

# Global Perspective on Elemental Impurities in Food Ingredients – Part 1:

## Chemical Contaminants in Food, Canadian Perspective

John Field

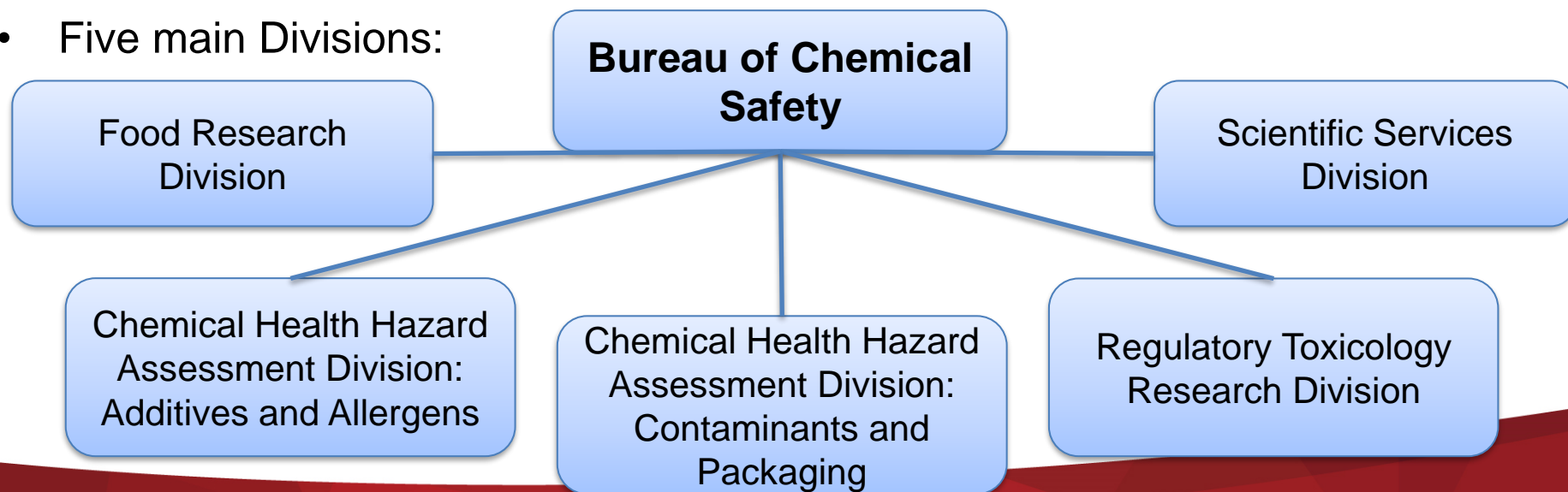
Bureau of Chemical Safety, Food Directorate  
Health Canada



# Food Directorate's Bureau of Chemical Safety: Roles and Responsibilities

- Bureau of Chemical Safety (BCS) sets policies and standards, conducts risk assessments, research, and evaluation activities related to chemicals in foods offered for sale in Canada, including food additives, allergens, chemical contaminants and food packaging materials.
- Participate and contribute to the development of international food safety standards via various Codex committees (e.g., Codex Committee on Contaminants in Foods).

- Five main Divisions:



# Bureau of Chemical Safety

## Food Research

- Identification of chemicals in food
- Analytical method development and standardisation
- Targeted surveys
- Total Diet Study (market basket study)

Occurrence data

## Chemical Health Hazard Assessment

- Health risk assessments
- Development of maximum levels
- Policy development
- Communicates and liaises with public, industry and government stakeholders

Health risk assessment/  
policy development

## Regulatory Toxicology Research

- Identification of adverse health effects associated with chemicals in food
- Research and method development

Hazard identification/  
Hazard characterization

# Canadian Food Inspection Agency (CFIA)

- Collaborative role with Health Canada's Food Directorate to fulfill the federal Government's responsibilities in food safety:
  - Main federal agency conducting surveillance and monitoring of chemical contaminants (metals, mycotoxins, etc.) in foods sold in Canada.
  - Requests health risk assessments and opinions from Health Canada.
  - Surveillance results are provided to Health Canada for:
    - Use in health risk assessments and development of safety standards (MLs)
    - Identification of potentially emerging food safety issues
    - Identification of trends



# International Involvement

- Canada is an active participant in various international committees that contribute to developing safety standards for contaminants in food.
- **Joint FAO/WHO Expert Committee on Food Additives (JECFA)** – hazard characterization and risk assessment of contaminants in food.
- **Codex Committee on Contaminants in Food (CCCF)** – develops and proposes international food safety standards, codes of practice for adoption by the Codex Alimentarius Commission (CAC).
- Health Canada's Food Directorate generally considers assessments conducted by the JECFA and standards and codes of practice adopted by the CAC when developing the approach to management of chemical in food in Canada.



