Health Canada Santé Canada

Canada

Indoor Air Quality Exposure Limits at Health Canada

Development and Use

Indoor Air Contaminants Assessment Section
Water and Air Quality Bureau
Stephanie Wille and Jocelyn Moore

May 2023

YOUR HEALTH AND SAFETY... OUR PRIORITY.

Outline

- Indoor Air Program at Health Canada
- Prioritization of Indoor Air Contaminants
- Residential Indoor Air Quality Guidelines (RIAQG)
- Indoor Air Reference Levels (IARLs)
- Uses of risk assessment products
- Standards Development

Health Canada's Indoor Air Program

MANDATE

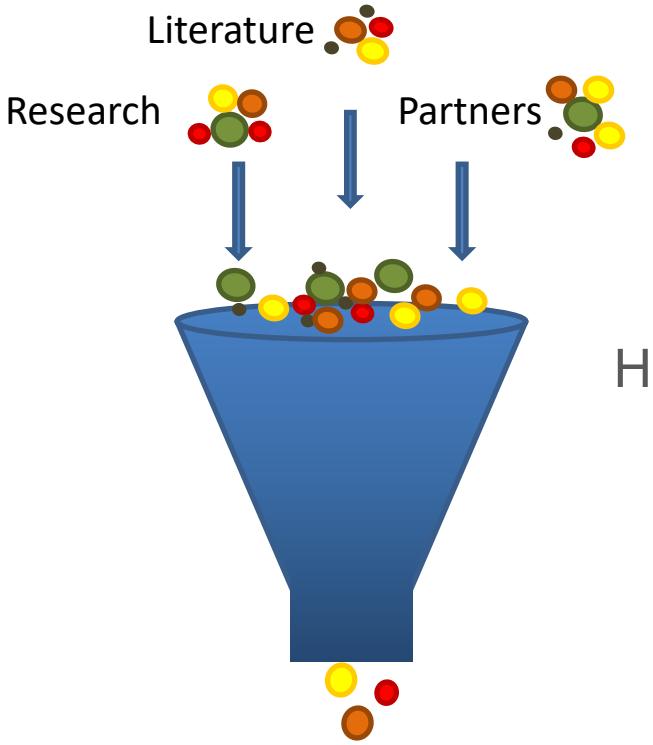
"To promote and protect the health of Canadians by evaluating, researching, and communicating the health effects of indoor air contaminants, and to contribute to developing solutions for improving indoor air quality."

Health Canada's Indoor Air Program:

- conducts **risk assessments** to better understand adverse health impacts of exposure to air pollution;
- leads **health research** to understand exposure and health impacts in the Canadian context;
- conducts **outreach and engagement** on indoor and outdoor air quality to communicate **guidance and strategies** to reduce exposure.

IACAS Risk Assessment Prioritization

Purpose: to identify, screen and rank indoor air contaminants for full assessment



Develop List of Indoor Air Contaminants

Health-risk based prioritization

Determine action for each priority contaminant

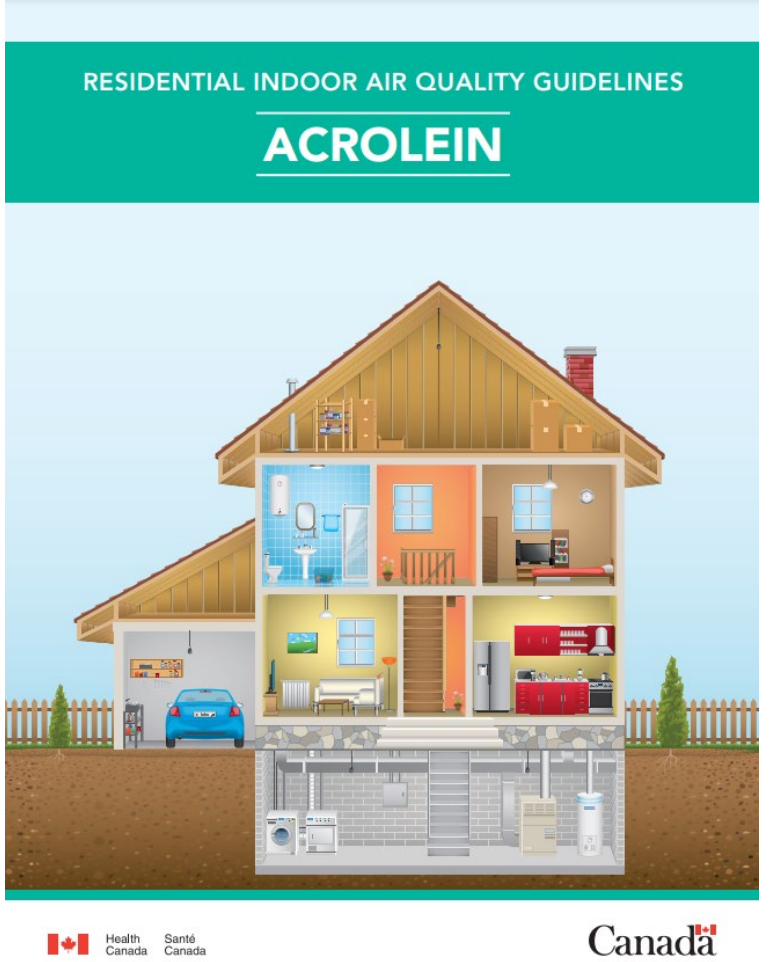
- Recently published inhalation health effects data
- Canadian exposure data (e.g. Health Canada residential studies)

