Safety of Food Additives: The Regulatory Roadmap

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GMA
The Association of Food, Beverage and Consumer Products Companies

JOHNS HOPKINS UNIVERSITY

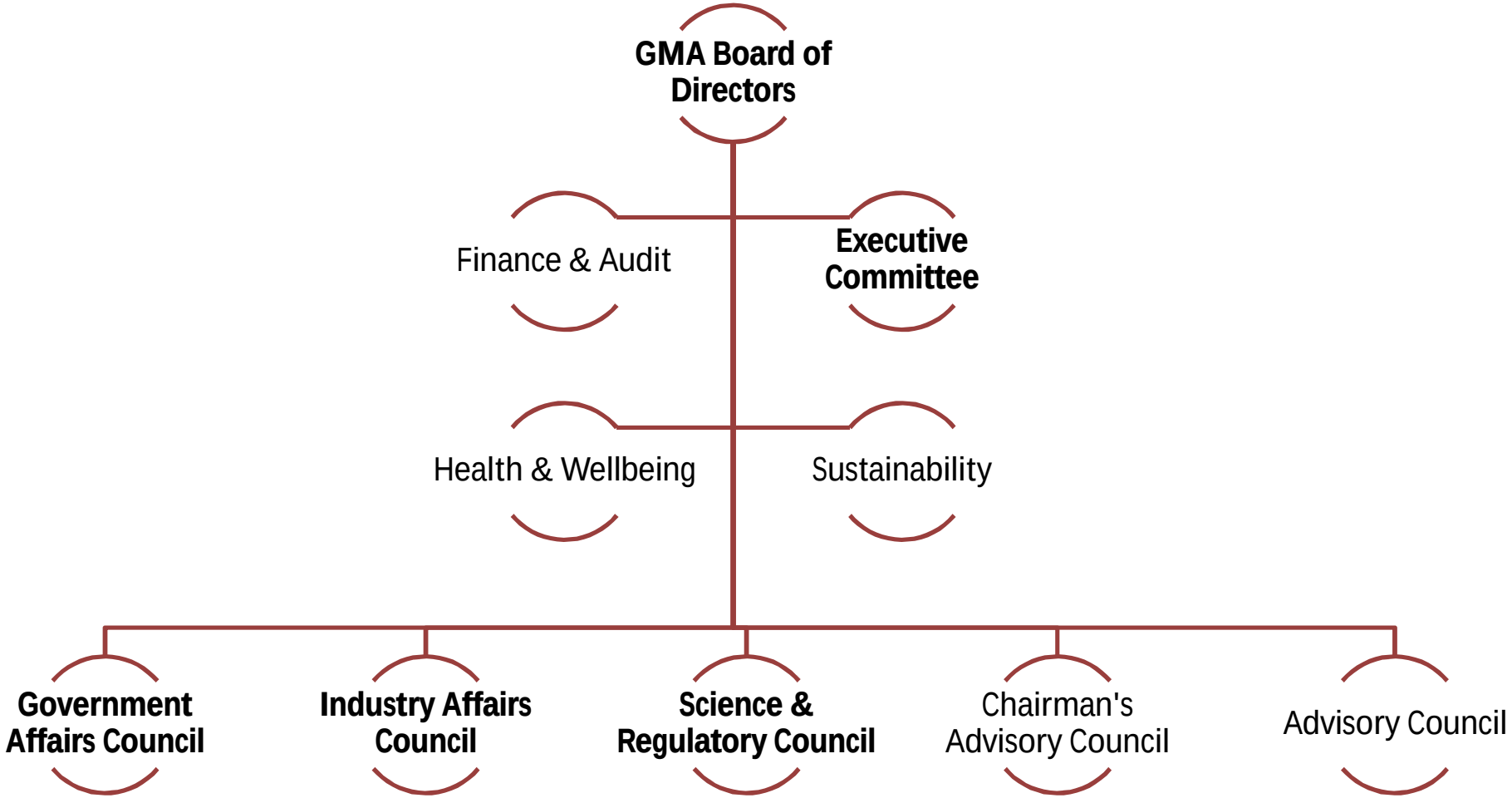
Agenda

- GMA overview
- Food Additives
- Determining Regulatory Status - FDA
- Risk Assessment Process
- FDA Safety Standards

The GMA Purpose

Provide a voice for the CPG industry as we seek to improve the health and wellbeing of consumers and society.

Executive Leadership



Science & Regulatory Affairs

Mission

Develop and promote science-based solutions that enhance the safety, quality and compliance of GMA member's products in order to build the trust and confidence of consumers.

What We Do

Provide science-based solutions that help members improve integrity of consumer products to build consumer confidence and trust