# Canadian Regulatory Framework for Chemical Contaminants

- Part I, Section 4(1) of the *Food and Drugs Act*.
  - No person shall sell an article of food that:
    - (a) has in or on it any poisonous or harmful substance;**
    - (b) is unfit for human consumption;
    - (c) consists in whole or in part of any filthy, putrid, disgusting, rotten, decomposed or diseased animal or vegetable substance;
    - (d) is adulterated; or
    - (e) was manufactured, prepared, preserved, packaged or stored under unsanitary conditions.
- Health Canada will assess on a case-by-case basis to determine if the situation is non-compliant with Part I, Section 4 of the *Act*.
- The presence alone of a contaminant does not mean the food is non-compliant with Section 4(1)(a); a food is non-compliant if it is determined that it may pose an unacceptable health risk.
- Risk management strategies vary depending on the situation; they can be regulatory or non-regulatory.



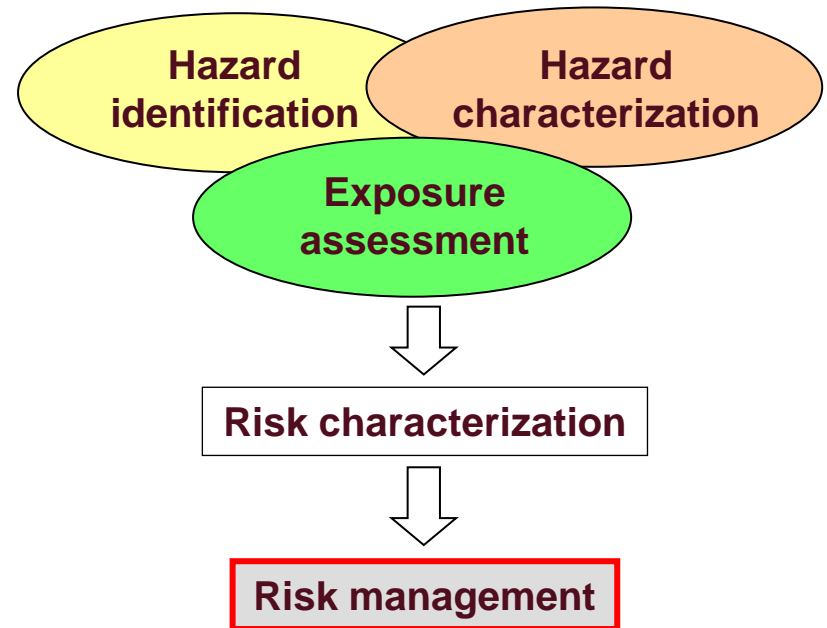
# Canadian Regulatory Framework for Chemical Contaminants

*Several possible measures to mitigate potential health risk from contaminants in foods:*

- **Consumer education:** Issue consumption advice or guidance to Canadians (e.g. [mercury in fish](#)).
  - **Industry guidance:** Encourage the implementation of corrective measures at the production stage (e.g. codes of practice).
  - **Establish maximum levels (MLs):** Limited and used when deemed appropriate.
  - **Targeted monitoring:** In collaboration with CFIA; outreach to manufacturers.
  - **Compliance and enforcement:** Remove the product(s) from store shelves (e.g. CFIA recalls).
- The absence of an ML does not equate to a lack of regulatory oversight (Part I, Section 4(1) of the *Food and Drugs Act*).

# Canadian Regulatory Framework for Chemical Contaminants

- Health Canada employs an internationally recognized risk analysis framework to develop MLs:
- Established for food(s) that may contribute a significant proportion of the dietary exposure (optimal reduction)
- Protective of human health
- Based on sound scientific principles – health risk assessment; ALARA principle; achievability



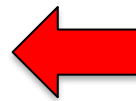


# Canadian Regulatory Framework for Chemical Contaminants

- MLs for chemical contaminants in foods are established in an effort to reduce dietary exposures and when considered the best approach to achieve such reductions.
- Proposed new or updates to existing MLs undergo public consultation prior to adoption.
- MLs are established by Health Canada and are enforceable by the CFIA.
- Existing MLs are currently found in 2 lists:

