Data and information for the identification of emerging risks in the food chain

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Overview

1. Mandate of EFSA
2. What are emerging risks?
3. How to identify emerging risks
4. Data collection and tool development
5. Results and reporting
6. Outputs, lessons learnt, next steps

Mandate of EFSA on emerging risks

**REGULATION (EC) No 178/2002 OF THE EUROPEAN PARLIAMENT
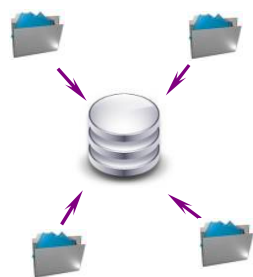AND OF THE COUNCIL of 28 January 2002**

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
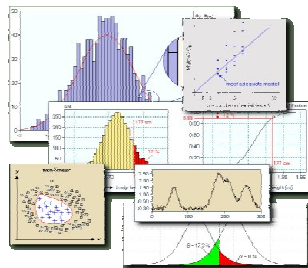
Article 34
Identification of emerging risks

1. The Authority shall establish **monitoring** procedures for systematic searching for, **collecting**, **collating** and **analysing** information and data **with a view to the identification of emerging risks** in the fields within its mission.
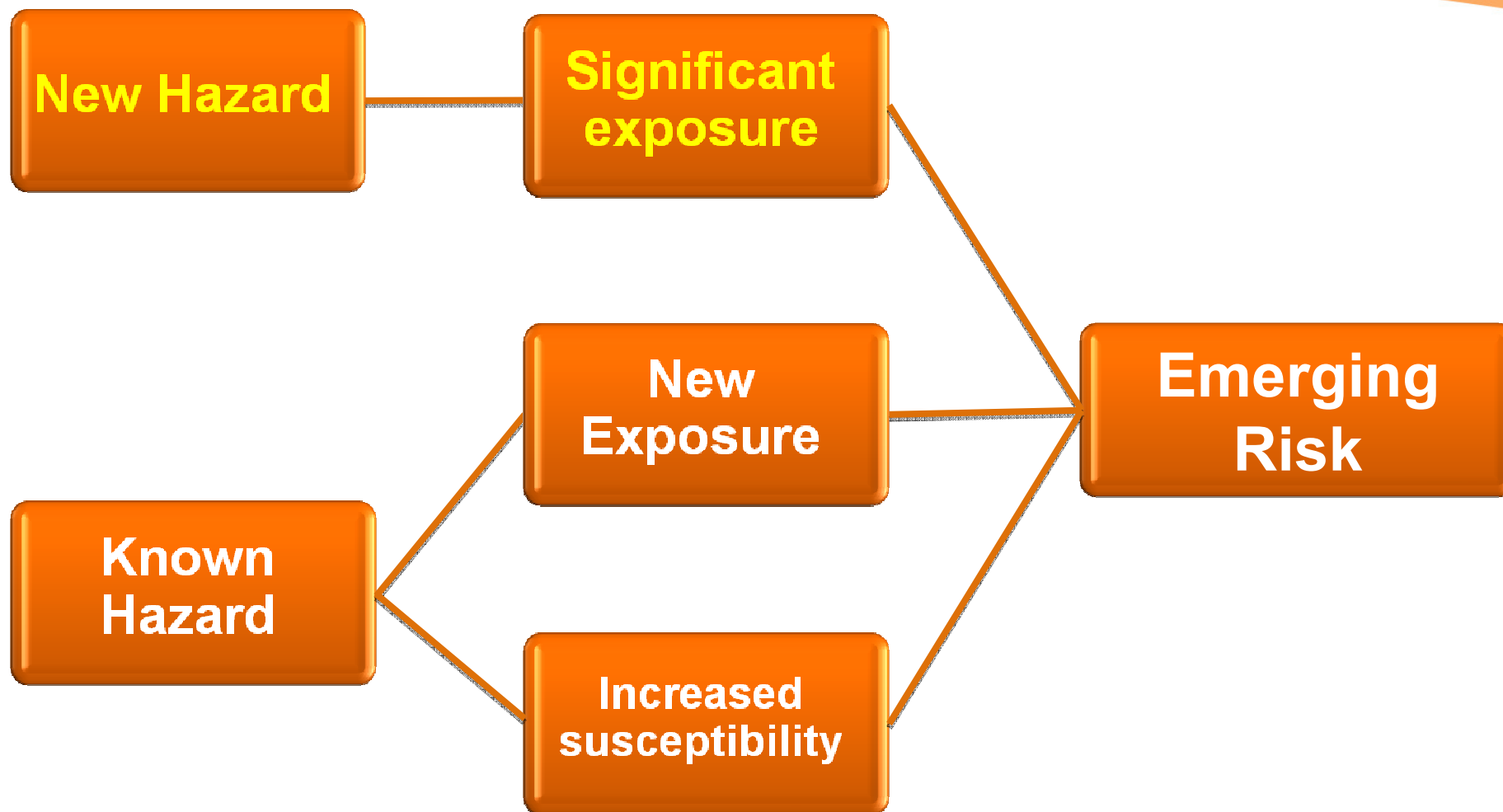
Collecting and collating