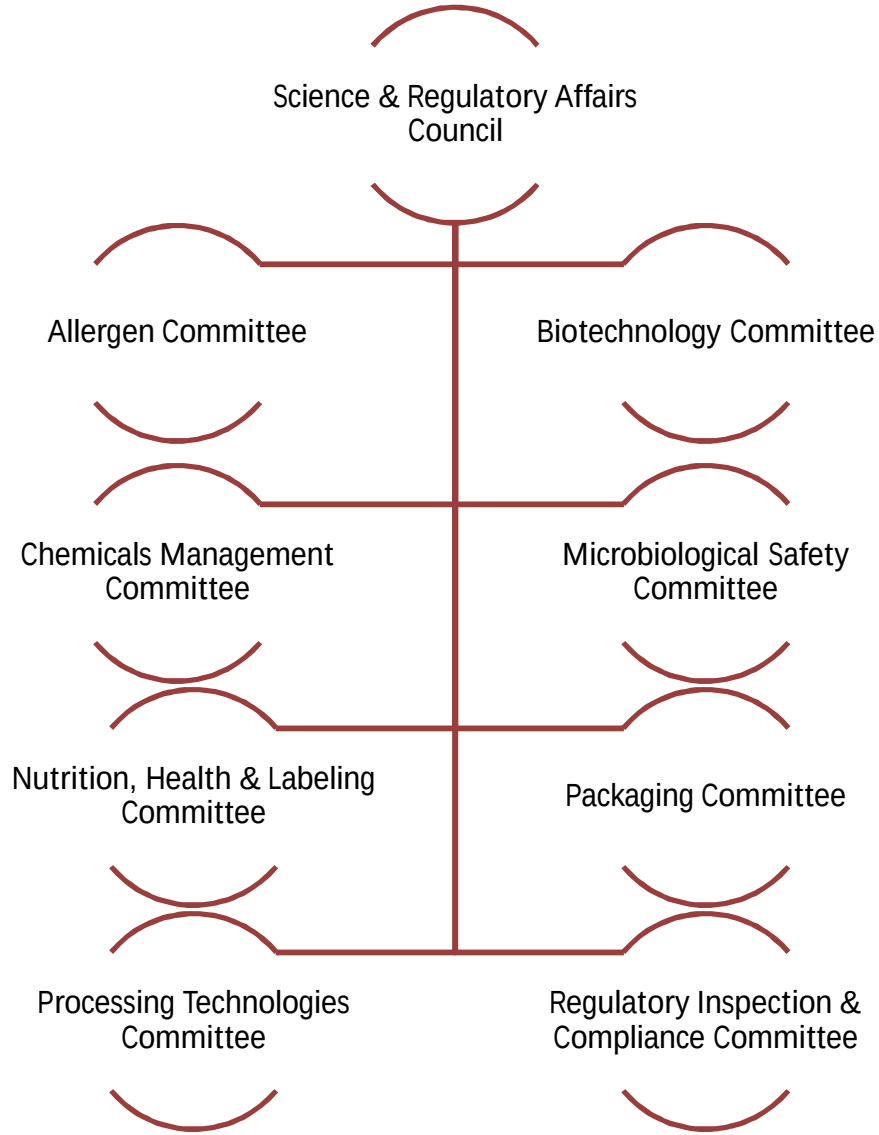
Product Safety & Regulatory Compliance

- **Policy engagement**
- **Member collaboration**
- **Technical service**

Consumer Product Information & Transparency

Nutrition, Health & Wellbeing

Science & Regulatory Affairs



Ingredient Safety

- **Consumer Packaged Good**
  - Ingredients
  - Contaminants

GMA Participation in Codex

ICGMA International Council of Grocery Manufacturer Associations ***Mission:***

Advance science-based international policy in Codex Alimentarius

- Promoting harmonization within Codex standards and policies, and
- Facilitating international trade

ICGMA is accredited as an observer organization in Codex

FDA - Food Additives

"The term ''Food Additive'' means **any substance** the intended use of which results or may reasonably be expected to result, **directly or indirectly**, in its becoming a component or otherwise **affecting the characteristics of any food** ...if such substance is not generally recognized, among experts qualified by scientific training and experience to evaluate its safety, as having been adequately shown ...to be safe under the conditions of its intended use (GRAS)..."

Sec. 201(s) FFDCA: Definition

Food Additive Consumption

- A person eats more than 1 kg of food a day, every day of the year for almost an entire life
  - 1kg/d x 365 d/yr x 82 yr = 29,930 kg/life or ~30 tons/life**
- A person eats ~65 kg of direct food additives a year, every A year for almost an entire life
  - 65 kg/yr x 82 yr = 5330 kg food additives/life**
    - After removing the common food additives (~95%) – salts, sugar, etc. – a person eats 1.43 kg food additives a year
    - 1.4 kg/yr x 82 yr. = 115 kg all other food additives/life
    - 1.4 kg/yr ÷ 365 d/yr. = 4 g all other food additives/day
- There are hundreds of direct food additives, so most are consumed in sub-milligram amounts, and not every day

**Advanced Comprehensive Toxicology, American College of Toxicology

Types of Food Additives

- **Added Directly to Food for an Intended Effect**
  - **Direct Additives:** Sweeteners; preservatives; nutrients; fat substitutes; texturizers (e.g., thickeners, emulsifiers); flavors
  - **Color Additives:** In food (also includes animal feed, drugs, cosmetics, and medical devices

Types of Food Additives

- **Indirect Additives**
  - **Food Contact Substances:** Coatings (paper, metal, etc.); new/recycled plastics including polymers and monomers; paper; adhesives; colorants, antimicrobials, and antioxidants in packaging; packaging materials used during food irradiation; packaging "formulations"
  - **Processing Aids:** Antimicrobials (meat and poultry processing); defoamers; ion exchange resins