*List of Contaminants and Other Adulterating Substances in Foods*

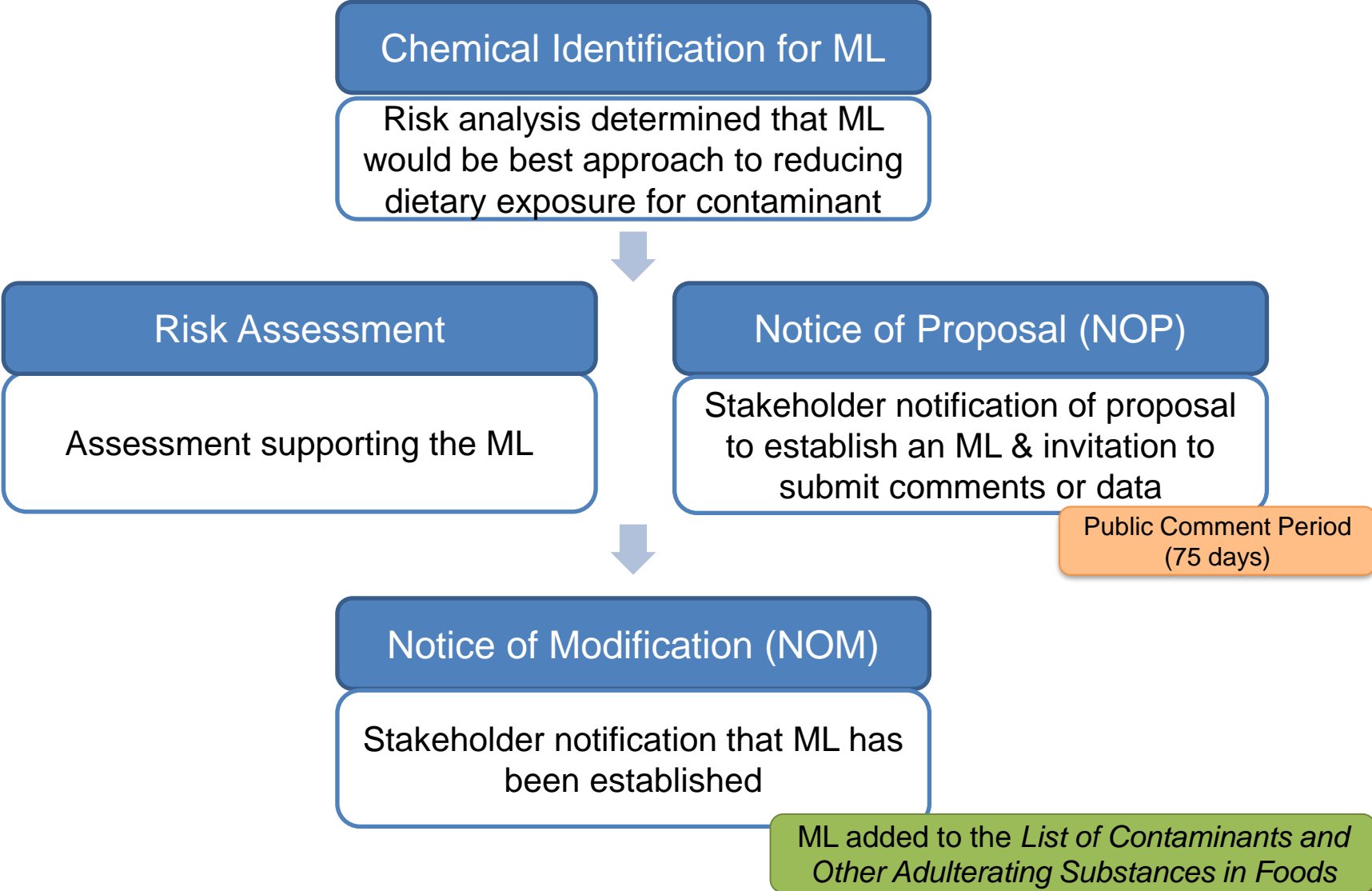
Incorporated by reference (IbR) into Division 15 of the Food and Drug Regulations



*List of Maximum Levels for Various Chemical Contaminants in Foods*

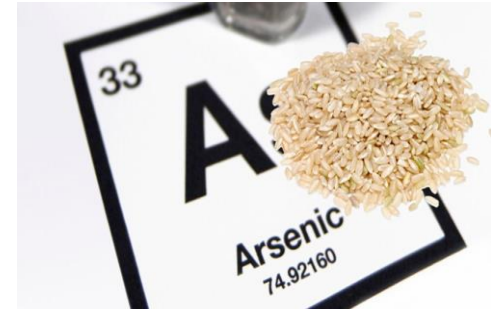
Administrative MLs found on Health Canada's website (non-IbR)

# Canadian Regulatory Framework for Chemical Contaminants



# Updates on Food Standards for Contaminants - Metals

- In June 2020, Health Canada finalised MLs for inorganic arsenic in rice (NOM/ADM C-2020-1):
  - 200 ppb in white (polished) rice
  - 350 ppb in brown (husked) rice
- Consistent with MLs established by the Codex Alimentarius in 2014 and 2016.