Analyse and **filter**

sharing

What are emerging risks?

Definition of Emerging Risk

European Food Safety Authority

New Hazard

Significant exposure

New Exposure

Known Hazard

Increased susceptibility
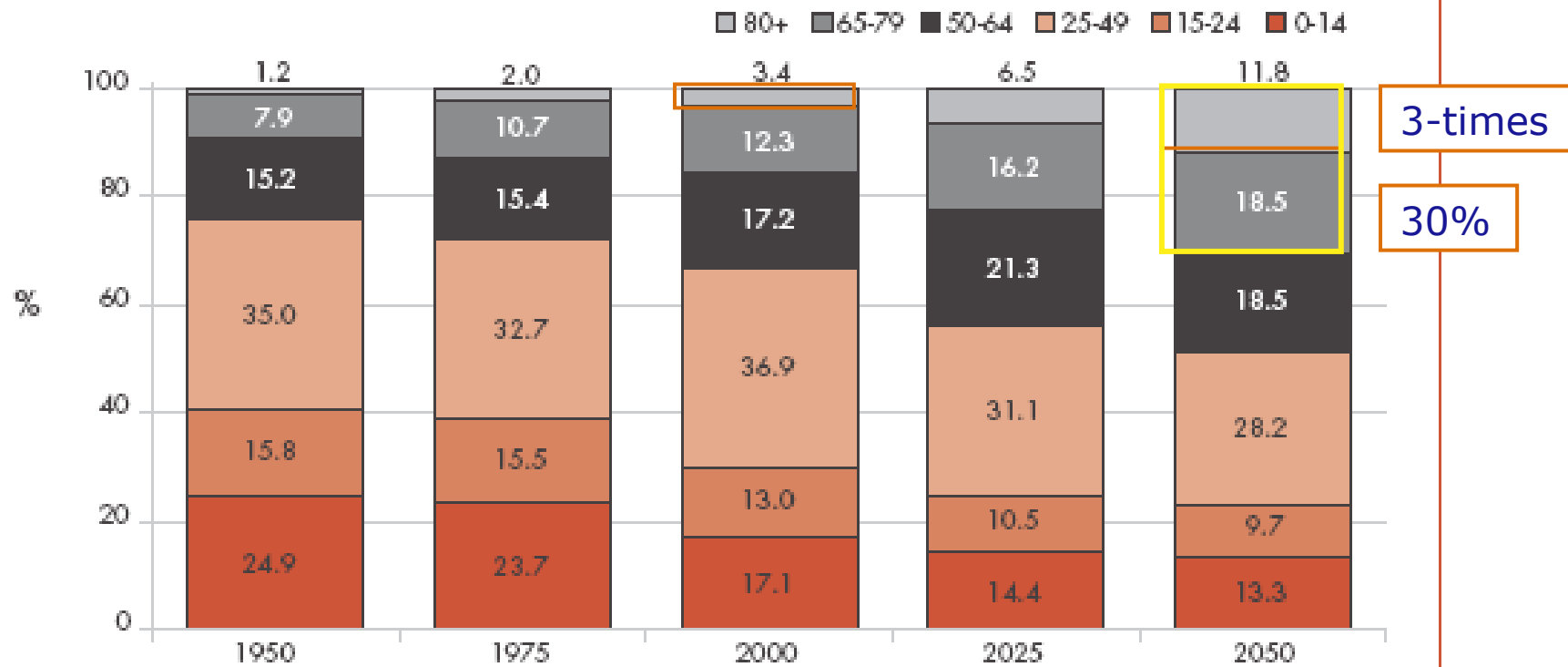
Emerging Risk

ESFA, 2007. Definition and description of « emerging risks » within the EFSA's mandate. Statement of the Scientific Committee, 10 July 2007.