Other Food Ingredients

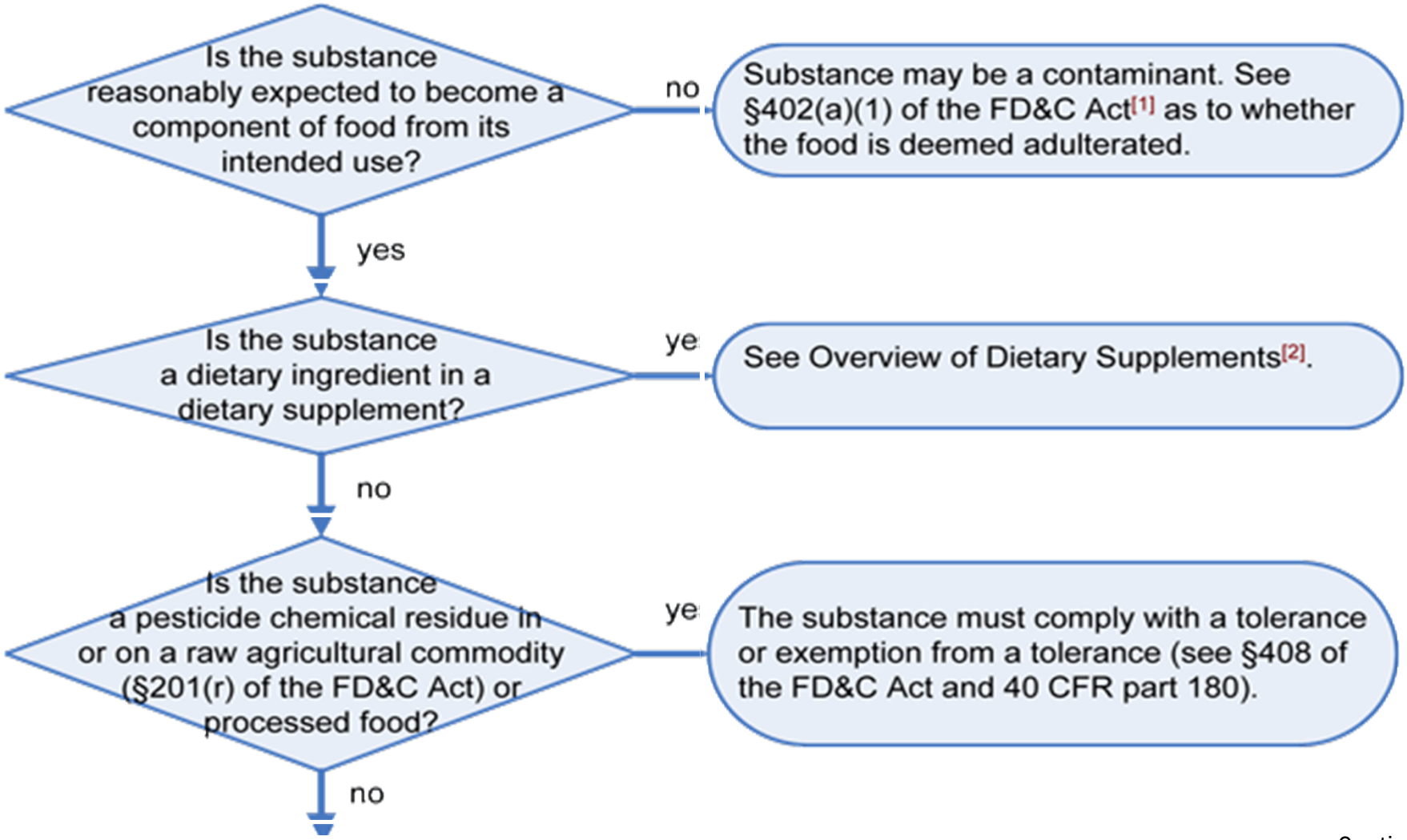
- Other “Ingredients”:
  - **Food Irradiation Equipment:** To process food or to inspect food
  - **GRAS Substances:** Enzymes; fibers; proteins; lipids; carbohydrates
  - **Foods/Ingredients Produced Via Biotechnology:** Plants with herbicide resistance or insect resistance; delayed ripening, etc.

Types of Food Ingredients

Preservatives	Sweeteners	Color Additives	Flavor and Spices	Flavor Enhancers
Fat Replacers	Nutrients	Emulsifiers	Stabilizers & Thickeners, Binders, Texturizers	Leavening Agents
Anti-Caking Agents	Humectants	Yeast Nutrients	Dough Strengtheners & Conditioners	Firming Agents
Enzyme Preparation	Gases			

