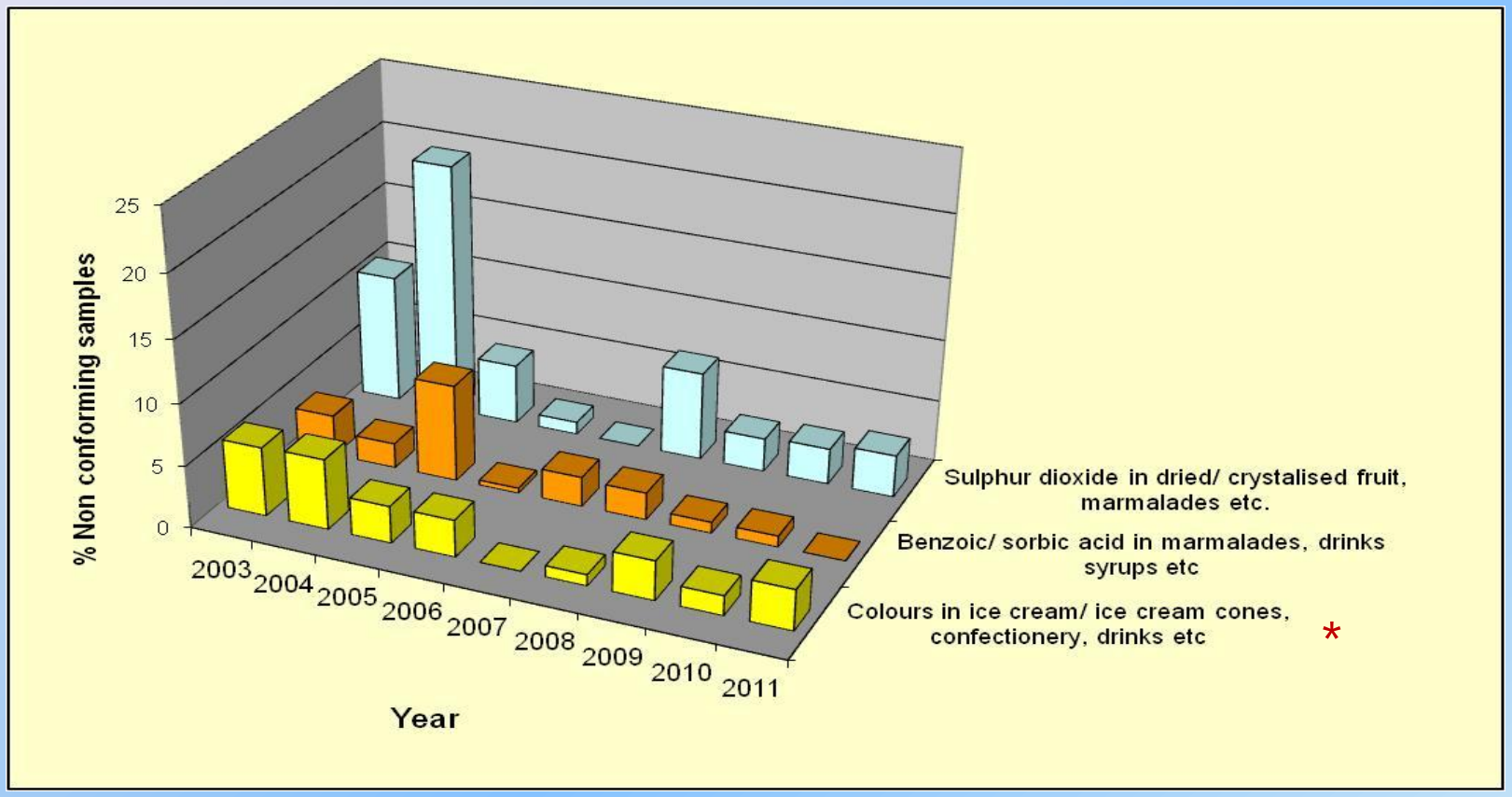
Therefore , the use of antibiotics must be limited and controlled as well their residues in food should be monitored because small amounts can have a big impact on health later in life!

