

The role of risk assessment in addressing the safety of foods of animal origin

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What is risk assessment?

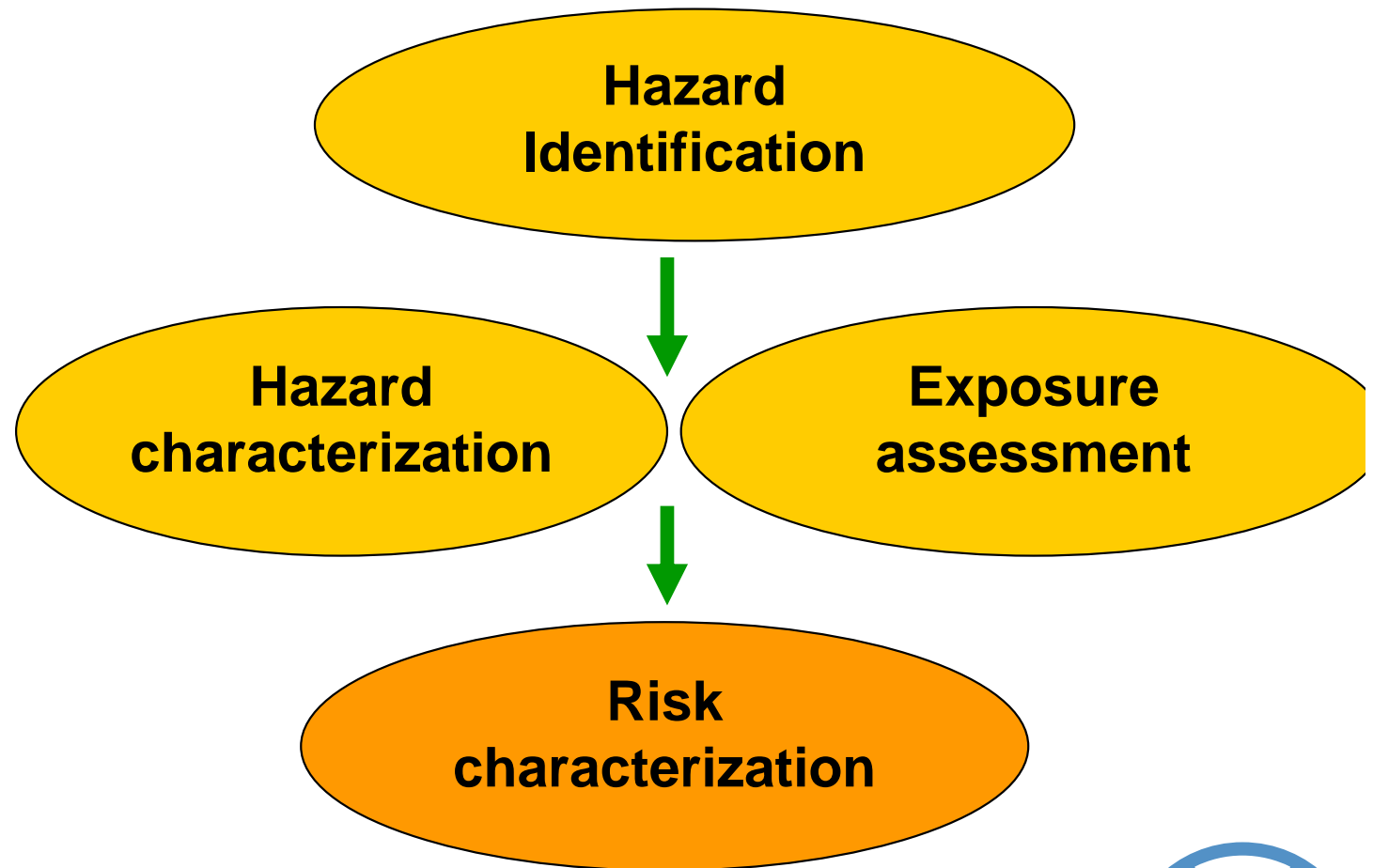
- A tool
 - for use in improving food safety

- APPLICATION: To assist risk managers in taking actions that lead to safer food



Risk assessment framework

- Defined by Codex Alimentarius
- A systematic approach for the provision of scientific advice to risk managers



Benefits and role of risk assessment?