http://www.fda.gov/downloads/Food/FoodIngredientsPackaging/ucm094249.pdf

Determining Regulatory Status



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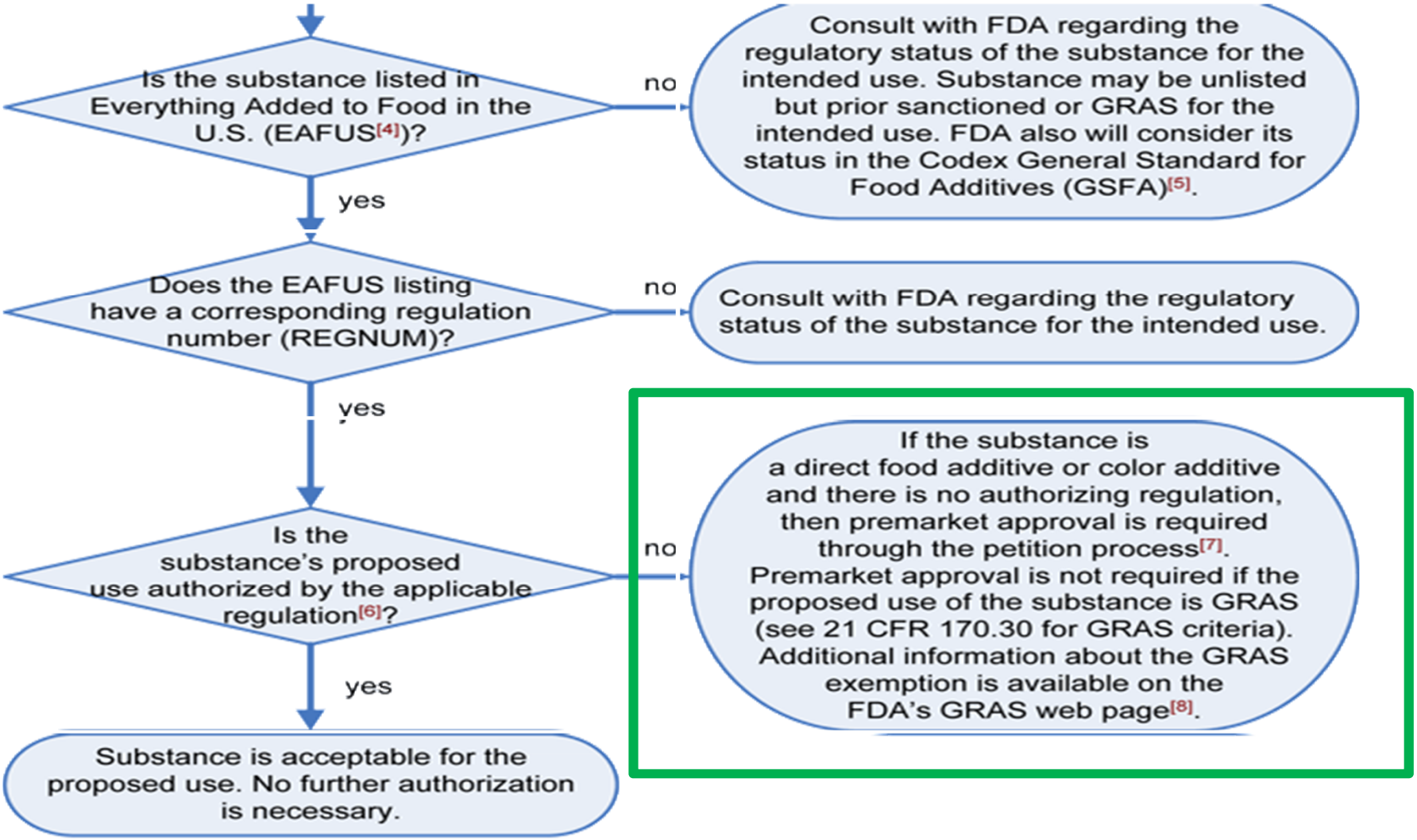
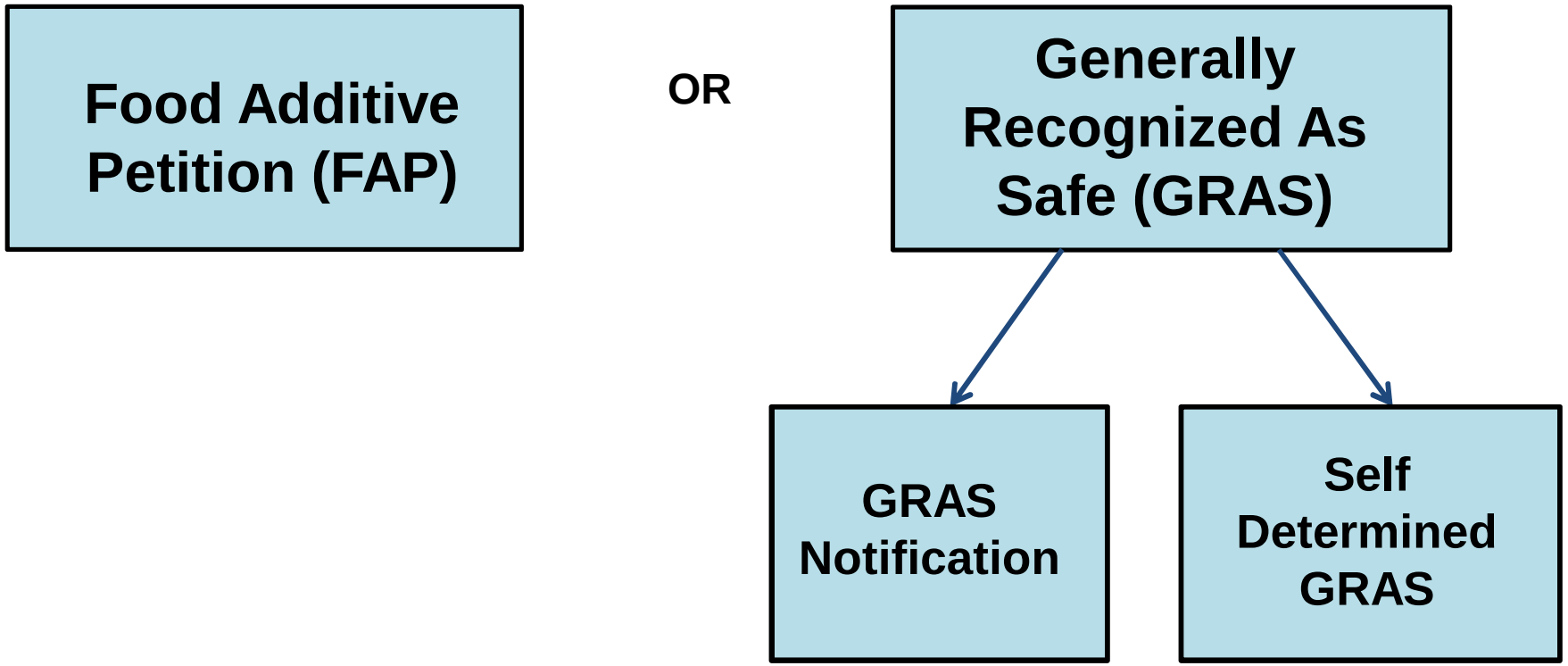
Determining Regulatory Status

