

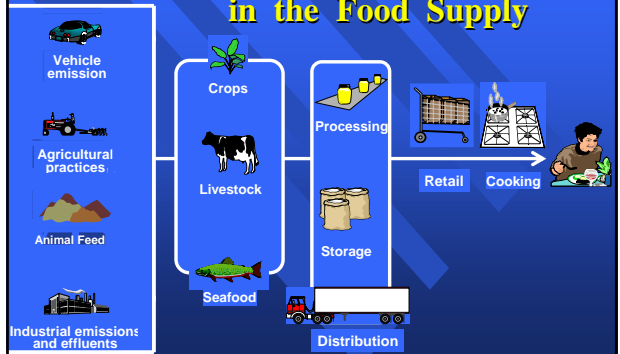
GEMS/Food Databases and Total Diet Studies

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Chemical Hazards in the Food Supply



WHO and Chemicals in Food

WHO Constitution (1948)

Mandate to develop, establish and promote international standards with respect to food

Joint FAO/WHO Expert Committee on Food Additives (1956)

International risk assessment of chemicals in food

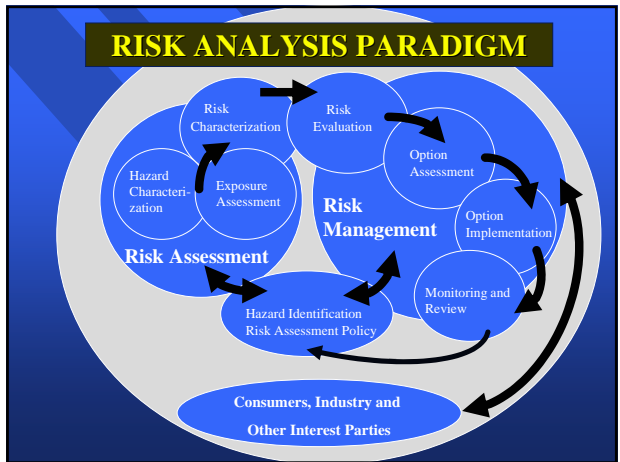
Joint FAO/WHO Codex Alimentarius Commission (1963)

International risk management through standards development

SPS Agreement of the World Trade Organization (1995)

Recognizes Codex standards and the primacy of risk assessment as the basis for health and safety requirements for food

RISK ANALYSIS PARADIGM

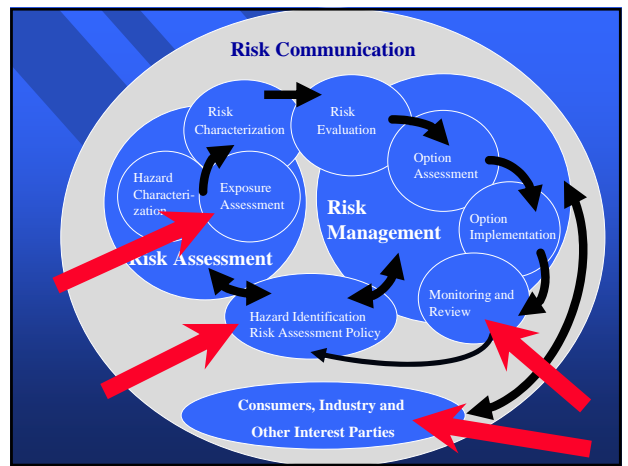


Risk Communication



Risk Communication





Objectives of GEMS/Food

- Compile data on food contamination and human exposure for global synthesis, evaluation and presentation
- Promote and support health-oriented, population-based studies on exposure to contaminants of public health significance

GEMS/Food Network

- WHO Collaborating Centres
- National Contact Points
- Participating Institutions
- Other international bodies and NGOs

Priorities of GEMS/Food

- Pesticide residues
- Heavy metals
- Industrial pollutants
- Naturally occurring toxicants

GEMS/Food Priorities Pesticides

- | | |
|-------------------------|--------------------|
| • Aldrin/dieldrin | • Diazinon |
| • DDT | • Fenitrothion |
| • Endosulfan | • Malathion |
| • Endrin | • Parathion |
| • Hexachlorocyclohexane | • Methyl parathion |
| • Hexachlorobenzene | • DTC |
| • Heptachlor | |