Susceptibility (example): Aging population

Trends in the population age structure EU-25

Legend: 80+ | 65-79 | 50-64 | 25-49 | 15-24 | 0-14

Age group	1950	1975	2000	2025	2050
80+	1.2	2.0	3.4	6.5	11.8
65-79	7.9	10.7	12.3	16.2	18.5
50-64	15.2	15.4	17.2	21.3	18.5
25-49	35.0	32.7	36.9	31.1	28.2
15-24	15.8	15.5	13.0	10.5	9.7
0-14	24.9	23.7	17.1	14.4	13.3

3-times

30%

Source: UN World Population Prospects (2002 Revision) and Eurostat 2004 Demographic Projections (Baseline scenario).

Emerging Risks – New Hazards (historical examples)

..1970s

Rotavirus, Norovirus, *C. Perfringens*

Campylobacter, Yersinia, Listeria, VTEC, *Salmonella Ent. PT4*

Dioxin residues in food and feed

Bovine Spongiform Encephalopathy

1980s

Salmonella Enteritidis PTs 1, 14B, 21

Cryptosporidia, Cyclospora

Sudan 1

1990s

Bisphenol A

Acrylamide

Nicotine in mushrooms

2000s

Avian flu

Bluetongue in North Europe

Melamine

**2010s**

Dioxin in meat..

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Emerging Risks - EFSA's definition

The EFSA definition is hazard based and as such is limited in scope to the short and medium term identification of emerging risks.

The long term anticipation of emerging risks is rather based on the identification of drivers (one does not have to identify a specific hazard in order to be able to anticipate that a certain change in conditions may give rise to the emergence of a risk).

Therefore, the identification of drivers is also considered in EFSA's identification of emerging risks.

Example: drivers of change

Climate change
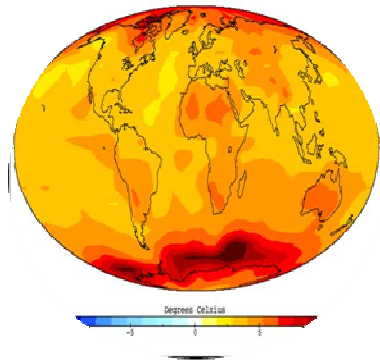
e.g. 1: plant and animal pests/disease shifts in space and time
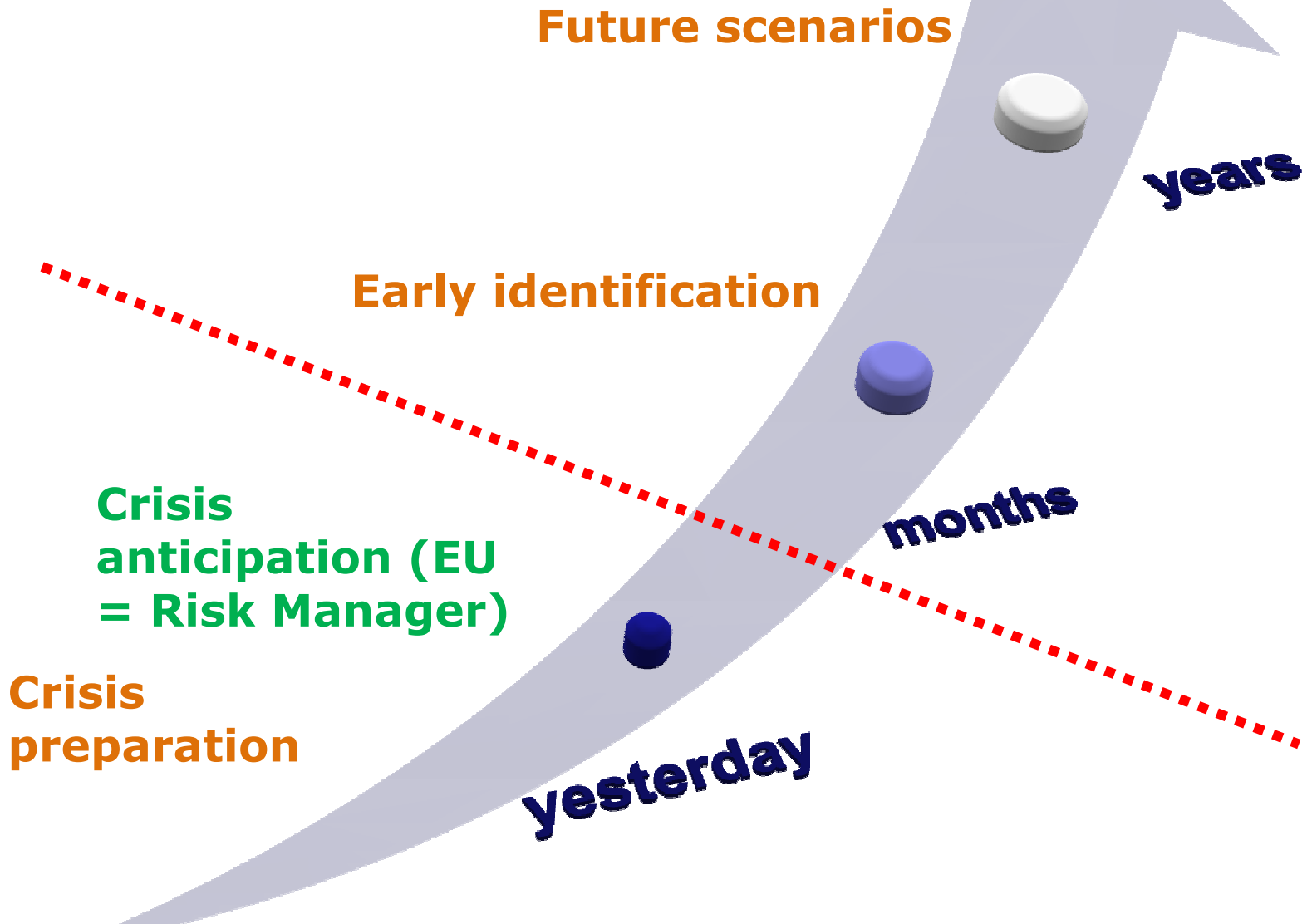**e.g. 2**: prolonged /increased in pesticides use