- Consider data gaps, government priorities, stakeholder needs
- Possible outcomes include RIAQG, IARL, need for data, re-evaluation

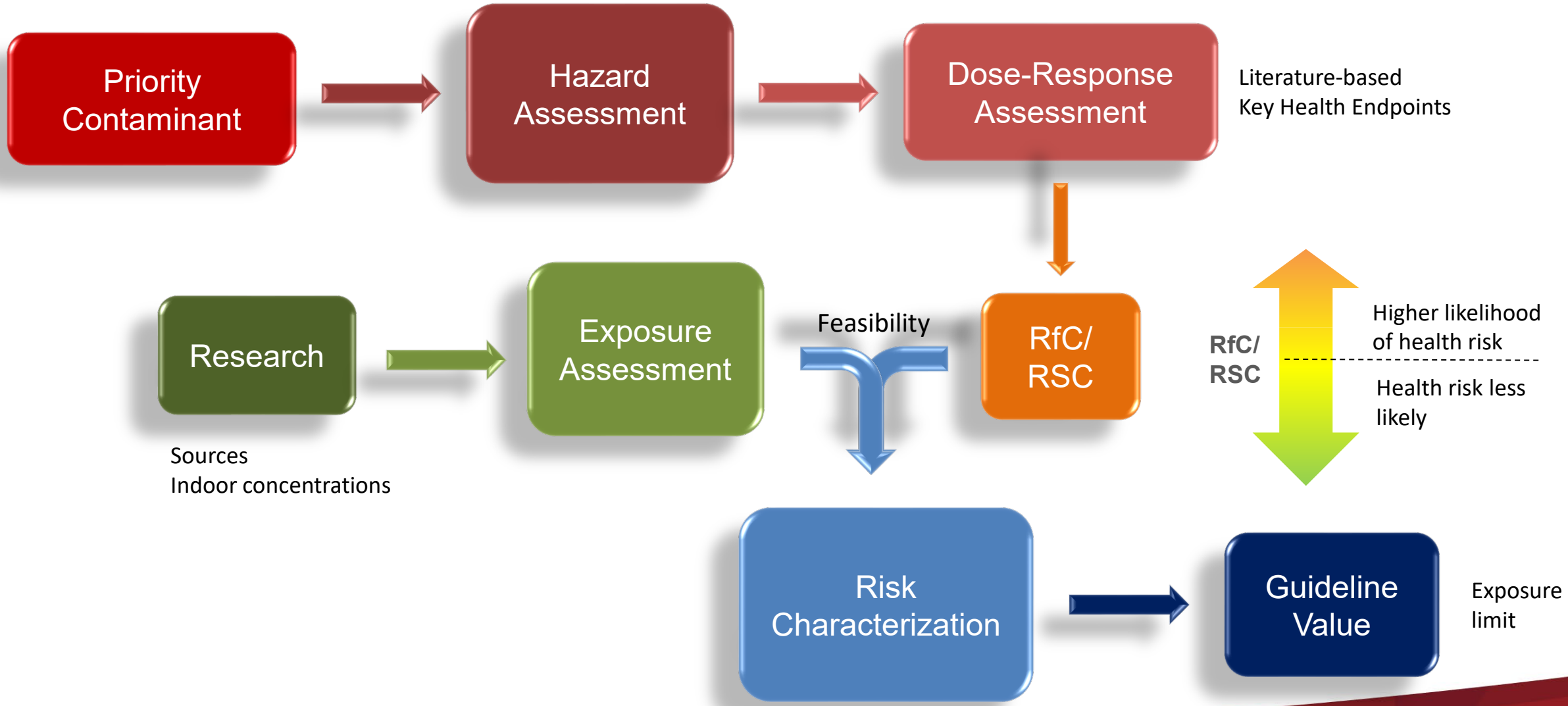
Residential Indoor Air Quality Guidelines