GEMS/Food Priorities Heavy metals

- Cadmium
- Lead
- Methylmercury
- Inorganic Arsenic

GEMS/Food Priorities Industrial Pollutants

- Polychlorinated Biphenyls
- Dioxins
- Dibenzofurans

GEMS/Food Priorities Naturally Occurring Toxicants

- Aflatoxins
- Patulin
- Fumonisin B₁
- Ochratoxin A
- Acrylamide

Codex Alimentarius Commission

Codex Committee on Food Additives

Codex Committee on Contaminants

Joint FAO/WHO Expert Committee on Food Additives

Codex Committee on Pesticide Residues

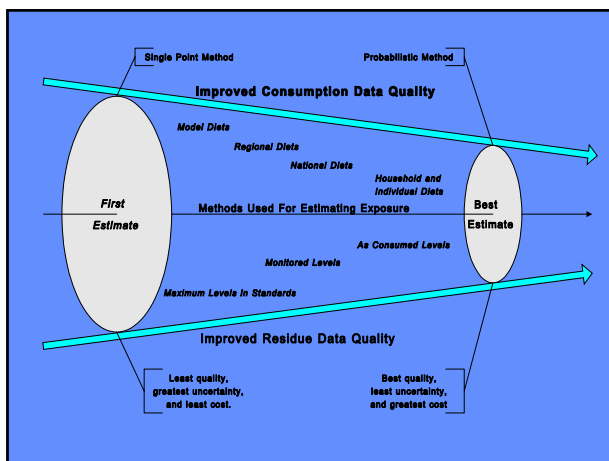
Joint FAO/WHO Meetings on Pesticide Residues

Exposure Assessment

$$\text{Dietary Exposure} = C \times F$$

C = Concentration of food chemical

F = Amount of food consumed



GEMS/Food Databases

- OPAL I Chemical Contaminants in Foods
–Aggregated and Individual Data
- OPAL II Chemical Contaminants
in Total Diet

GEMS/Food OPALs Operating Programmes for Analytical Laboratories

- Stand alone systems based on MS-ACCESS
- Data Collection at National Level
- Provides analytical tools
- Export/Import functions
- English, French and Spanish versions

GEMS/Food Global Configuration

National Collections
(OPAL or electronic
transformation)

WHO/HQ

Central Database



GEMS/Food Global Configuration

National Collections
(OPAL or electronic
transformation)

WHO/HQ

Central Database



Literature and national
reports (manual entry)

GEMS/Food Global Configuration

National Collections
(OPAL or electronic
transformation)

WHO/HQ

Central Database

Codex, JECFA
JMPR, other
users



Literature and national
reports (manual entry)

GEMS/Food Global Configuration

National Collections
(OPAL or electronic
transformation)

WHO/HQ

Central Database

Codex, JECFA
JMPR, other
users

WHO/SIGHT
Dissemination
via WWW



Literature and national
reports (manual entry)