- Enables a linkage between management action and impact on consumer health
- Provides a transparent science based foundation to underpin risk management actions, standards, regulations
 - Meeting SPS obligations
- Facilitates comparisons of different approaches
 - before implementation (helps in selection of best options)
 - after implementation - establishment of equivalence



Benefits and role of risk assessment

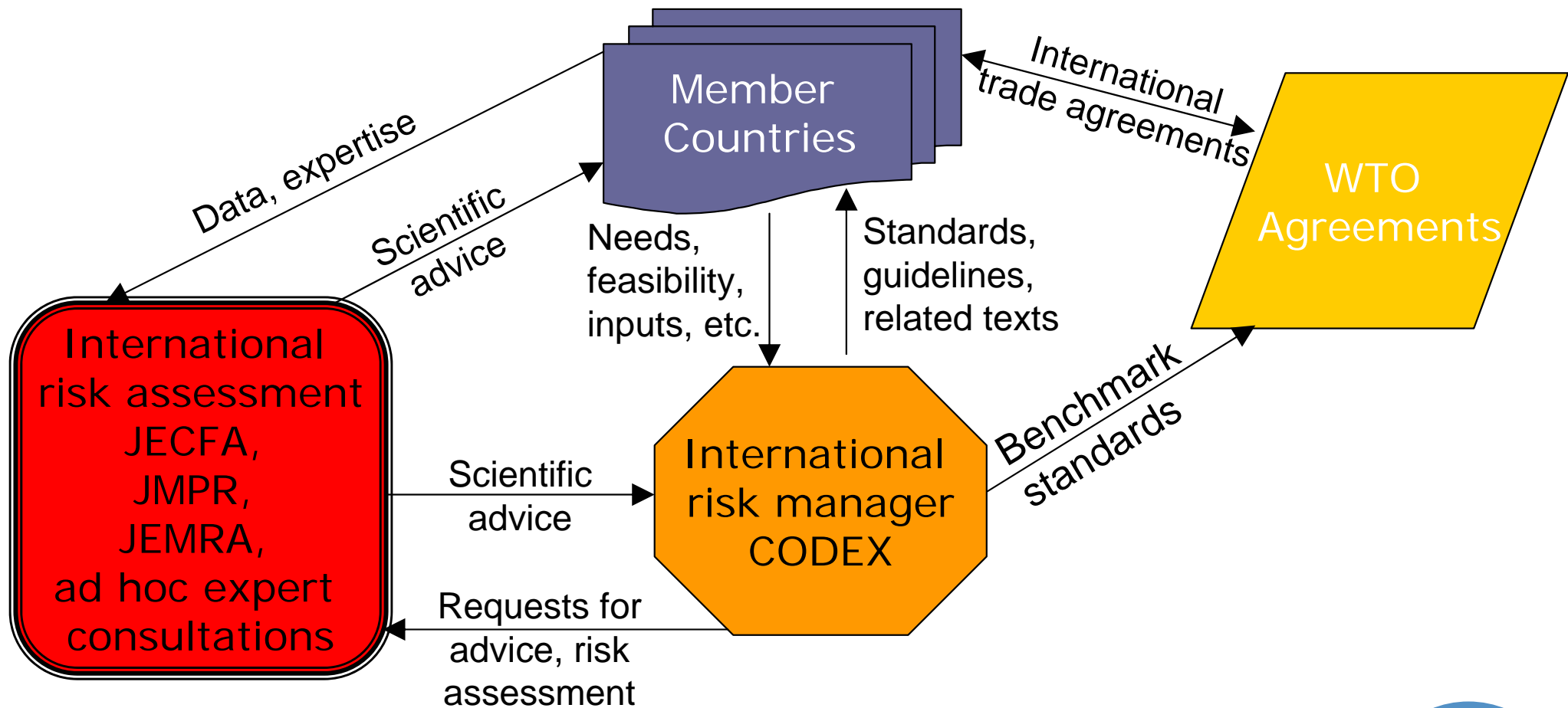
- ❑ Not always needed but of particular value when issues are complex
- ❑ Facilitates an in-depth look at the food chain of concern – gain greater insight into issues, problems