Globalisation

e.g. 1: food consumption patterns
e.g. 2: traded food

Processing and production modes

e.g. 1: organic farming

Anticipation Timescale

European Food Safety Authority

Future scenarios

Early identification

Crisis anticipation (EU = Risk Manager)

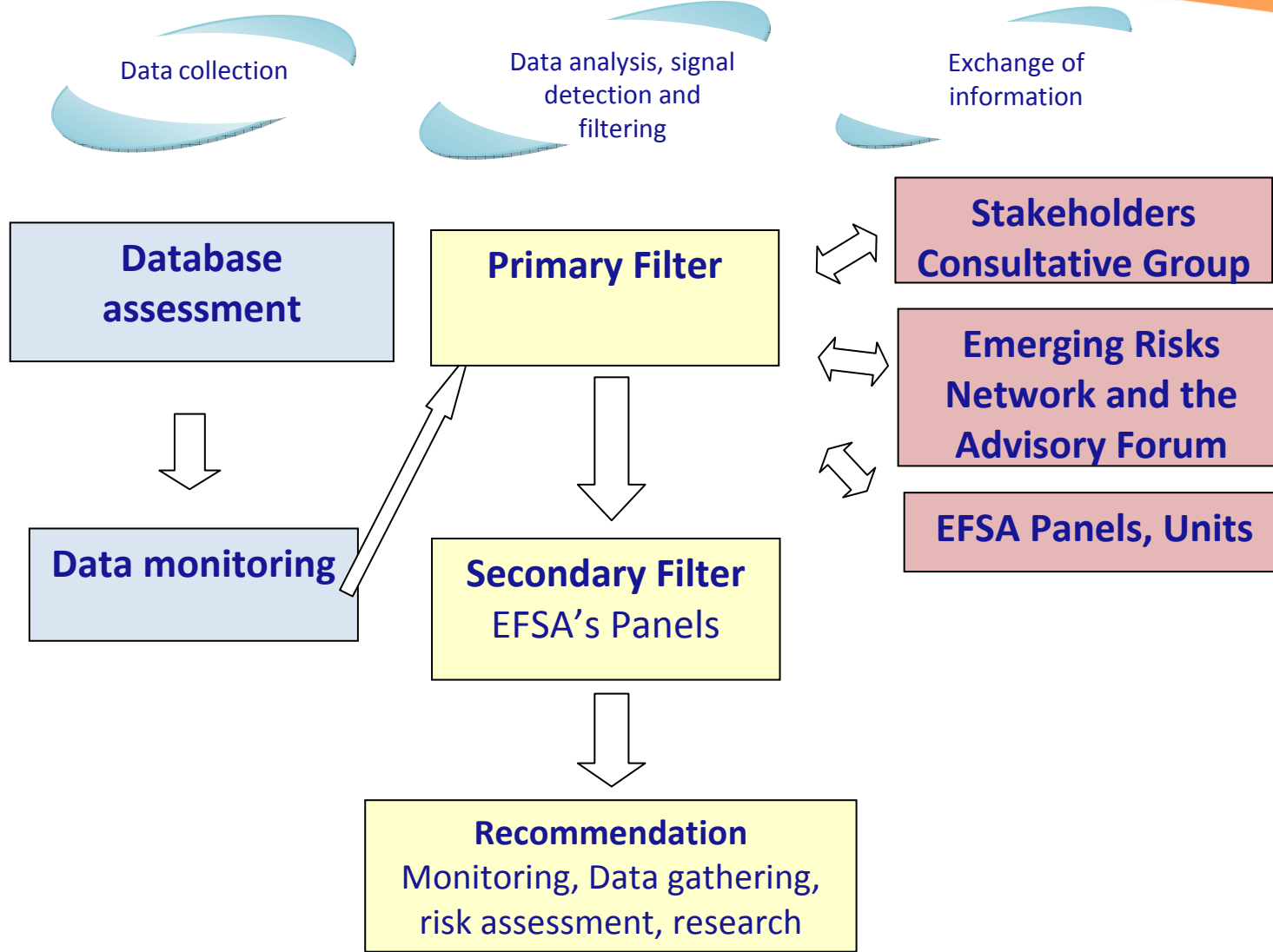**Crisis preparation**

years

months

yesterday

How to identify emerging risks?

Overall strategy being developed at EFSA

- Relies on three steps:
  - Data collection
    - Soft – media, grey literature
    - Regulatory – RASFF, trade data, compulsory monitoring/surveillance
    - Scientific literature
    - Expert judgement – Panels, Units, Networks, Stakeholders
  - Data analysis, signal detection and filtering
  - Exchange of information

- Progressive implementation
  - 2009-10 Food and feed
  - 2011: Plant Health
  - 2013: Animal Health

Emerging risks identification system

Data collection

Data analysis, signal detection and filtering

Exchange of information

Database assessment

Primary Filter

Stakeholders Consultative Group

Emerging Risks Network and the Advisory Forum

EFSA Panels, Units

Data monitoring

Secondary Filter
EFSA's Panels

Recommendation
Monitoring, Data gathering, risk assessment, research

....

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Two approaches

Data monitoring
- Short-Medium term
- Already existing in the food/feed chain
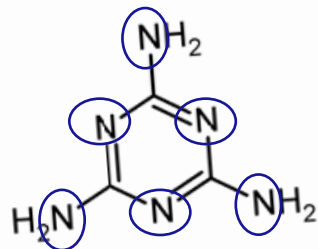- Direct reporting of the hazard
- New knowledge of old hazards (re-emerging risks)

Scenario building
- Long term
- Not yet in the food chain
- Identifying drivers

The case of Melamine

- approved as food contact material
  (Directive 2002/72/EC)