Contents of Database

Chemical Contaminants in Foods

Aggregated Data

- 75 000 Entries
- 47 Countries
- 503 Foods
- 238 Contaminants

Contents of Database

Individual Data

- 55 000 Entries
- 5 Countries
- 321 Foods
- 55 Contaminants

Acrylamide Data

- 1 300 Entries
- 4 Countries
- 649 Foods

Contents of Database

Total Diet Studies

- 3 700 Entries on dietary exposure
- 29 Countries
- 200 Contaminants

GEMS/Food Database

Dissemination of Data

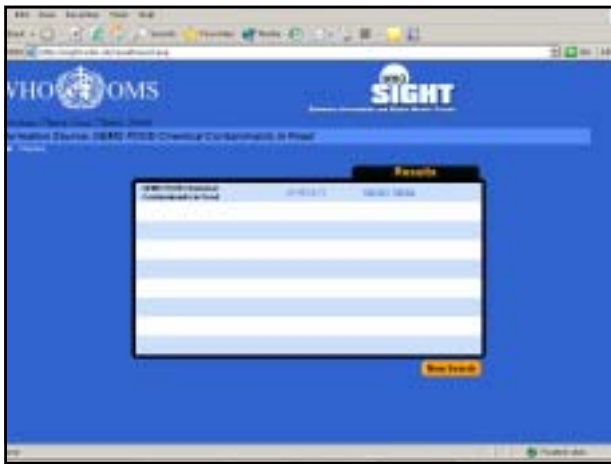
WHO Food Safety Home Page

➤ <http://www.who.int/foodsafety/chem/>

JIFSAN Acrylamide

➤ <http://www.acrylamide-food.org/>





System for Integrated Global Environmental Health

Country	Year	Year From	Year To	Food Cluster	Food Group	Year
Canada	1989	1989	11	Other	F0282	Chem. Group
Germany	1989	1989	12	Canadian	F0283	Chem. Group
Germany	1989	1989	13	Canadian	F0284	Chem. Group
Germany	1989	1989	14	Other	F0285	Chem. Group
Germany	1989	1989	15	Canadian	F0286	Chem. Group
Germany	1989	1989	16	Canadian	F0287	Chem. Group
Germany	1989	1989	17	Canadian	F0288	Chem. Group
Germany	1989	1989	18	Canadian	F0289	Chem. Group
Germany	1989	1989	19	Canadian	F0290	Chem. Group
Germany	1989	1989	20	Canadian	F0291	Chem. Group
Germany	1989	1989	21	Canadian	F0292	Chem. Group
Germany	1989	1989	22	Canadian	F0293	Chem. Group
Germany	1989	1989	23	Canadian	F0294	Chem. Group
Germany	1989	1989	24	Canadian	F0295	Chem. Group
Germany	1989	1989	25	Canadian	F0296	Chem. Group
Germany	1989	1989	26	Canadian	F0297	Chem. Group
Germany	1989	1989	27	Canadian	F0298	Chem. Group
Germany	1989	1989	28	Canadian	F0299	Chem. Group
Germany	1989	1989	29	Canadian	F0300	Chem. Group
Germany	1989	1989	30	Canadian	F0301	Chem. Group
Germany	1989	1989	31	Canadian	F0302	Chem. Group
Germany	1989	1989	32	Canadian	F0303	Chem. Group
Germany	1989	1989	33	Canadian	F0304	Chem. Group
Germany	1989	1989	34	Canadian	F0305	Chem. Group
Germany	1989	1989	35	Canadian	F0306	Chem. Group
Germany	1989	1989	36	Canadian	F0307	Chem. Group
Germany	1989	1989	37	Canadian	F0308	Chem. Group
Germany	1989	1989	38	Canadian	F0309	Chem. Group
Germany	1989	1989	39	Canadian	F0310	Chem. Group
Germany	1989	1989	40	Canadian	F0311	Chem. Group
Germany	1989	1989	41	Canadian	F0312	Chem. Group
Germany	1989	1989	42	Canadian	F0313	Chem. Group
Germany	1989	1989	43	Canadian	F0314	Chem. Group
Germany	1989	1989	44	Canadian	F0315	Chem. Group
Germany	1989	1989	45	Canadian	F0316	Chem. Group
Germany	1989	1989	46	Canadian	F0317	Chem. Group
Germany	1989	1989	47	Canadian	F0318	Chem. Group