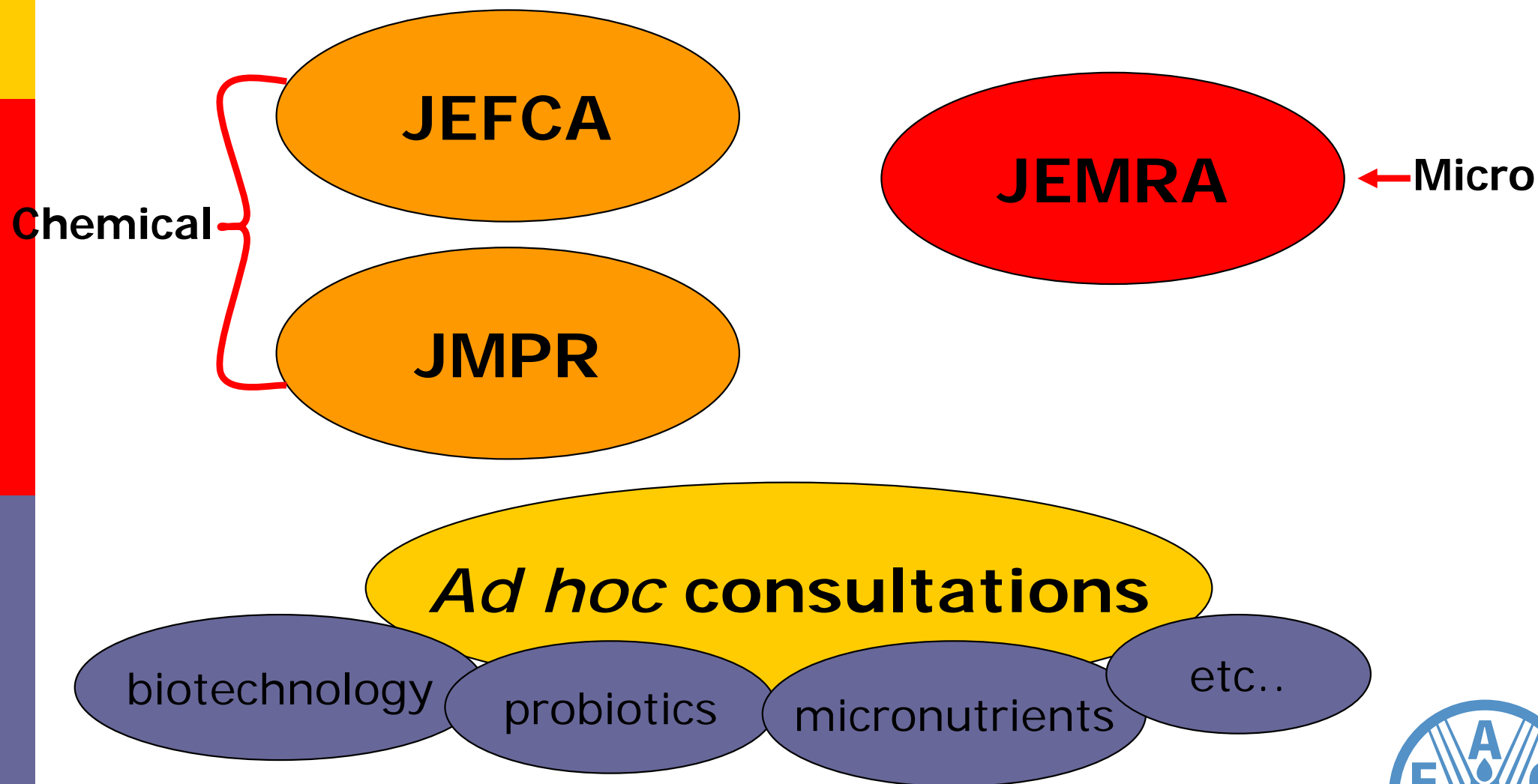
- ❑ Establishment of performance objectives



Risk assessment in an international arena



Risk assessment groups at FAO



International risk assessments

- Not a new activity
- JECFA celebrated 50th anniversary in June
- But risk assessment process continues to evolve
- Expands to cover new areas of hazards
 - only began looking at microbiological hazards in 2000
- Undertaken in response to specific requests from Codex and member countries
 - Underpin international standard setting process
 - Provide risk based advice for countries



Areas of risk assessment relevant to foods of animal origin

Chemical

- Residues of veterinary drugs
- Food additives and flavouring agents
- Pesticide residues
- Naturally occurring toxicants
- Acrylamide
- Dioxins

Microbiological

- Well known pathogens
 - *Salmonella*
 - *Listeria monocytogenes*
 - *Campylobacter*
 - Enterohaemorrhagic *E. coli*
- Antimicrobial resistant microorganisms