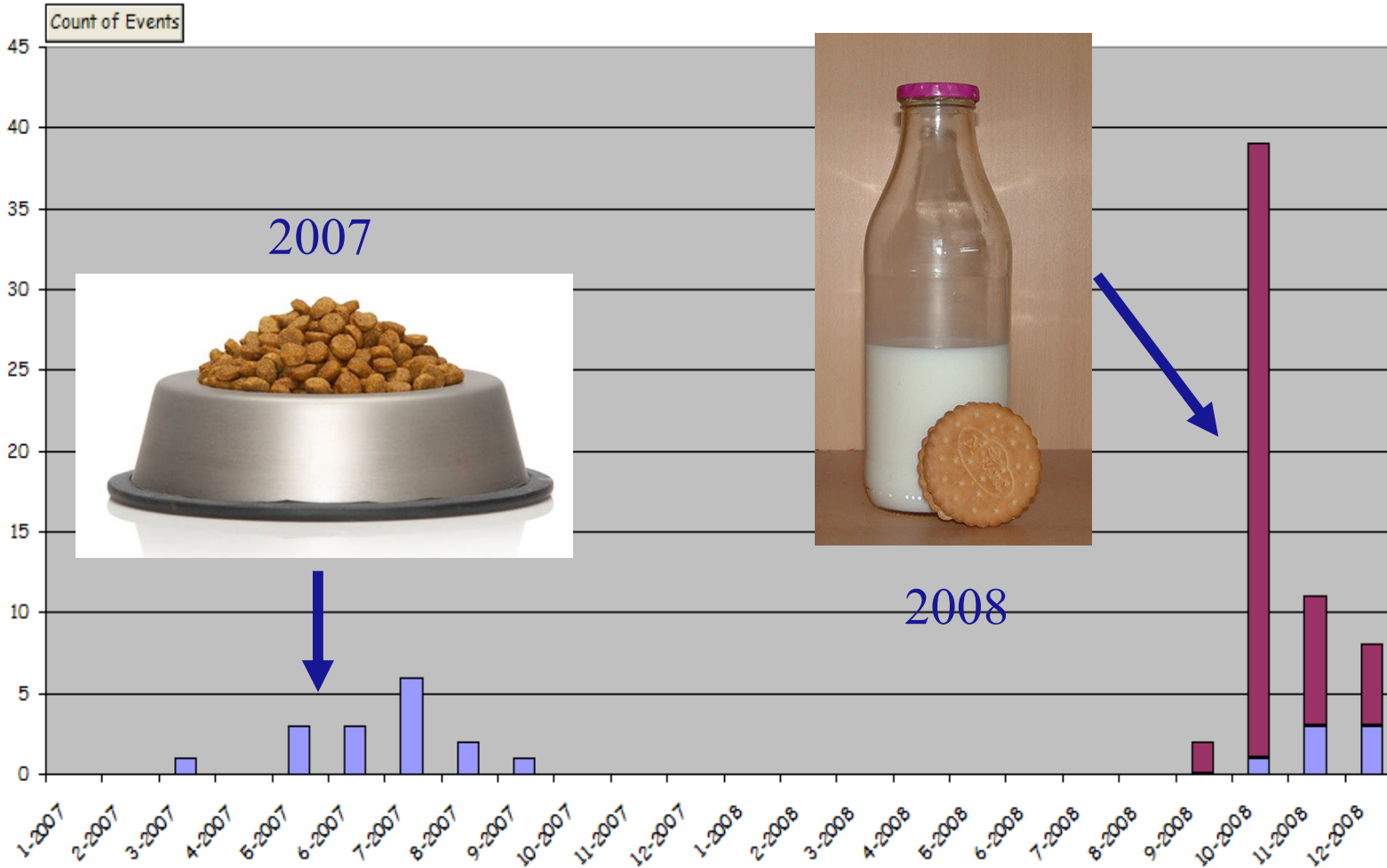• legally used in plastics, fabrics, glues, colorant for inks etc

• illegally used in feed & food

analytical tests measure higher protein content

£ € $

RASFF events regarding melamine

Melamine – an example of both approaches

Data monitoring (animal health risk)
- ✓ Short-Medium term
- ✓ Already existing in the food/feed chain
- ✓ Direct reporting of the hazard
- ❖ New knowledge of old hazards (re-emerging risks)

Scenario building (human health risk)
- ✓ Long term
- ▪ Not yet in the food/feed chain
- ✓ Identifying drivers

Data Collection and tool development

Data collection

Hazard databases
    Rapid Allert System for Food and Feed (RASFF)

Web monitoring systems
    MedISys and ProMED-mail

Trade data
    Eurostat and UN Comtrade

Data collection – Hazard databases

Hazard databases

RASFF –a tool has been developed for analysing the data through identifying reporting trends including first time reporting of hazards, hazard-matrix combinations.

Web monitoring

MedISys (Medical Information System)

- Developed by the JRC for monitoring medical information.
- Automatically screens more than 90,000 news articles per day in **50** languages, 24/7, real-time and updated every 10min
- Customisation of the system for food with JRC to better defining food related categories, and identifying additional media sources in third countries.

Trade and emerging risks

Changes in trade and prices

- New trading partners (countries)
    - Co-risks (plant and animal pests)
    - Different production practices – new risks

- Increase in trade volume
    - Exposure levels
    - Possible indicator of new uses/exposure routes
    - Indicator of new production practices (Increased trade due to decreased price, due to ………)

- Trade in new commodities

- Trends in prices

Trade data

- Evaluation of an existing tool (ARIADNE) developed by the EC for the semi-automated monitoring of trade data.

- Tested to scan Eurostat's data to detect trends in trade.