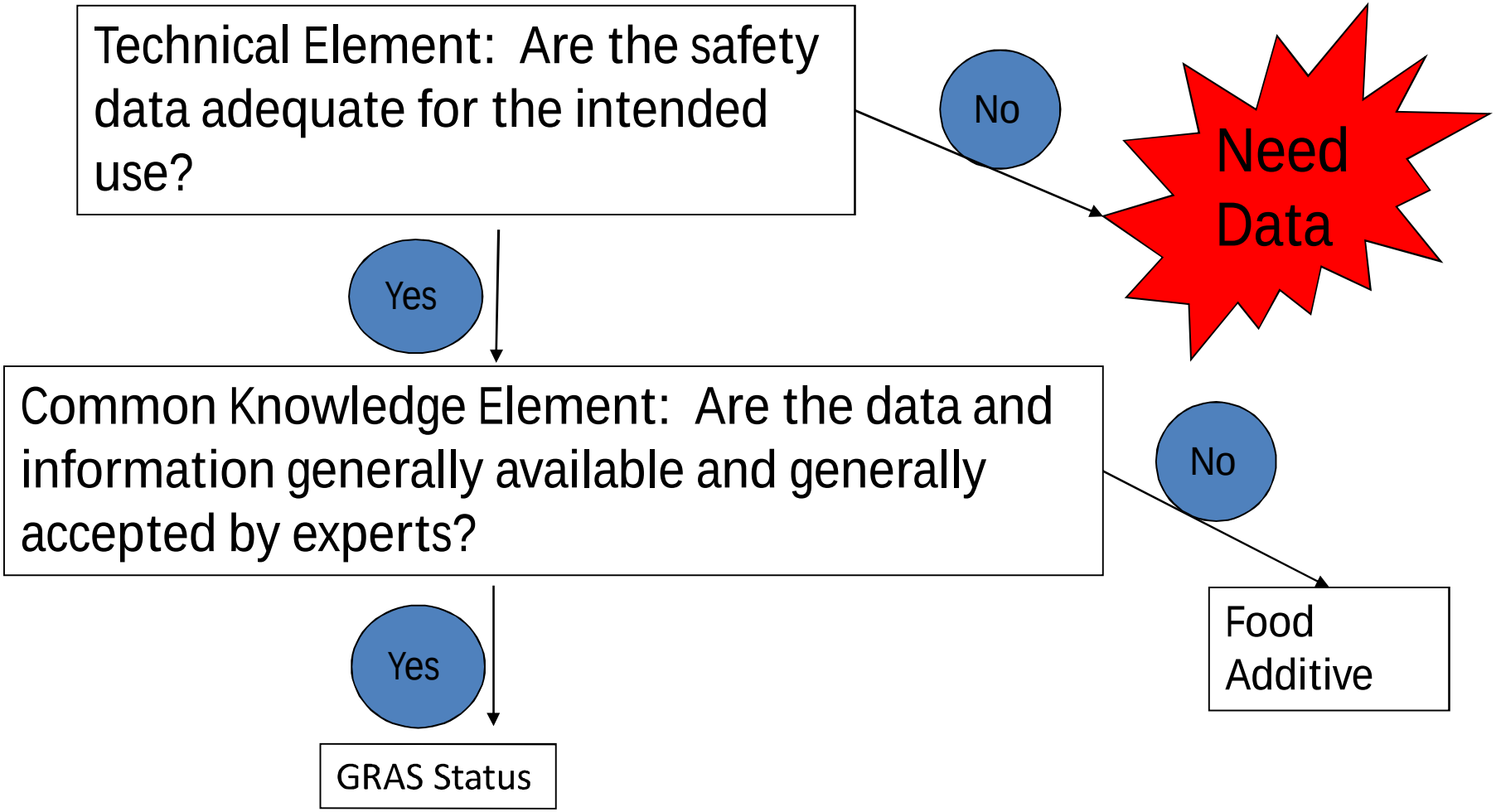


http://www.fda.gov/Food/IngredientsPackagingLabeling/FoodAdditivesIngredients/ucm228269.htm

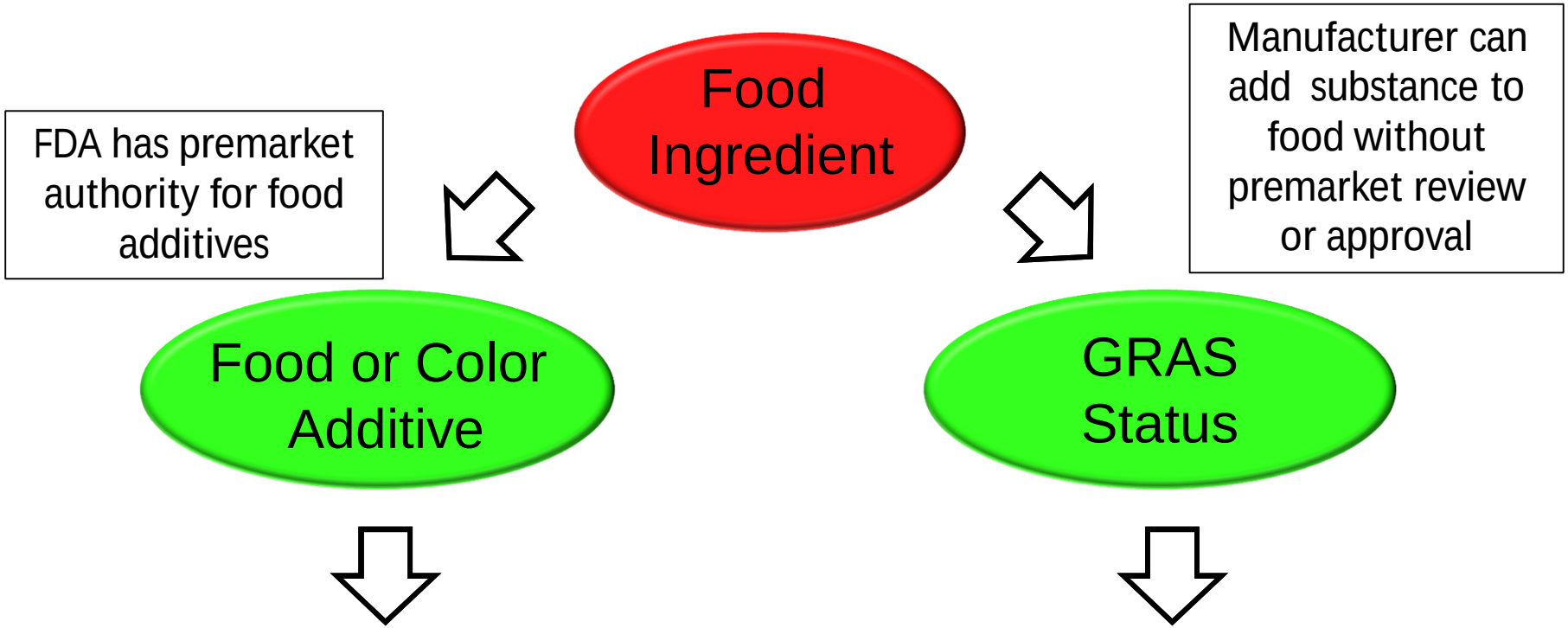
Substances Added to Food



FAP vs. GRAS


Technical Element: Are the safety data adequate for the intended use?
No
Need Data
Yes
Common Knowledge Element: Are the data and information generally available and generally accepted by experts?
No
Food Additive
Yes
GRAS Status