- Foods derived from genetically modified animals
- Lactoperoxidase system



EXAMPLE 1: Residues of veterinary drugs

- the treatment of the animal with veterinary drugs prior to slaughtering

- JECFA establishes
 - Maximum Residue Limits (MRLs)
 - Acceptable Daily Intakes (ADI's)
 - Principles for evaluating the safety of residues of veterinary drugs in food and for establishing ADIs and MRLs for certain drugs when they are administered to food-producing animals in accordance with good veterinary practices



EXAMPLE 1: -Neomycin

- **Acceptable daily intake:** The ADI of 0-60 mg/kg bw (established at the forty-seventh meeting of the Committee (WHO TRS 876, 1998)) was maintained.
- **Residue definition:** Neomycin
- *Recommended maximum residue limits (MRLs)^a*

Species	Liver (mg/kg)	Kidney (mg/kg)	Milk (mg/kg)
Cattle	500	10 000	1500

^aThe MRLs of 500 mg/kg for cattle muscle and fat and all other MRLs recommended at the forty seventh meeting of the Committee (WHO TRS 876, 1998) were maintained.



EXAMPLE 1: Impact of no risk assessment

2001/2002 - DISRUPTIONS IN FOOD TRADE CAUSED BY DETECTION OF TRACE AMOUNTS OF CHLORAMPHENICOL AND NITROFURANS IN ANIMAL PRODUCTS

➔ **Veterinary drug residues without ADI/MRL**

- **FAO/WHO meeting, 2004**
- Identified the scientific, technical and regulatory problems
- Appropriate follow-up steps
 - Analytical methodology – considered measures and made recommendations
 - Recommended that work on international MRLs for veterinary drugs that have been evaluated by national governments and are currently in use is completed within the coming ten years
 - Require innovative approaches to capacity building.

REPORT:

http://www.fao.org/es/ESN/food/meetings_vetdrugs_en.stm



Other residues/chemicals of concern

- Contaminants in animal feedstuffs
 - Mycotoxins
 - Heavy metals
 - Dioxans
 - Pesticide residues

- Growth promoters
 - Antimicrobials - issue of antimicrobial resistance – risk assessment forthcoming
 - Hormones – risk assessments undertaken, some ADI,s established



EXAMPLE 2: Aflatoxin M₁ in milk

- Question from Codex - 0.05 or 0.5 µg/kg?
- JECFA risk assessment
 - Used data from a range of countries
 - Considered susceptible populations (prevalence of Hep B)
 - Looking at risk of liver cancer
 - Risk estimate – worst case scenario
 - Non hepatitis carriers – risk so low impossible to demonstrate
 - With 1% Hep+
 - 0.05 µg/kg – 3.2 cases cancer / 1000 million / year
 - 0.5 µg/kg - 32 cases cancer / 1000 million / year
 - Conclusion – small difference – focus on vaccination and control of hepatitis



EXAMPLE 2: Aflatoxin M₁ in milk

- JECFA risk assessment → CCFAC
- Discussed and debated
- Differing opinions
- Results of risk assessment – scientific advice
→ 0.5 µg/kg adopted
- adequate for the protection of consumer health
- reasonably achievable for all countries
- Implications of lower ML
 - a significant reduction in the availability of milk in developing countries
 - negative implications from a nutritional point of view.



Microbiological hazards in foods of animal origin

- Pathogens can enter at various places along food chain
- Dynamic hazard....can decrease or increase depending on the microorganism
- Risk assessments on
 - *Salmonella* in eggs and broiler chickens
 - *Campylobacter* in broiler chickens
 - *Listeria monocytogenes* in milk, fermented meats



EXAMPLE 3: *Listeria monocytogenes* (milk, fermented meats)

- ❑ Differences in national approaches to addressing the problem of *Listeria* contamination and so difficult for Codex to agree on a management approach
- ❑ Risk assessment undertaken from retail to consumption
- ❑ Output
 - Predicts that nearly all cases of listeriosis result from the consumption of high numbers of *Lm*.
 - Preventing exposure to high levels has the greatest impact.
 - Most cases of listeriosis are associated with the consumption of foods that do not meet current standards (e.g. absence in 25g, 100cfu/g,.....)



EXAMPLE 3: Criteria vs compliance - which is more important?