Tetracyclines and Sulfonamides residues in foodstuffs of animal origin



Additives in foodstuffs

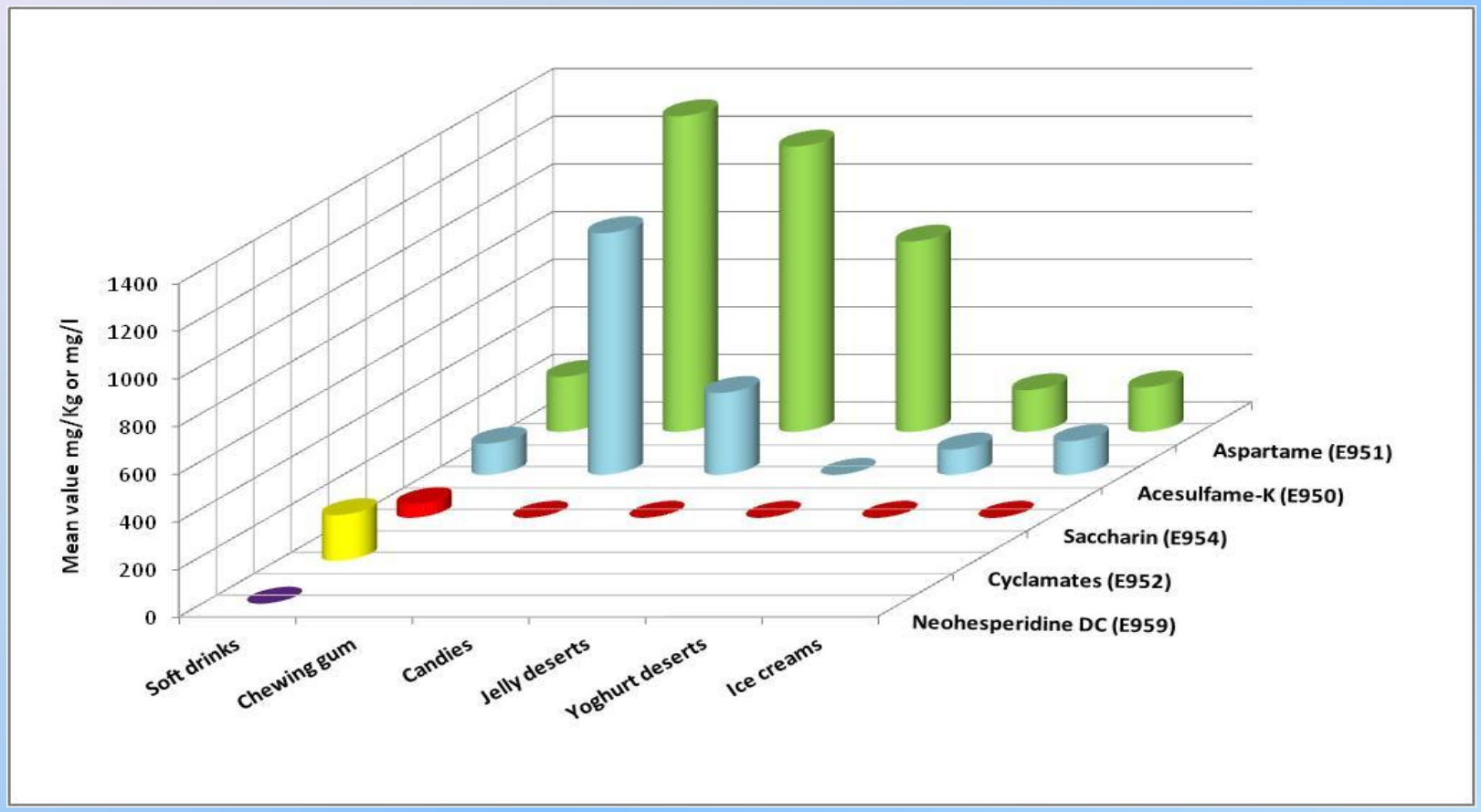
Non conforming samples 2003-2011: Official control of foodstuffs for preservatives and colours



* **Including the Southampton colours (E102, E104, E110, E122, E129)**

Artificial sweeteners *

Incidence and levels of sweeteners in food and drinks, energy reduced or with no-added sugars (2010)