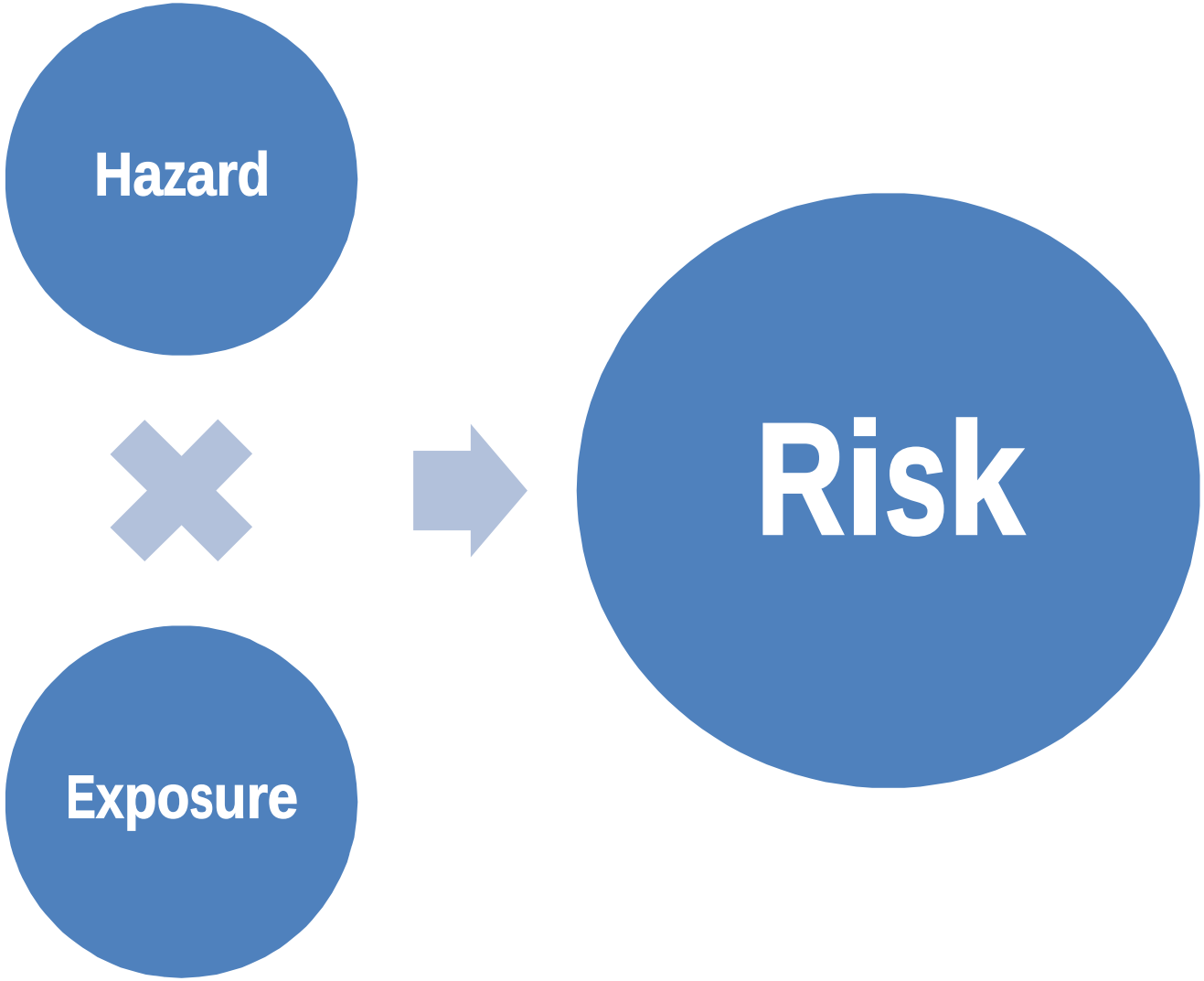
FAP vs. GRAS


Food Ingredient
FDA has premarket authority for food additives
Manufacturer can add substance to food without premarket review or approval
Food or Color Additive
GRAS Status
Evidence of safety
Evidence of safety
& General recognition of safety
(safety data & information must be generally available and generally acceptable)

FAP vs. GRAS

	Level of Evidence	Safety Evidence in Public Domain?	Public Rulemaking Process?	Who Makes Safety Determination?	Timing
Food Additive Petition	Same	Not Required	Yes	US FDA	Years
GRAS Notification	Same	Required	No	Submitter of Notification Uses Experts; FDA Issues No Objection Letter	Months to Get FDA's No Objection Letter
Independently -Determined GRAS	Same	Required	No	Manufacturer uses Experts or Expert Panel	Days to Months