Trade data

Technical report: evaluation of a system for the scanning of Eurostat's data to detect trends in trade.
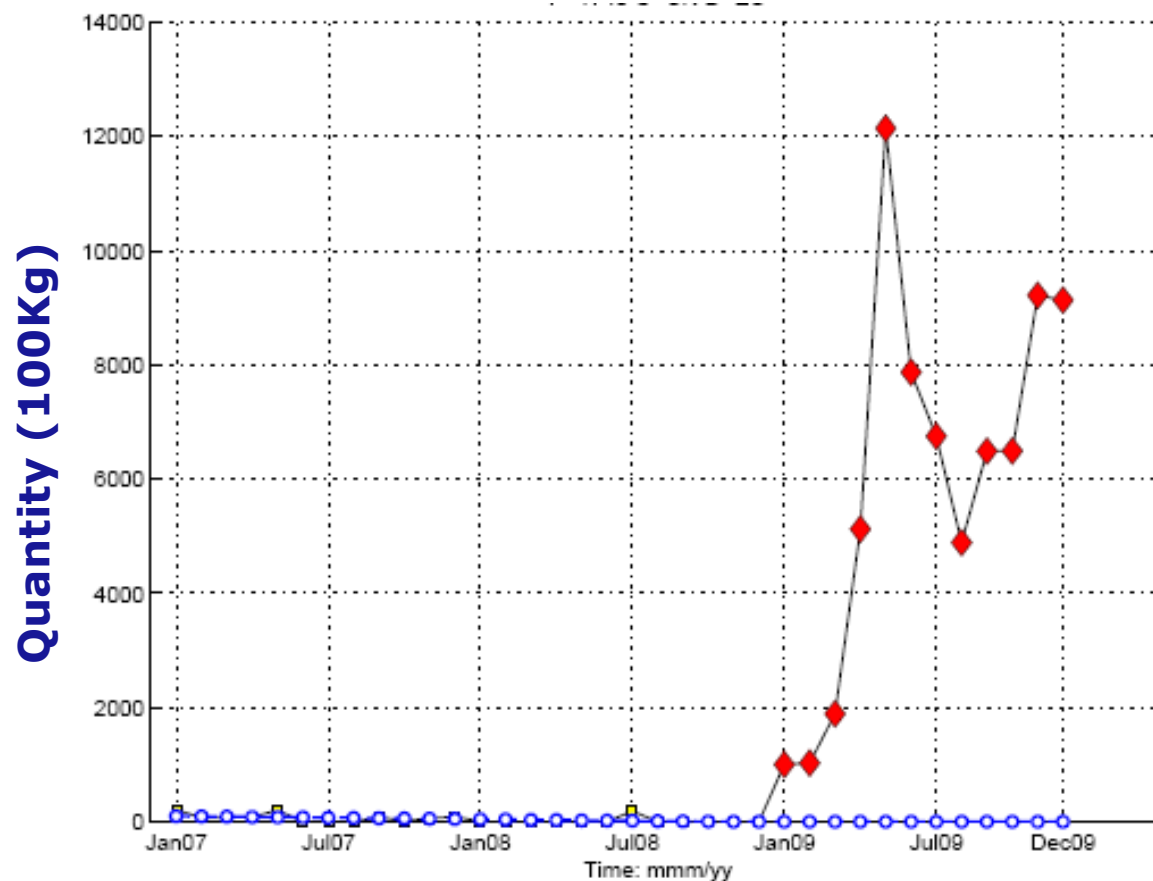
Product: 01740; Meat and offal (other than liver) of poultry of subgroup 001.4, prepared or preserved, n.e.s. **Origin**: China; **Destination**: EU

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Illegal/unregistered trade

The scale of illegal meat importation from Africa to Europe via Paris

Chaber et al., (2010); Conservation Letters, p 1-7

Sanitary inspections at Roissy-Charles de Gaulle airport, Paris, between 3 and 20 June 2008. 29 Air France flights from Central and West Africa were checked.

Passengers carrying iceboxes were targeted for inspection, and other passengers chosen at random. 134 passengers were inspected, of which almost half were carrying meat or fish (note that part of the inspection was targeted).

Most bushmeat was recovered fresh, having been slaughtered shortly before boarding. 446 kg of fish were found, 131 kg of livestock and 188 kg of bushmeat. For bushmeat, average individual consignments were over 20 kg.