*** Including Aspartame → Phenylalanine → Phenylketonuria**

Substances found in food supplements taken mainly by teenagers and young adults

YEAR	NUMBER OF SAMPLES TESTED	SENDER	POSITIVE SAMPLES	PHARMACEUTICAL SUBSTANCES FOUND
2005	5 87 (TOTAL: 92)	▪ POLICE ▪ PUBLIC HEALTH SERVICES	-	-
2006	93	▪ PUBLIC HEALTH SERVICES	1	Sildenafil
2007	104	▪ PUBLIC HEALTH SERVICES	4	Sildelafil, Tadalafil
2008	93	▪ PUBLIC HEALTH SERVICES	-	-
2009	6 98 (TOTAL: 104)	▪ SGL ▪ PUBLIC HEALTH SERVICES	6	Sibutramine (5 samples) DHEA (1 sample)
2010	4 106 (TOTAL: 110)	▪ SGL ▪ PUBLIC HEALTH SERVICES	8	Yohimbine/ Synephrine (1 sample) Sibutramine (5 samples) DHEA (1 sample) Tadalafil (1 sample)
2011	6 119 8 1 (TOTAL: 134)	▪ SGL ▪ PUBLIC HEALTH SERVICES ▪ POLICE ▪ GENERAL HOSPITAL	22	Tadalafil (7), Sildenafil (1) Sulfoaildenafil/Sulfosildenafil (2), Sibutramine (3), Caffeine/Yohimbine (1), Vinburnine/Vincamine (1), N-Acetylcysteine (4), Yohimbine (1), Phenolphthalein (1), Sibutramine/Phenolphthalein (1)

Microbiological / Biological Hazards

Prevention of diseases and disability from pathogens

- **Monitoring of pathogens in food is imperative to prevent for example the presence of**
  - **Listeria Monocytogenes ,Salmonella and E coli 0157:H7 which are of concern for aging populations**
  - **Campylobacteria which are higher in incidence in the very young**
  - **Chronobacter Sakazaki which is associated to infant bacteraemia, meningitis and necrotising enterocolitis**

Summing up

Aged people must be:

- **kept active and given an active role in society**
- **Mobilize their potentials/ experience and skills**
- **As long as they are kept HEALTHY**
- **Healthy aged people have increased employability**
- **The state of people's health makes all the difference between**
  - **them being able to work or not,**
  - **needing health care or not,**
  - **recovering from an illness fast or not .**

- **Precaution and prevention should always be at the heart of public health practice**
- **Preventive strategies should have a holistic approach so as to cover (not only safe food) also**
- **Safe consumer products(articles in contact with food, toys,cosmetics)**
- **safe and clean water**
- **Good quality of indoor air (eg legionella monitoring,nicotine from tobacco smoke) and outdoor air (eg traffic pollutants) and in general**
- **a clean environment (sea water, ground water, etc)**

Conclusions

Vital tools towards Healthy Aging

- **Encourage policy makers and stakeholders to promote PREVENTIVE ACTIONS from very early stages of life**
- **Preventive actions should include food safety**
- **Encourage research and innovation towards solving complex risks arising from nutrition and food safety issues.**
- **Raise awareness on safe and nutritional food through Governmental Departments and Organisations(e.g. Cyprus National Committee on Environment and Children s Health) and NGO ‘s eg Consumer Organisations.**
- **Awareness campaigns should be focused on parents and school teachers**