Assumed percentage of "defective" servings	<u>Predicted number of listeriosis cases per year</u>	
	Initial standard of 0.04 cfu/g	Initial standard of 100 cfu/g
0	0.5	5.7
0.00001	1.7	6.9
0.0001	12.3	17.4
0.001	119	124
0.01	1,185	1,191
0.018	2,133	2,133
0.1	11,837	11,848
1	117,300	117,363



EXAMPLE 3: Importance of compliance with established criteria

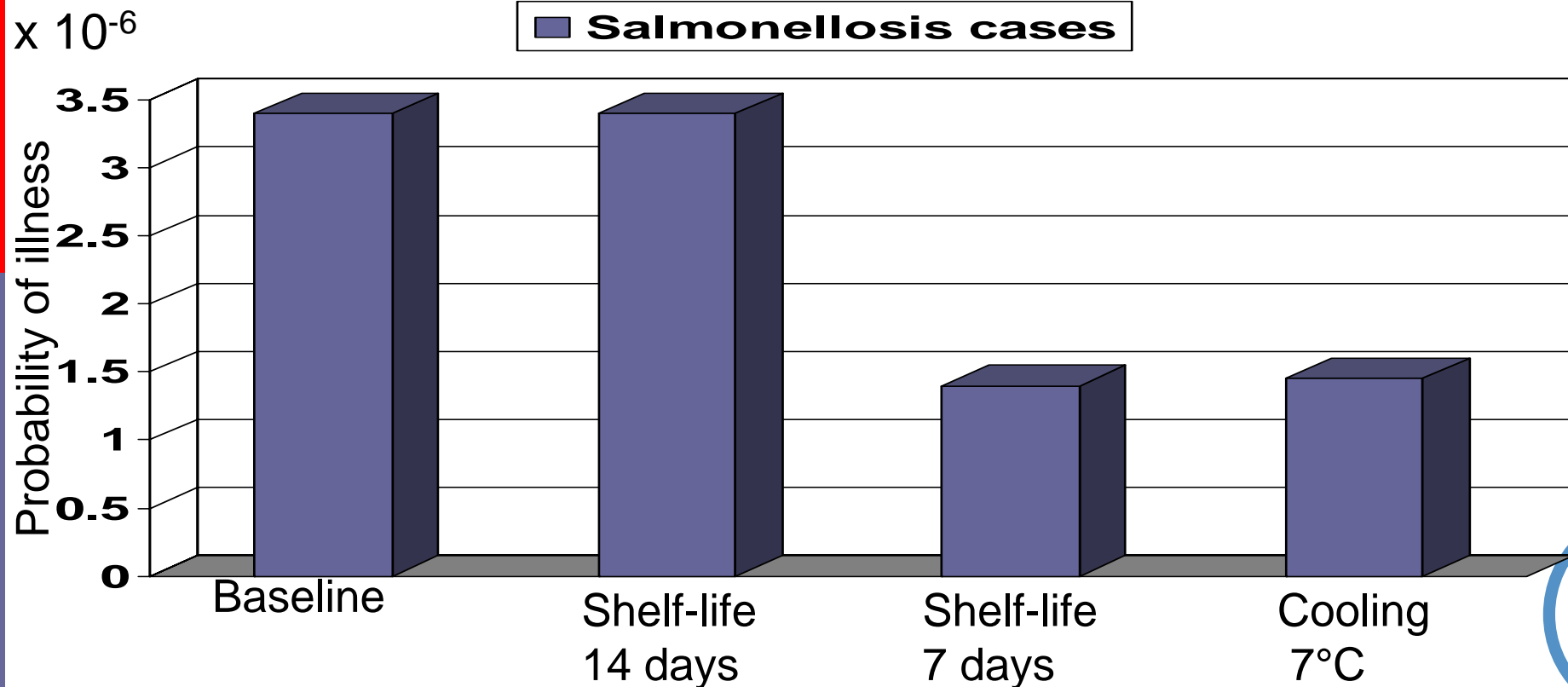
The rate of defective servings is a more significant risk factor than the numeric value of the criterion within the range that CCFH asked the risk assessment team to consider



EXAMPLE 4: *Salmonella* in eggs

- Risk assessment focussed on evaluating a range of control measures – comparative assessment

Salmonella in eggs: Shelf-life and cooling scenarios



Future work – EHEC's in meat and meat products

- Addressed by existing approaches – GHP, GMP etc.
- But e.g. July/August 2006:
 - 28 events/outbreaks of *E.coli* 0157:H7 with approx 248 human cases.
 - 8 of these events have led to changes in control measures; 6 recalls; 10 in public education campaigns; and 4 in legal actions.
 - Large economic costs to society