Germany	1989	1989	48	Canadian	F0319	Chem. Group
Germany	1989	1989	49	Canadian	F0320	Chem. Group
Germany	1989	1989	50	Canadian	F0321	Chem. Group
Germany	1989	1989	51	Canadian	F0322	Chem. Group
Germany	1989	1989	52	Canadian	F0323	Chem. Group
Germany	1989	1989	53	Canadian	F0324	Chem. Group
Germany	1989	1989	54	Canadian	F0325	Chem. Group
Germany	1989	1989	55	Canadian	F0326	Chem. Group
Germany	1989	1989	56	Canadian	F0327	Chem. Group
Germany	1989	1989	57	Canadian	F0328	Chem. Group
Germany	1989	1989	58	Canadian	F0329	Chem. Group
Germany	1989	1989	59	Canadian	F0330	Chem. Group
Germany	1989	1989	60	Canadian	F0331	Chem. Group
Germany	1989	1989	61	Canadian	F0332	Chem. Group
Germany	1989	1989	62	Canadian	F0333	Chem. Group
Germany	1989	1989	63	Canadian	F0334	Chem. Group
Germany	1989	1989	64	Canadian	F0335	Chem. Group
Germany	1989	1989	65	Canadian	F0336	Chem. Group
Germany	1989	1989	66	Canadian	F0337	Chem. Group
Germany	1989	1989	67	Canadian	F0338	Chem. Group
Germany	1989	1989	68	Canadian	F0339	Chem. Group
Germany	1989	1989	69	Canadian	F0340	Chem. Group
Germany	1989	1989	70	Canadian	F0341	Chem. Group
Germany	1989	1989	71	Canadian	F0342	Chem. Group
Germany	1989	1989	72	Canadian	F0343	Chem. Group
Germany	1989	1989	73	Canadian	F0344	Chem. Group
Germany	1989	1989	74	Canadian	F0345	Chem. Group
Germany	1989	1989	75	Canadian	F0346	Chem. Group
Germany	1989	1989	76	Canadian	F0347	Chem. Group
Germany	1989	1989	77	Canadian	F0348	Chem. Group
Germany	1989	1989	78	Canadian	F0349	Chem. Group
Germany	1989	1989	79	Canadian	F0350	Chem. Group
Germany	1989	1989	80	Canadian	F0351	Chem. Group
Germany	1989	1989	81	Canadian	F0352	Chem. Group
Germany	1989	1989	82	Canadian	F0353	Chem. Group
Germany	1989	1989	83	Canadian	F0354	Chem. Group
Germany	1989	1989	84	Canadian	F0355	Chem. Group
Germany	1989	1989	85	Canadian	F0356	Chem. Group
Germany	1989	1989	86	Canadian	F0357	Chem. Group
Germany	1989	1989	87	Canadian	F0358	Chem. Group
Germany	1989	1989	88	Canadian	F0359	Chem. Group
Germany	1989	1989	89	Canadian	F0360	Chem. Group
Germany	1989	1989	90	Canadian	F0361	Chem. Group
Germany	1989	1989	91	Canadian	F0362	Chem. Group
Germany	1989	1989	92	Canadian	F0363	Chem. Group
Germany	1989	1989	93	Canadian	F0364	Chem. Group
Germany	1989	1989	94	Canadian	F0365	Chem. Group
Germany	1989	1989	95	Canadian	F0366	Chem. Group
Germany	1989	1989	96	Canadian	F0367	Chem. Group
Germany	1989	1989	97	Canadian	F0368	Chem. Group
Germany	1989	1989	98	Canadian	F0369	Chem. Group
Germany	1989	1989	99	Canadian	F0370	Chem. Group
Germany	1989	1989	100	Canadian	F0371	Chem. Group