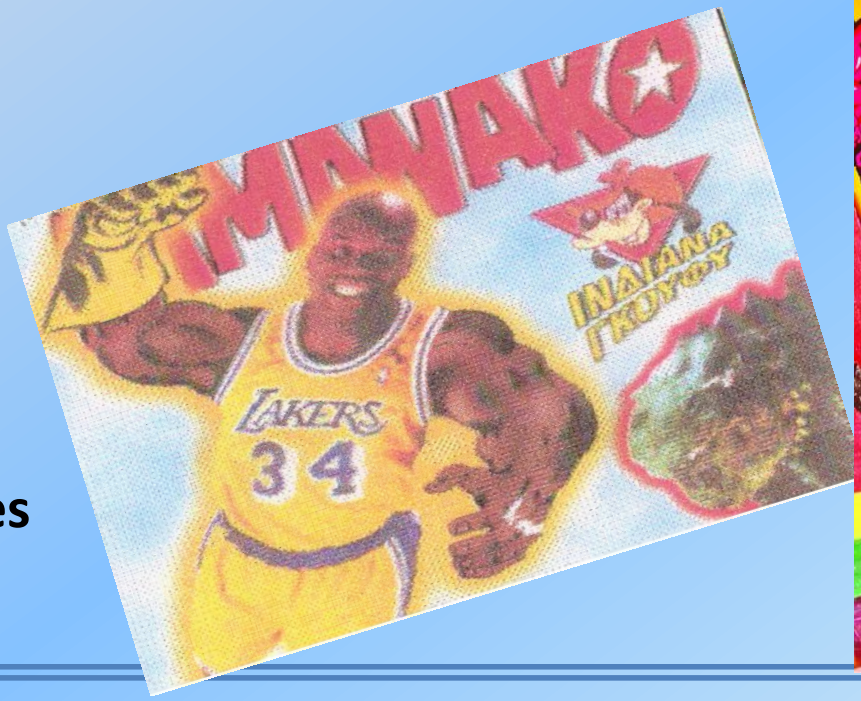
Conclusions (Continue)

- Strict restriction on advertising/claims on children ' s and adolescents food
- Protect children from various forms of marketing of unhealthy food and Ungrounded claims (EFSA has studied 2758 claims and has Approved at the moment only 222)

Examples of marketing

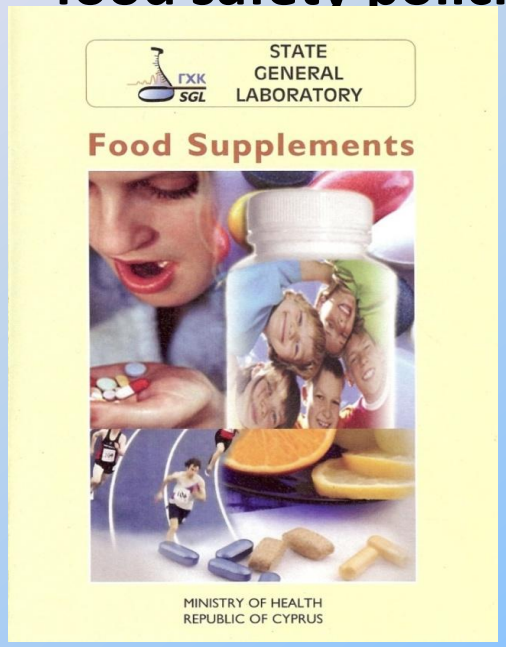
- Food supplements claiming that their use can make one strong with muscles
- Bubble gums and lollies

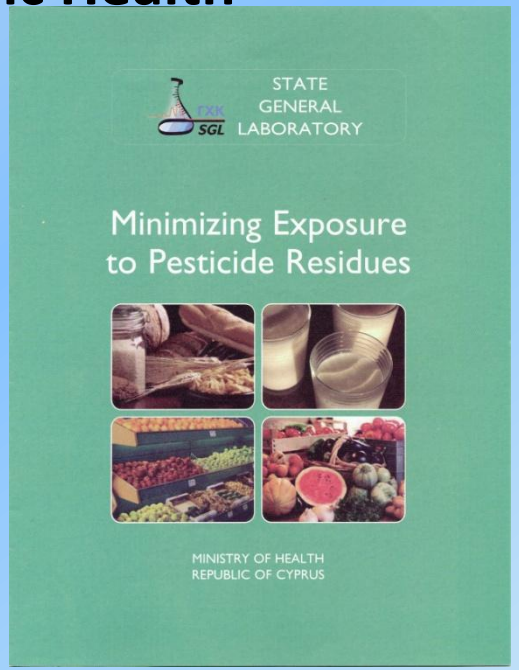
With a host of E colours



Conclusions(Continued)

- **Provide education and information to the public through media, leaflets etc**
- **Informed consumers are partners in the implementation of food safety policies for protection of Public Health**





Good Health adds life to years

Any Questions

Thank you for your attention

Many thanks to all SGL's collaborators and
Special thanks to Dr Eleni Kakouri and to the rest of my colleagues