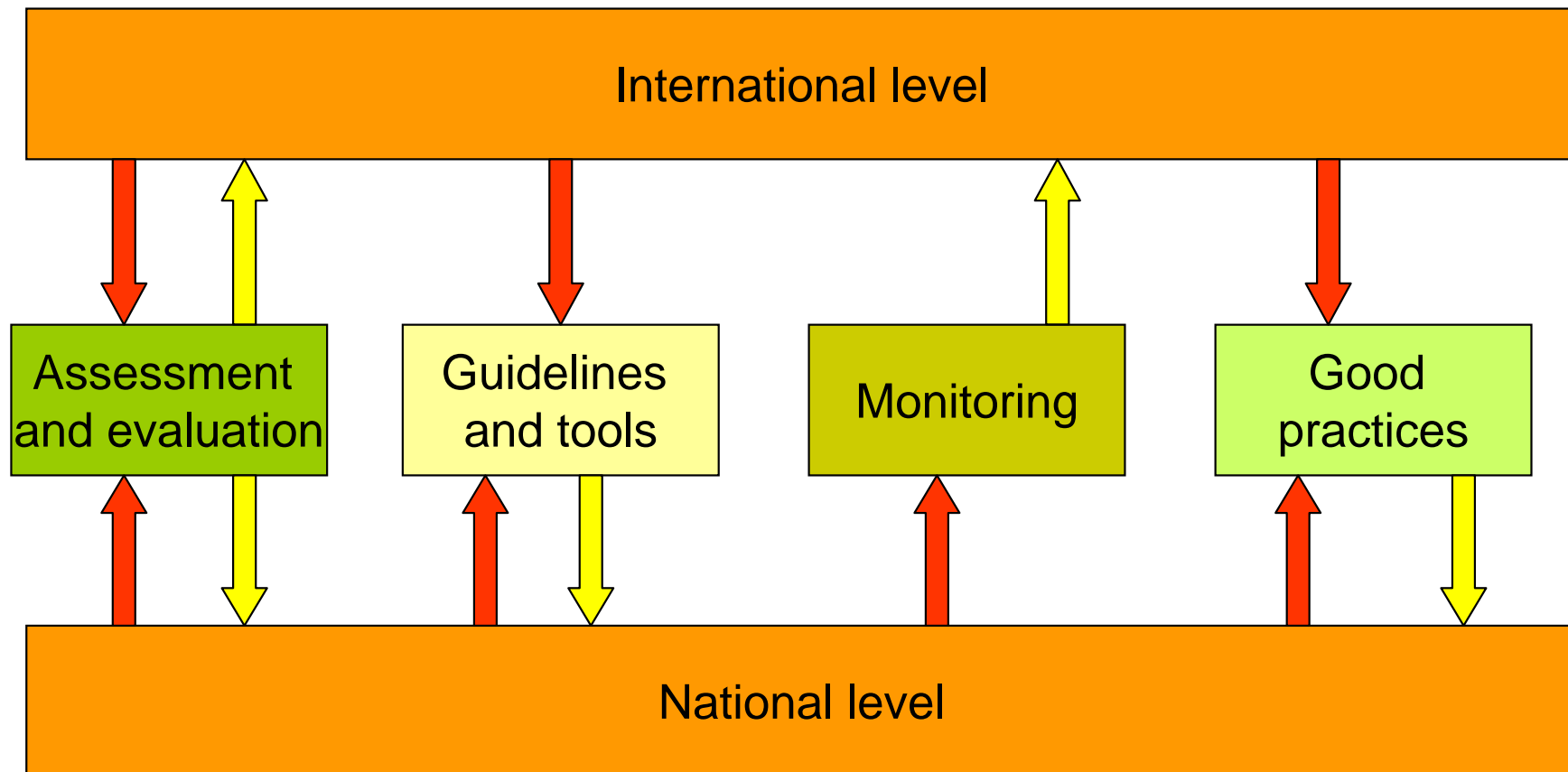


New work – EHEC's in meat and meat products

- 5 risk assessments developed at national level over a 10 year period
- Learning process – only the most recent had true interaction between risk assessors and risk managers
- Many undertaken as a research exercise
 - But good basis for future work
 - Move in some countries to re-evaluate their measures using risk assessment



Risk assessment integral part of overall system



For more information

- FAO webpage

http://www.fao.org/ag/agn/food/riskassessment_en.stm

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