Residential Indoor Air Quality Guidelines (**RIAQGs**) are voluntary objectives under the *Canadian Environmental Protection Act* (*CEPA 1999*)

- Contain calculated **health-based exposure limits**, using currently available scientific data
- Take into account **highly exposed and susceptible populations**
- Used to **characterize risk** and **provide scientific basis** for risk mitigation recommendations to reduce exposure and/or protect health



Risk Assessment (RIAQG)



Guidelines and Guidance for Indoor Air Contaminants

Guidelines

- Acetaldehyde (2017)
- Acrolein (2021)
- Carbon Dioxide (2021)
- Carbon Monoxide (2006)
- Formaldehyde (2006)
- Naphthalene (2013)
- Nitrogen Dioxide (2015)
- Ozone (2010)
- Radon
- Toluene (2011)
- Xylenes (2022)

Guidance

- Benzene (2013)
- Fine Particulate Matter ($PM_{2.5}$) (2012)
- Mould (2007)

Indoor Air Reference Levels (IARLs)

- Supplement to RIAQGs
- **Evaluation of inhalation Toxicological Reference Values** (TRVs) and hazard assessments from other jurisdictions
- Include **cancer and non-cancer endpoints**
- Regularly updated
- Advantages
  - Rapid screening
  - May be used for establishing product emission standards
- Limitations
  - Not Health Canada risk assessments
  - Only chronic endpoints

SUMMARY DOCUMENT
Indoor Air Reference Levels for Chronic Exposure to Volatile Organic Compounds

IARLs

Chloroform
Cyclohexane
Dichloromethane
Epichlorohydrin
Ethylbenzene
Ethylene oxide
Isopropyl alcohol
Isopropylbenzene
1,3-Butadiene
1,4-Dichlorobenzene
2-Butoxyethanol
2-Ethoxyethanol
3-Chloropropene
Acetone
Aniline
Carbon tetrachloride
Methyl ethyl ketone
Methyl isobutyl ketone
Propionaldehyde
Propylene oxide
Styrene
Tetrachloroethylene
Toluene diisocyanate

**Updated as RIAQGs: Acrolein, Acetaldehyde, Xylenes*

Uses for our Risk Assessment Products

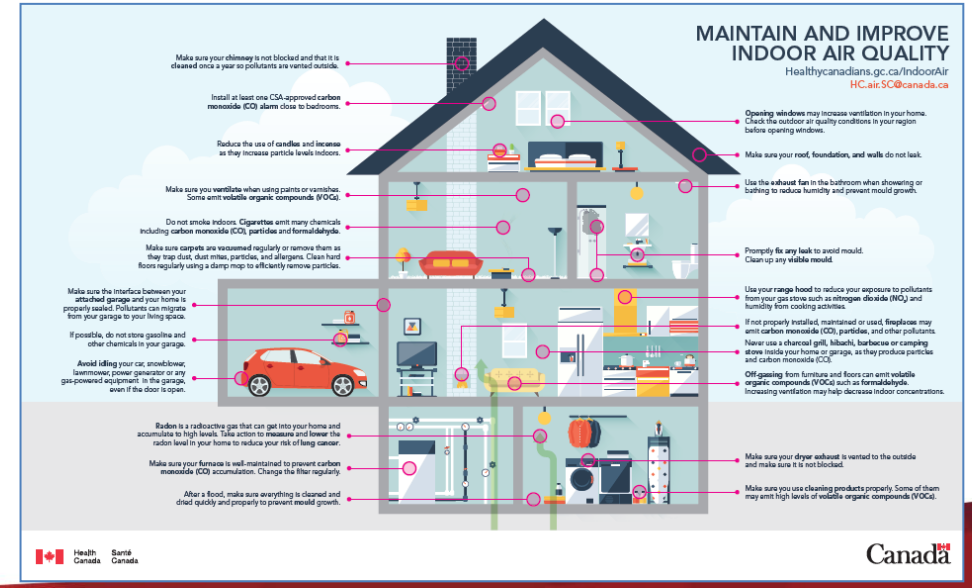
- Communication and outreach products
  - Risk mitigation strategies to reduce exposure for people who live in Canada