The authors estimate that for the Air France routes checked, **63.2 tonnes of meat and fish were imported per week,** of which 5.25 tonnes was bushmeat (3287 and 273 tonnes per year, respectively, if these figures are representative).

Illegal/unregistered trade

Zoonotic agents in confiscated wildlife products collected at US airports

Samples from 44 animals were checked, of which 35 rodents and 9 NHPs (nonhuman primates) comprising 2 chimpanzees, 2 mangabeys, and 5 guenons.

Pathogen screening identified retroviruses (simian foamy virus) and/or herpesviruses (cytomegalovirus and lymphocryptovirus) in the NHP samples.

Uncertainties/limitations of the study:

• Illegally imported shipments were confiscated opportunistically and thus the study established only the presence and not the prevalence of zoonotic agents in the specimens;

• Virus isolation was not performed to determine the infectiousness of the specimens at the time of confiscation.

Results and reporting

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Data analysis

Signal identification and filtering

75 data sources monitored during the start up phase.

The characterisation of potential signals by five criteria (scored as High, Medium or Low) has been trialed:

- Novelty
- Soundness
- Imminence
- Scale
- Severity

Potential signals (Feb 2010 – May 2011)

- Approximately 2200 signals discussed.
- 158 potential signals brought to the attention of the primary filter over this 16 month period.
- 25 Briefing notes prepared.
- 12 signals judged to be worth follow up.
  - Presentation to the secondary filter

Issues prioritised for action were identified mainly from the scientific literature.

Potential signals (Feb 2010 – May 2011

- ## Specific chemical and biological hazards:
  - e.g. Trends in trade and primary production linked to reports of contaminated products through RASFF

- ## New technology
  - e.g. synthetic biology

- ## Drivers of change:
  - e.g. climate change, waste management/recycling, biofuels

- ## Old friends:
  - Listeria, Antimicrobial resistance, Chemical mixtures

Experience with RASFF

- Deals almost exclusively with known hazards
  - Direct signals relate to re-emerging risks.
  - BUT, the reporting may provide useful indirect signals of other changes in the food chain.
  - Most powerful when combined with other data, particularly trade data.

- The tool developed quickly analyses the latest data for trends (with alerts) and first time reporting.

Experience with media monitoring

- MediSys was originally developed to monitor medical information: not well adapted to foodborne risks.

- Lots of data (signals) produced, but of little value.

- Due to low reliability of data sources, the signals are not taken seriously by experts.

- Has proven to be useful when responding to urgent requests, but less so for identifying emerging risks.

- Appeared to have some potential in specific areas such as plant health, animal health and GMO.

Experience with trade data

Eurostat and UN Comtrade

- For identifying trade trends and new trading partners (and commodities).

- Has proved to be useful when combined with data from RASFF.

- Requires broad expertise for interpretation.

Outputs, Lessons Learnt, Next Steps

Outputs/ implementation

- Technical Reports 2009-2011
  - Development of tools for data monitoring (Media, RASFF, Trade)
  - Outsourced project MODMAP – (end 2011) effect of climate change on mycotoxin production in cereals.

- Networking established in 2010
  - Emerging Risks Exchange Network (MS)
  - Stakeholder consultative group on emerging risks

- EMRISK technical report (July 2012)

  Piloting a process for emerging risks identification; lessons leanrt and next steps

Lessons learnt

- Holistic monitoring for signals of emerging risks is not very efficient (resource demanding, producing a modest number of signals).

- Expertise and networking are a vital part of the process, particularly for filtering signals.

- The monitoring priority should be on non-regulated areas and not previously assessed hazards rather than changing exposure to known hazards.

Future developments

- **Targeted issues/topics** should be agreed prior to the selection of sources of information for data collection;

- Filtering to be assisted by a **Standing Working Group of the Scientific Committee**.

- Improved traceability through the emerging risk identification system by further refining filtering criteria at each step of the process.

New and future tasks

Data sources:

- Chemical hazards database – summary toxicogical data from all EFSA chemical opinions will be gathered into a database, with a view to better sharing data on chemical hazards with other institutions (OECD echem portal, ECHA, WHO).

Specific issues:

- Energy drinks consumption data, following a request by the AF (report due end 2012).

- Internal task force on chemical mixtures – to review the state of the art of risk assessment of mixtures (report due February 2013).

- A review of omics and food safety risk assessment (report due July 2013).

- Bee health, including weakening of honey bee colonies.

Future networking

- Other European and International Agencies (already FAO)

- Key third countries (already US-FDA)