Notice of modification: <https://www.canada.ca/en/health-canada/services/food-nutrition/public-involvement-partnerships/modification-maximum-levels-inorganic-arsenic.html>

# Updates on Food Standards for Contaminants - Metals

- In August 2022, Health Canada finalized an ML of 100 ppb inorganic arsenic in rice-based foods intended specifically for infants and young children (NOM/ADM C-2022-2).
- Alignment:
  - European Commission ML for rice destined for the production of foods for infants and young children (Regulation 2015/1006); and
  - U.S. FDA's action level for inorganic arsenic in infant rice cereals.



Notice of modification: <https://www.canada.ca/en/health-canada/services/food-nutrition/public-involvement-partnerships/notice-modification-maximum-level-inorganic-arsenic-rice-based-foods-infants-young-children.html>

# Updates on Food Standards for Contaminants - Metals

- In August 2022, Health Canada finalized MLs for inorganic arsenic in fruit juice and fruit nectar (NOM/ADM C-2022-3):
  - 10 ppb in fruit juice, except grape juice, and fruit nectar except grape nectar
  - 30 ppm in grape juice and grape nectar.
- Aligns with the U.S. FDA's action level for inorganic arsenic in apple juice.

Notice of modification: <https://www.canada.ca/en/health-canada/services/food-nutrition/public-involvement-partnerships/notice-modification-maximum-level-total-arsenic-fruit-juice-nectar/document.html>

# Risk Management for Contaminants – Ethyl Carbamate

- Ethyl carbamate assessed under the Chemicals Management Plan.
- Formed in certain food and beverages during the fermentation process.
- Potential health concern and levels in alcoholic beverages should be minimized.
- Risk management strategies:
  - **Maximum levels:** established under the *List of Maximum Levels for Various Chemical Contaminants* for ethyl carbamate in certain alcoholic beverages.
  - **Industry guidance:** encouraging industry adoption of ethyl carbamate reduction strategies and development of techniques to minimize ethyl carbamate formation.
  - **Targeted monitoring:** in collaboration with the CFIA, continued monitoring of ethyl carbamate levels in fermented foods and in alcoholic beverages.
  - **Consumer education:** consumption guidance to Canadians for sake and fruit brandy and to follow Canada's low-risk alcohol drinking guidelines.

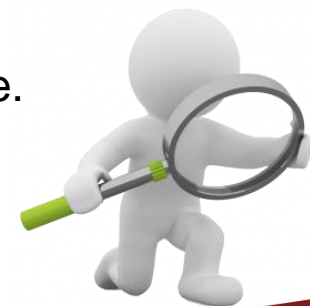
# Other BCS Activities Involving Chemical Contaminants

## Monitoring & Surveillance:

- **Total Diet Study (TDS):** annual surveillance program measuring levels of chemical contaminants in foods typically consumed by Canadians.
- **CFIA Surveys:** annual surveillance programs for chemical contaminants in foods – Food Safety Oversight, Children’s foods Project and the National Chemicals Residue Monitoring Program.

## Dietary Exposure Assessment & Risk Management:

- Occurrence data from HC and the CFIA are used to:
  - Estimate dietary intakes to chemical contaminants based on Canadian consumption data.
  - Observe trends in level of chemical contaminants in food over time.
  - Establish MLs for chemical contaminants.
  - Determine effectiveness of risk management measures.



## International Activities for Contaminants - Metals

- BCS actively participates in on-going international activities related to safety standards for contaminants in foods.

<b>JECFA</b>	
<b>Lead</b>	2022 call for data on lead in spices and herbs; work to continue at CCCF17 (2024).
<b>Arsenic</b>	Inorganic and organic arsenic on JECFA priority list for evaluation.

<b>CCCF</b>	
<b>Lead</b>	Active participant in the 'Maximum levels for lead in certain foods' Working Group.
<b>Mercury</b>	Co-chair for the Methylmercury in fish sampling plan Working Group (with New Zealand). To be presented at CCCF17 in 2024.
<b>General</b>	Chair of 'Prioritization of CCCF Standards for Review' Working Group.



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