Risk Assessment Process



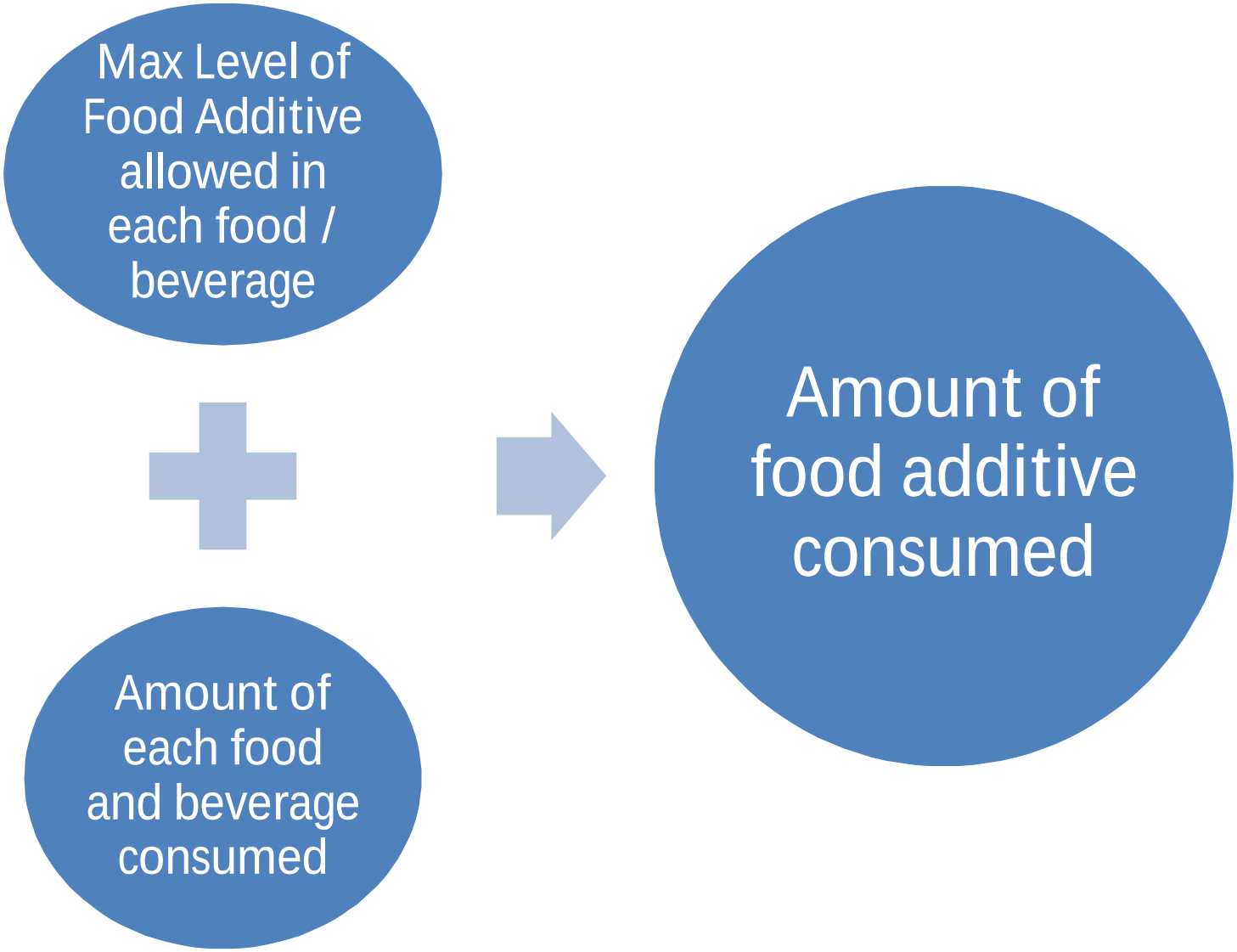
Hazard Determination

- Toxicological Studies
  - Does the additive affect the genetic material?
  - Where does additive go when we consume it?
  - What adverse effects does the additive cause?
    - Carcinogen*
  - Any effect on Reproduction?
- Determining No-Observed Adverse Effect Level (NOAEL) and Lowest Observed Adverse Effect Level (LOAEL)
- Determine an Acceptable Daily Intake (ADI) Level
  - ADI = NOAEL / Safety Factor (100)

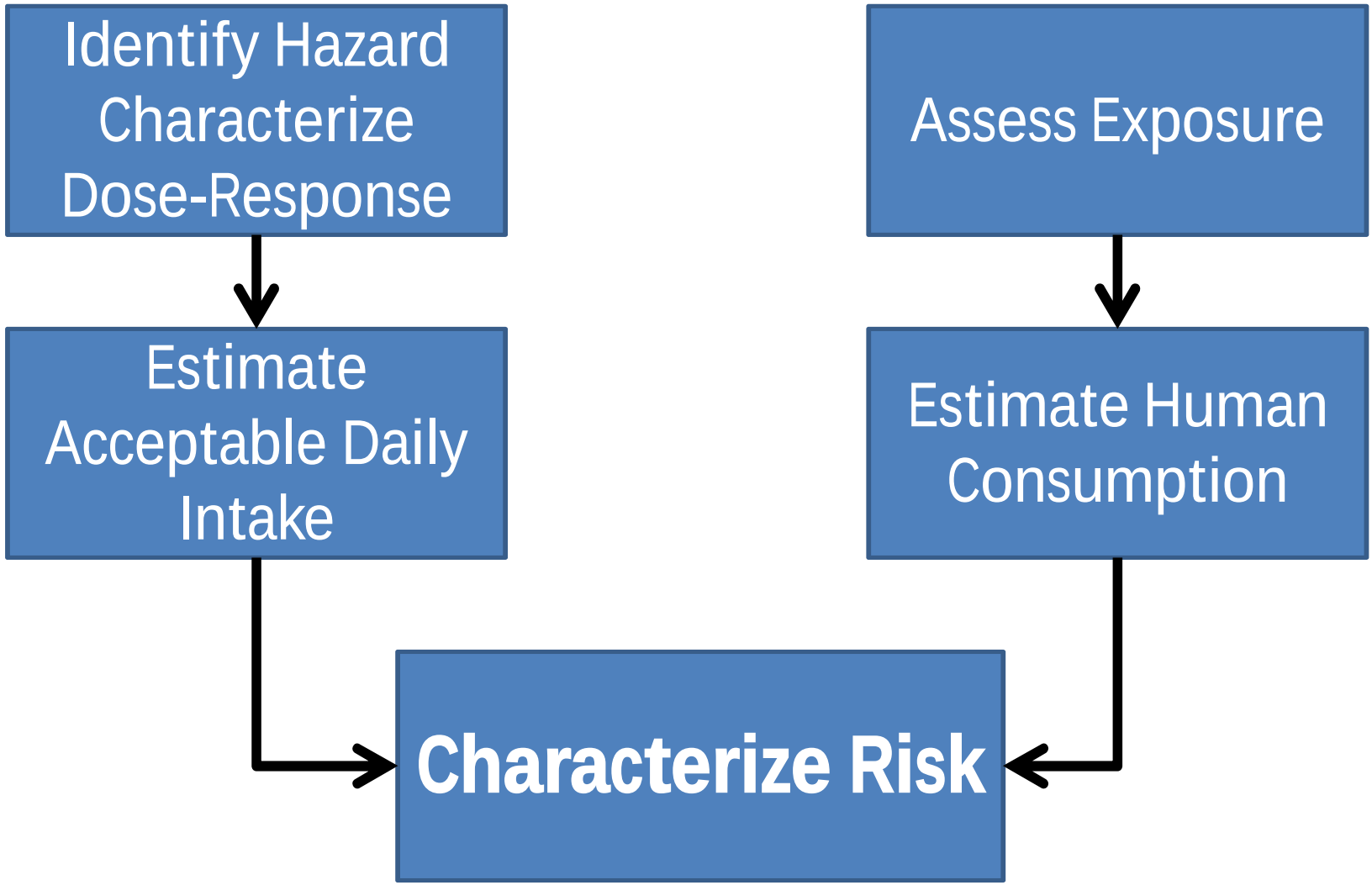
Delaney Clause*

- The Food Additives Amendment of 1958 contained what is known as the Delaney Clause
  - Section 409(C)(3)(A) ... no additive shall be deemed to be safe if it is found to induce cancer when ingested by man or animal, or if it is found, after tests which are appropriate for the evaluation of the safety of food additives, to induce cancer in man or animal ...
- Has been invoked a few times
  - Aminotriazole on cranberries
  - Colorings: FD & C Red #3

Exposure Estimation



Risk Assessment Paradigm



Safety Standards - FDA

"Reasonable certainty of no **harm**"

What is Harm?