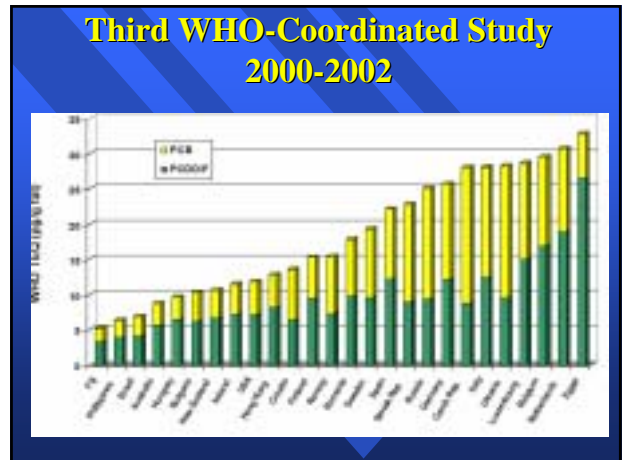
Other GEMS/Food Databases

- GEMS/Food Consumption Cluster Diets



Other GEMS/Food Databases

- Persistent Organic Pollutants in Human Milk



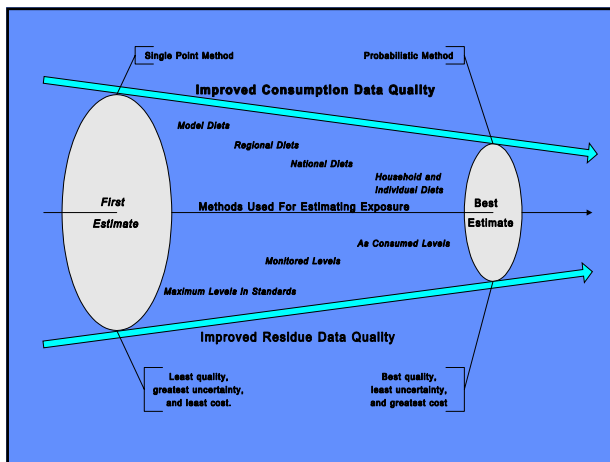
Other GEMS/Food Functions

International Food Safety Authority Network (INFOSAN) Emergency

- Inventory of capabilities (analytes, matrix, LOQ, LOD, AQA, etc.)
- Linked to revised International Health Regulations

GEMS/Food Technical Cooperation

- Support for analytical quality assurance
- New exposure assessment methods
- Collaboration in total diet studies



GEMS/Food Total Diet Studies

What are the health reasons for total diet studies?

- Protect public health from toxic chemicals in the food supply
- Provides initial assessment of potential nutritional imbalances in the diet
- Provide baseline data in case of emergency

GEMS/Food Total Diet Studies

What are the trade reasons for total diet studies?

- Provide essential component of risk analysis for trade purposes
- Informs on the acceptability of Codex standards
- Provides basis for standard setting
- Provide baseline data in case of emergency

GEMS/Food Total Diet Studies

What are the activities of total diet studies?

- Measure the average amount of selected chemicals in foods as consumed
- Estimate the amount of chemicals ingested by different age/sex groups living in a country
- Assess whether or not specific chemicals pose a risk to health.

GEMS/Food Total Diet Studies

What are the basic steps in total diet studies?

- Purchase random samples of foods commonly consumed at the retail level
- Processing samples as for consumption
- Homogenize and analyse samples for toxic chemicals and certain nutrients
- Estimate exposure to chemicals in diet

GEMS/Food Total Diet Studies

What are the costs and benefits of total diet studies?

- Cost will typically run around US\$125 000
- Study only needs to be repeated every 5 years
- Reduce burden of foodborne disease caused by chemicals and nutritional imbalances
- Offers resource allocation tool for developing capacities and further study and/or remedial action
- Promotes food exports and market stability

GEMS/Food International Workshops and Training in Total Diet Studies

First Workshop

US Food and Drug Administration,
Kansas City, July 2000 and in
cooperation with the Pan American
Health Organization and FAO

GEMS/Food International Workshops and Training in Total Diet Studies

Second Workshop

Food Standards Australia New Zealand and
the New Zealand Institute for
Environmental Studies and Research,
Brisbane, February 2002 in cooperation
with Asia Pacific Food Analysis Network
and FAO

GEMS/Food International Workshops in Total Diet Studies

Third Workshop

National Institute for Agricultural Research
(INRA) in cooperation with the French
Ministry of Foreign Affairs and FAO,
Paris, May 2004 (bilingual English-French)

GEMS/Food International Workshops and Training in Total Diet Studies

Fourth Workshop

Institute for Nutrition and Food Safety,
Chinese Centers for Disease Control and
Prevention in cooperation with FAO,
Beijing, October 2006

Regional Training in Total Diet Studies

Europe – Brno, Czech Republic, November 2002

Latin America – Buenos Aires, March 2003

Planned:

Europe/Eastern Mediterranean – Amman, 2007

Southeast Asia – Jakarta, 2007

Countries with Total Diet Studies

Australia	Japan
Cameroon	Kuwait
Canada	Lebanon
China	Netherlands
Czech	New Zealand
Finland	Papua New Guinea
France	Spain
Guatemala	Sweden
Indonesia	United Kingdom
Ireland	United States

GEMS/Food Total Diet Studies

Total diet studies are one of the most cost-effective methods for assuring the safety of the food supply from chemical hazards.

Thank you for your attention