- Guidance for public spaces and air health issues
  - Monitoring and response framework
  - Triggers for action (e.g., ventilation schedules in ice arenas)

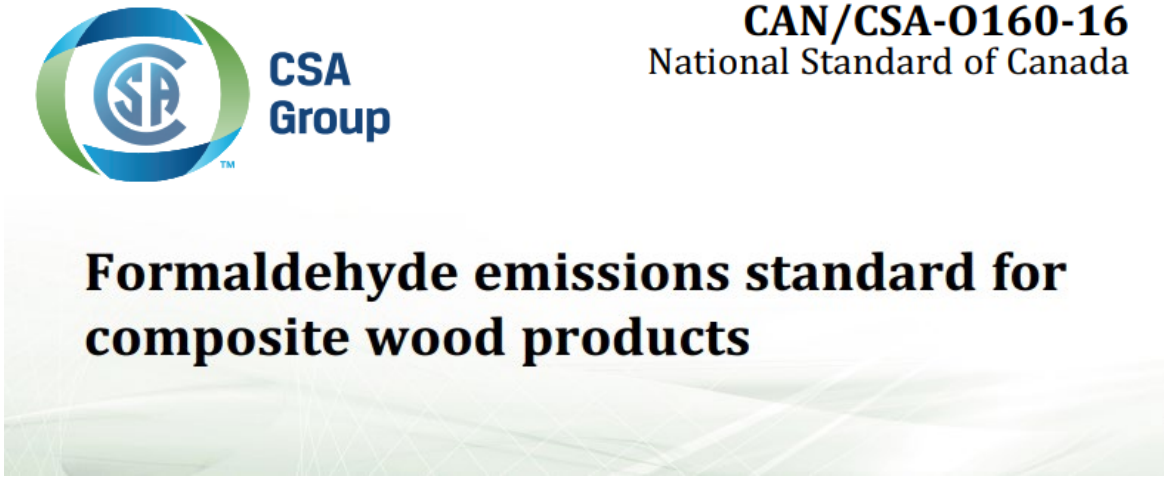
- RIAQGs/IARLs as benchmarks for RAs within the federal, provincial and territorial governments

- Inform research priorities
  - Identify susceptible and highly exposed people
  - Testing of risk mitigation strategies

- Building codes and product standards



Standards Development: Formaldehyde



- Consistent with CARB (ATCM) 93120
- Testing in accordance with ASTM E1333 or ASTM D6007
- Health Canada included in Technical Committee

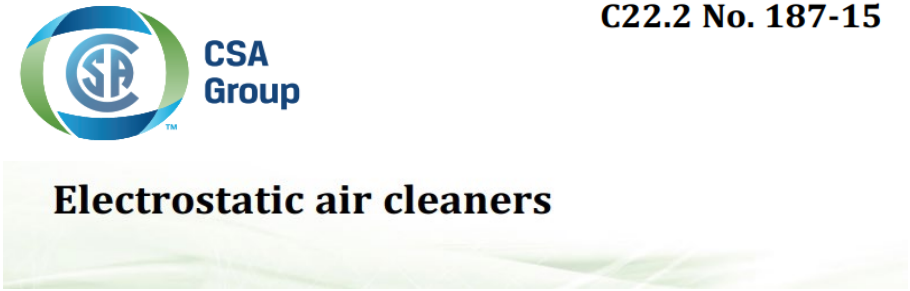
- Long-term guideline value from RIAQG for formaldehyde was the basis for maximum allowable chamber concentrations
- Exposure studies and emission testing supported the potential benefit
- CSA standard was the foundation of the *Formaldehyde Emissions from Composite Wood Products Regulations* (enacted 2021)

Other standards

Carbon Monoxide Alarms

- Inclusion of low-level CO display, with action recommendations that align with RIAQG
- Follow-up included infographics and *Detect to Protect* retail campaign

Electrostatic Air Cleaners



- RIAQG for Ozone (20 ppb) included as a recommendation to reduce exposure *(unable to meet health-based guideline)*
- Follow-up included *Choosing A Portable Air Purifier*

For More Information

- Health Canada's Residential Indoor Air Quality Guidelines

  https://www.canada.ca/en/health-canada/services/air-quality/residential-indoor-air-quality-guidelines.html

- Subscribe to HC air mailing list:

  air@hc-sc.gc.ca

- Direct email:

  Stephanie.wille@hc-sc.gc.ca Jocelyn.moore@hc-sc.gc.ca

Acknowledgements

- Staff and management from the Water and Air Quality Bureau in the Safe Environments Directorate of Health Canada