-Harm refers to Health

-Man or Animal

The safety standard for additives are higher than food. So they need to be even safer than food

Petitioner burden to demonstrate a "reasonable certainty of no harm"

FDA - How is safety determined?

- Following factors are considered:
  - The **probable consumption of the substance** and of any substance formed in or on food because of its use
  - The **cumulative effect of the substance** in the diet, taking into account any chemically or pharmacologically related substance or substances in such diet
  - **Safety factors** which, in the opinion of experts qualified by scientific training and experience to evaluate the safety of food and food ingredients, are generally recognized as appropriate.

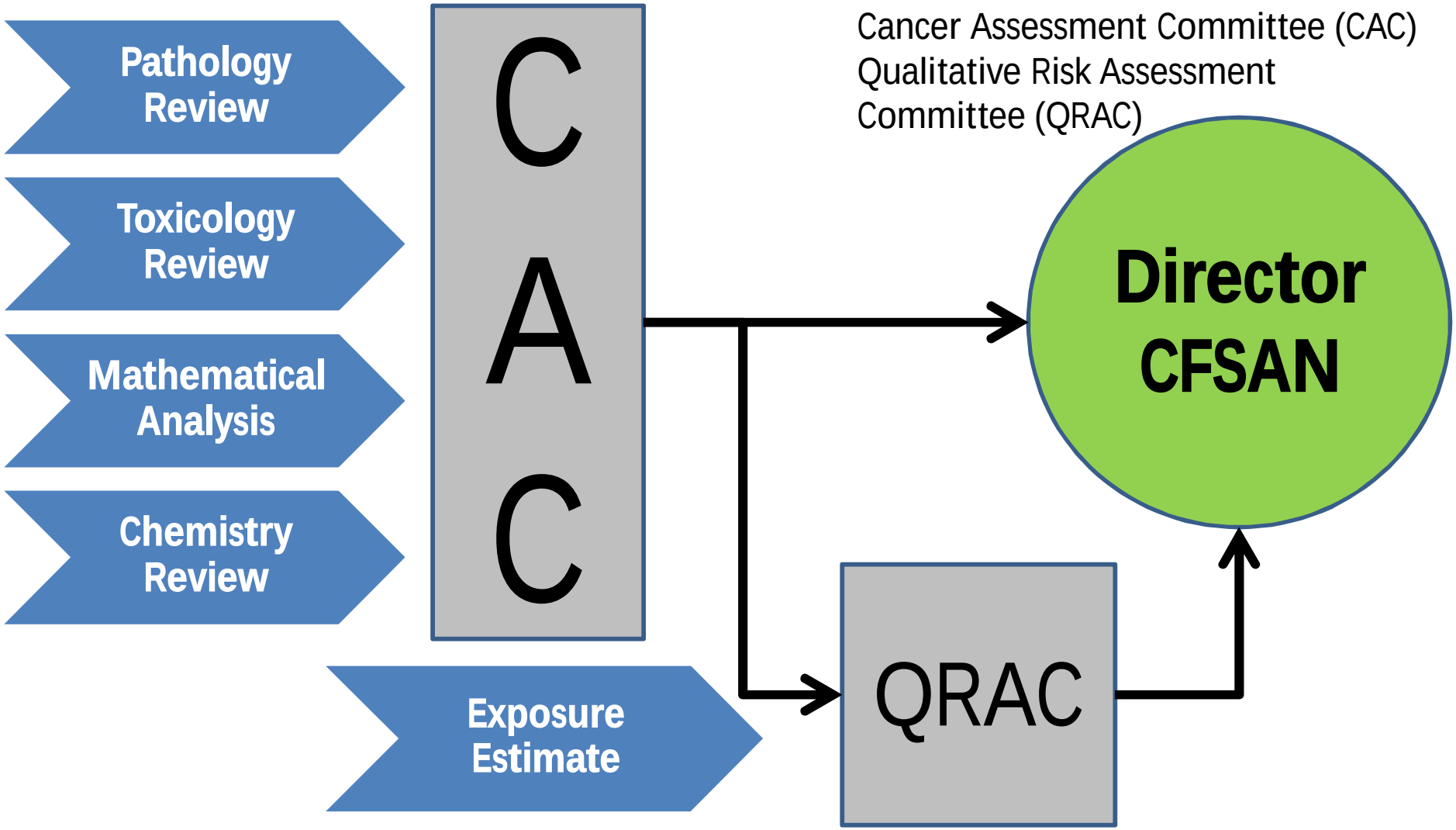
Establishing Safety

- The FDA provides guidance to industry and the public concerning the procedures and methods for safety assessment of food and color additives.
  - "Redbook" ("Toxicological Principles for the Safety Assessment of Direct Food Additives and Color Additives Used in Food") was first published in 1982
  - Latest edition of Redbook - 2000, Revised July 2007
- Establish maximum exposure (Acceptable Daily Intake) based on hazard assessment
- Benefits are not weighed in during safety decision

Redbook: Toxicological Tests

Toxicity Tests
Genetic Toxicity Tests
Short-term toxicity tests with rodents
Sub chronic toxicity studies with rodents
Sub chronic toxicity studies with non-rodents
One-year toxicity studies with non-rodents
Chronic toxicity or Combined chronic toxicity/carcinogenicity studies with rodents
Carcinogenicity studies with rodents
Reproduction studies
Developmental toxicity studies
Metabolism and Pharmacokinetic Studies
Human studies

FDA: Assessment of Cancer Risk



Technical Review

- FDA scientist review data and evaluate petitioner's safety argument
- FDA communicates with petitioner to resolve any questions and/or additional data needs
- FDA review, documentation
- FDA reaches a scientific conclusion and makes a recommendation

Legal Aspects of FAP

- Food Additives unsafe until FDA decision
- Regulations stipulate an identity, specifications and conditions of safe use
- Regulations do not provide specific product approvals
- Direct additives or Food-contact substance

Take Home Message

Historic use of Food Additives

Today additives are used for adding flavor, color…

Regulated by the FDA for product safety

Petitioner is responsible for demonstrating safety

FDA is responsible for data evaluation and issuing regulation

Thank You

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GMA

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